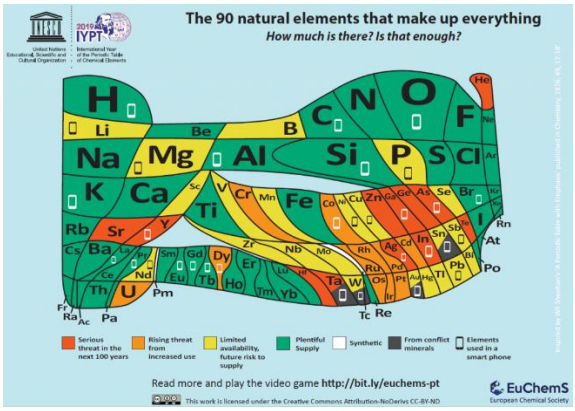
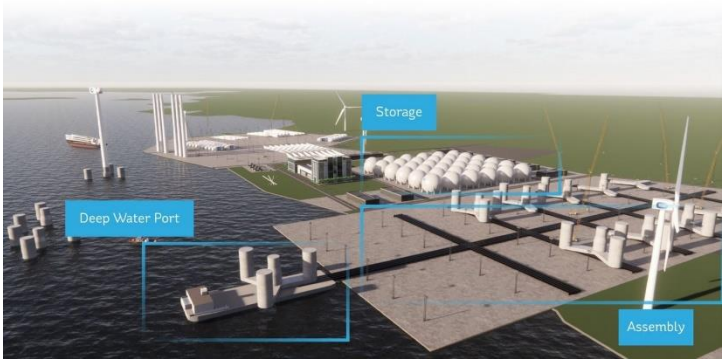
Irish Chemical News

A Journal of the Institute of Chemistry of Ireland

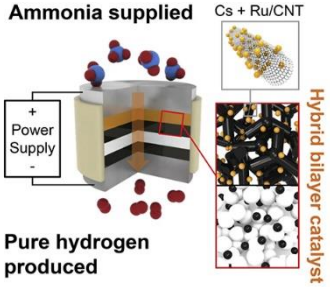
The Next big Challenge for Humanity – Carbon. Getting Alternatives - Hydrogen, Solar Energy, Wind Power, Li Batteries, Storing Electricity, Fuel Cells, Carbon Capture, Fusion Power, Bio-Fuels





irishtimes.com

urce: University of Illinois at Urbana-Champaign



Lim et al., Joule 4 1-10 (2020).

Institiúid Ceimice na hÉireann
The Institute of Chemistry of Ireland
ICI Centenary 1922-2022
Patron: Michael D. Higgins, President of Ireland
The Professional Body Representing Chemists in Ireland

Ravensdale Road, Dublin D03 CY66.

Web: www.instituteofchemistry.org

Contents:

New email for the Editor: editor@instituteofchemistry.org

Note: Opinions expressed in this Journal are those of the authors and not necessarily those of the Institute.

Sponsors:-


PREMIER
PUBLISHING & EVENTS


Henkel
Excellence is our Passion


LABPLAN


PerkinElmer
For the Better


Advion


Fisher Scientific


SIGMA-ALDRICH


Chemglass
Life Sciences


MASON
TECHNOLOGY


Megazyme


Waters
THE SCIENCE OF WHAT'S POSSIBLE.™


Agilent Technologies


IDA
IRELAND


LENNOX


CSCB
Centre for Synthesis
& Chemical Biology


ENTERPRISE
IRELAND


GPE
SCIENTIFIC LIMITED


UCD
DUBLIN


RCSI


Gute Chemie
abcr

RCSI
ROYAL COLLEGE OF SURGEONS IN IRELAND
COLÁISTE RÍOGA NA MÁINLEÁ IN ÉIRINN

A Message from the President

Dear Fellows, Members, Graduates and Associates,

I sincerely hope that you and your families are all keeping safe and well. Isn't it so heartening to see the daily increases in numbers of people being vaccinated? As the vaccination programme continues to be rolled out, we can all begin to genuinely look forward with hope and anticipation as more of us and our loved ones benefit from the protection the vaccine provides.

Our editor, Dr Patrick Hobbs, is to be congratulated once again for putting together yet another excellent issue of the Irish Chemical News. He has provided a comprehensive editorial so I shall focus my message predominantly on our recent ICI award ceremony.

First, as you know, we hosted a virtual ICI Award Ceremony on Thursday, 29th April, 2021. We are grateful to all those who presented and also to all those who attended. A special congratulations to Professor AP De Silva from QUB, recipient of the ICI Boyle Higgins Gold Medal and Lecture Award 2020, who delivered an inspirational award lecture on *'Fluorescent Sensing and Logic Systems'*. Professor De Silva has kindly agreed for us to share a recording of this lecture, which will be published shortly on the ICI website. Congratulations also to Dr Conor Crawford, one of the ICI Postgraduate awardees in 2020. Conor delivered an insightful presentation into his quest for a cryptococcal vaccine. Unfortunately, the other ICI Postgraduate awardee in 2020, Dr Priyanka Ganguly, was unable to present her award lecture due to circumstances beyond her control but we were delighted that one of her supervisors, Professor Suresh Pillai, stepped in at short notice. Professor Pillar provided a wonderful insight into Priyanka's research and outreach contributions. We wish Conor and Priyanka continued success. The call is now open to submit nominations for both the ICI Boyle Higgins Gold Medal and Lecture award 2021 and the ICI Postgraduate Award 2021 with a deadline date of Friday, 18th June, 2021. I would encourage you please to submit nominations. This is an excellent opportunity to acknowledge our colleagues and postgraduate scholars who are achieving excellence in their respective fields.

During the award ceremony, we also announced the recipient of the ICI David Brown Award – Professor Nicholas Farrell, Virginia Commonwealth University, USA. Our warmest congratulations to Professor Farrell who has significantly contributed to the field of bioinorganic chemistry. Professor Farrell delivered an outstanding award lecture entitled '*Inorganic Drugs - Away from DNA and Back*?' during the Inorganic Ireland Symposium, which was hosted recently by Dr Constantina Papatriantafyllopoulou and local organizing committee, NUIG. Professor Farrell, a UCD graduate, brought the first non-classical platinum anti-cancer drug to late stage clinical trials some years ago. It is heartening to see that he is still pushing the boundaries in this important field.

The ICI Young Chemists' Network (YCN) is continuing to work hard to support our young chemists as outlined by Dr Mark Kelada during the award ceremony. For those interested in learning more about the ICI YCN, please check the website for updates https://www.chemistryireland.org/young-chemists-network and also follow them on Twitter: @ICIYCN and on Facebook: https://www.facebook.com/ICIYoungChemists/about

I was particularly pleased, during the award ceremony, to acknowledge Dr Raymond Leonard's enormous contribution to the ICI which spans over half a century. We wish Dr Leonard continued good health and happiness as he retires from Council. Dr Eoghan McGarrigle, Council member and assistant honorary treasurer, is also stepping down from Council, having served on Council for a number of years. We sincerely thank Dr McGarrigle for sharing his expertise on Council and we likewise wish him continued happiness and success. I am delighted to say that Professor Michael Lyons, Head of the School of Chemistry, TCD, will be joining us on Council following his election onto Council during the ICI AGM, which was held immediately following the award ceremony. We are very much looking forward to working with Professor Lyons and availing of his expertise and experience.

A special word of congratulations to Professor Dervilla Donnelly, Emeritus Professor of Phytochemistry, UCD, who was awarded an honorary ICI Fellowship during our AGM which she so richly deserves. Professor Donnelly has not only had a highly distinguished career in academia but has also contributed significantly to the wider community serving in a variety of leadership roles.

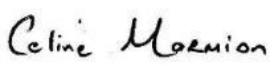
I am also pleased to acknowledge Prof John Wenger, Professor of Chemistry and Director of the Centre for Research into Atmospheric Chemistry, UCC, who has recently been appointed to the Environmental Protection Agency's Advisory Committee. It is wonderful that Chemistry is being represented and I have no doubt that Professor Wenger will play an instrumental role in shaping policies and practices in this important field.

Since the last ICN issue, and following an external, independent review of nominations submitted for the ICI Annual Award for Chemistry (Eva Philbin Public Lecture Series) 2020, I am delighted to note that Professor Declan Gilheany is the 2020 award recipient. We are very much looking forward to Professor Gilheany's public lectures which he plans to deliver in the near future, most likely virtually. These will be publicized in advance on the ICI website and via email to all ICI members.

Finally, may I pay a special words of thanks to Dr Peter Childs for providing a fascinating paper which is published in this issue on the Irish Seaweed Industry 18th – 21st Century. Dr Childs was awarded an ICI honorary fellowship in 2020.

Please do not hesitate to get in contact if you would like the Institute to showcase any updates that you may have both in the ICN and under the 'Latest News' section on our website https://www.chemistryireland.org/latest-news

On behalf of Council, may I wish you all continued good health and happiness.



Professor Celine J. Marmion PhD FRSC FICI
President, Institute of Chemistry of Ireland
21st May, 2021

Editorial

As we enter May and summer approaches we have 4 approved Covid-19 vaccines being widely administered and hospital admittance and deaths have decreased dramatically. There are some concerns as daily new infections have plateaued which is likely linked to social behaviour. The success of the vaccines being available in a year is a great testament to the scientists and medics who cooperated across all disciplines on an international level to give us this success. There are some concerns with the viral vector vaccines and very rare blood clots which seem to affect women more than men and we don't yet understand why. There are also concerns with supplies. Manufacturing new vaccines on short timelines is a major challenge, in some cases with shortages of raw materials such a nucleic acids which are mainly manufactured in the US who still ban exports.

AstraZeneca/Oxford in particular have problems supplying the expected quantities. They are new to vaccines manufacture and have mainly been a cancer drug company. The manufacturing process is biological and variability is to be expected. Knowhow and experience is vital especially when manufacturing at multiple locations and coordinating all this activity at the contract manufacturing organisations. They have set the goal of supplying at cost which is admirable. In my opinion the EU suing in European courts is not helpful and could discourage future risky efforts by pharmaceutical companies. There is a lot of talk in the news feeds about suspending Intellectual Property rights and Patents on the vaccines. I believe this could have unintended consequences and act as a disincentive to pharma companies to develop vaccines for future pandemics given the time efforts and costs involved. Some things that may be popular with public opinion may not be so good for populations in the long term. Licensing agreements would likely be a better option which I understand is happening anyway.

I have tried to capture papers on the manufacturing processes for both the new mRNA and the adeno vector virus vaccines along with specific technical topics such as plasmid production, cell free manufacture mainly in Addenda so as not to disrupt the time flow of articles. Most of us traditional chemists do not have a great knowledge of biological processes. As biologics become a greater focus of new medicines there is a need in chemical education for more endeavours to include training in biological pharmaceutical production processes.

Other technical topics focusing on the biochemistry of the virus are Angiotensin-converting enzyme 2 (ACE2), Post-Translational Modifications, SARS-CoV-2 Nucleocapsid (N) protein which is heavily glycosylated and a focus of future vaccines against variants. Previously I had found the sequence code for Pfizer's mRNA vaccine via the WHO but could not get the code for Moderna. A clever research group have de-convoluted the code from traces of the vaccines in used vials and while it is similar to Pfizer's there are differences.

On-line seminars and conferences are now well established and the Institute is no exception. We successfully held our awards ceremony on April 29th and followed later with our AGM. A link to the Awards is on page 17. EuChemS is also active and I attended an on-line workshop with 250 attendees title "The Carbon Element" where the focus was on the scientific and technological challenges of decarbonisation. Links to the sessions are on page 34. EuChemS will run future workshops in a series on the elements and lithium was voted as the next element for a workshop. The Irish Mass Spectroscopy host the "The International Mass Spectrometry School (IMSSc)" in Belfast later in August - page 25. EUROVARIETY 2021 on-line Conference will be held in July in Slovenia page 35.

Our most prolific contributor Dr Peters Childs has written a fine paper titled “From Soap to Ice-cream: the Irish Seaweed Industry 18th – 21st Century” which is a fine historical read on the early chemical industry in Ireland.

The Irish University & 3rd Level Chemistry News section still needs some work but two significant events have happened which are:

1. Waterford and Carlow ITs have applied for University status. The aim of the Technological University of South East Ireland (TUSEI) consortium is that the TU – yet unnamed but with the working title of TUSEI – will be established on 1 January 2022.

2. Limerick and Athlone ITs designated - The Midlands & Mid-West Technological University have been granted University status. It’s not clear that this will be the final name.

The Institute of Chemistry of Ireland’s Young Chemists’ Network is active and now have a full committee – see page 18.

The Institute’s Nominee Prof John Wenger, Professor of Chemistry at University College Cork has appointed to Environmental Protection Agency’s Advisory Committee.

Despite the pandemic and lock downs science and chemistry publications continue at a high rate alongside thousands of publications on the corona virus. The European chemistry journal ChemPubSoc Europe has been renamed Chemistry Europe and some information on this is in this Issue. The last year has seen unpresented open access to journals in particular to papers in reputable science and medical journals relating to the SARS CoV-2 epidemic and the many pages in this Issue would not be possible without this access. Other popular science magazines and reputable newspapers allowing access to many articles but do carry advertising and look for donations but you don’t have to subscribe but be thankful for the access. I have included papers from preprint servers but these are not peer reviewed so caution is needed.

As the developed countries near an end to the Corona-19 crisis another bigger one looms, affecting everyone and there will be no vaccine this time. This is the Climate Crisis. Chemists, physicists and engineers are working hard to find solutions and there is much work under way to address the crisis. There are many examples in this Issue. Hydrogen or green hydrogen is one which may lead to the possibility of hydrogen powered ships, aircraft and land based transport either directly or via fuel cells, Solar energy with better chemistry and efficiency in solar cells, Off Peak storage of electricity in better batteries such as Li and even better sodium batteries or efficient capacitors to support peak demand. Progress on fusion power is happening and one company in the US has come up with a novel design and are progressing to a pilot plant. Unfortunately commercial fusion reactors are some way off yet. On top of the climate problem there is the micro plastics problem in our waters, oceans and even in Antarctica glaciers.

There are lots of other exciting chemistry topics peppered throughout the Chemistry and related Science around the World section so enjoy browsing this material. Last word, antigen self-testing is controversial and briefly reported but no objective assessment is available here yet but some UK reports are not encouraging so maybe for next Issue. Again there is a need for caution with self-use of these antigen tests.

Comments and Responses are welcome and can be sent a **new Editor Email address: -**

editor@instituteofchemistry.org

Patrick Hobbs MSc, FICI, CChem, CSci, MRSC.
Editor

The Institute of Chemistry of Ireland Awards

The ICI Boyle Higgins Gold Medal and Lecture Award
The ICI Annual Award for Chemistry (Eva Philbin Public Lecture Series)
The ICI Postgraduate Award

The Boyle Higgins Gold Medal and Lecture Award

The Boyle Higgins Gold Medal and Lecture Award, instituted in 1985, is an award for research work carried out in chemistry under the headings: (a) Pure Chemistry, (b) Applied and Industrial Chemistry or (c) Chemical Education. The award recognizes a chemist **of any nationality working in Ireland or a chemist who is an Irish citizen working overseas** who has made **an outstanding and internationally recognised research contribution to the advancement of chemistry.** A person nominated for this award must be a member of the Institute at the time of nomination or upon receipt of the award.

Nomination process: The nominator shall indicate in writing to the President of the Institute the category which applies to their nominee and they shall submit by email one electronic copy which will include a brief statement outlining the reasons for the nomination, together with a CV (maximum 3 pages) of the nominee. Nominations will be externally reviewed by two independent referees, who are recognised experts in the category and who are not nominators.

The ICI Annual Award for Chemistry (Eva Philbin Public Lecture Series)

This award is for a practising chemist, who has made a significant contribution to the advancement of chemistry and has considerably raised the profile of chemistry through both the excellence of their work and their ability to communicate in an effective and lucid manner. **The recipient, who may be an Irish or international chemist of repute,** will present lectures in three locations in Ireland (including Dublin), which will be open to the public. A person nominated for this award must be a member of the Institute at the time of nomination or upon receipt of the award.

Nomination process: The nominator shall send one electronic copy of their nomination by email to the President of the Institute, which will include a cover letter providing a brief statement outlining the reasons for the nomination, together with a CV (maximum 3 pages) of the nominee. Nominations for this award will be externally reviewed.

The ICI Postgraduate Award

The nominee must be **a registered PhD student in any Chemistry discipline working in an Irish Higher Education Institution**. They must have demonstrated excellence in research through publications. They must also have demonstrated a commitment to supporting and promoting Chemistry within their Institution (e.g. through active participation in public engagement initiatives). A person nominated for this award must be a member of the Institute at the time of nomination or upon receipt of the award.

Nomination Process: The nominator, who must be the student's PhD supervisor, shall send one electronic copy of their nomination by email to the President of the Institute, which will include a cover letter providing a brief resume of the reasons for the nomination, together with a CV (maximum 2 pages) of the nominee.

For these awards and others see ICI website https://www.chemistryireland.org/awards-events

Nominations to be sent to the ICI President at: president@instituteofchemistry.org

The Institute of Chemistry of Ireland
is delighted to announce the call for nominations for the following prestigious ICI award:

The ICI Boyle Higgins Gold Medal and Lecture Award 2021

Deadline for receipt of nominations: Friday, 18th June, 2021

The Boyle Higgins Gold Medal and Lecture Award 2021

The Boyle Higgins Gold Medal and Lecture Award, instituted in 1985, is an award for research work carried out in chemistry under the headings: (a) Pure Chemistry, (b) Applied and Industrial Chemistry or (c) Chemical Education. The award recognizes a chemist **of any nationality working in Ireland or a chemist who is an Irish citizen working overseas** who has made **an outstanding and internationally recognized research contribution to the advancement of chemistry.** A person nominated for this award must be a member of the Institute at the time of nomination or upon receipt of the award.

Nomination process: The nominator shall indicate in writing to the President of the Institute the category which applies to their nominee and they shall submit by email one electronic copy which will include a brief statement outlining the reasons for the nomination, together with a CV (maximum 3 pages) of the nominee. Nominations will be externally reviewed by at least two independent referees, who are recognized experts in the category and who are not nominators.

Nominations to be addressed to the ICI President, Professor Celine Marmion and sent by email to: secretary@instituteofchemistry.org

ICI website: http://www.chemistryireland.org

The Institute of Chemistry of Ireland

is delighted to announce the call for nominations for the following prestigious ICI award:

The ICI Postgraduate Award 2021

Deadline for receipt of nominations: Friday, 18th June, 2021

The nominee must be **a registered PhD student in any Chemistry discipline working in an Irish Higher Education Institution**. They must have demonstrated excellence in research through publications. They must also have demonstrated a commitment to supporting and promoting Chemistry within their Institution (e.g. through active participation in public engagement initiatives). A person nominated for this award must be a member of the Institute at the time of nomination or upon receipt of the award.

Nomination Process: The nominator, who must be the student's PhD supervisor, shall send one electronic copy of their nomination by email to the President of the Institute, which will include a cover letter providing a brief resume of the reasons for the nomination, together with a CV (maximum 2 pages) of the nominee.

Nominations to be addressed to the ICI President, Professor Celine Marmion and sent to: secretary@instituteofchemistry.org

ICI website: http://www.chemistryireland.org/

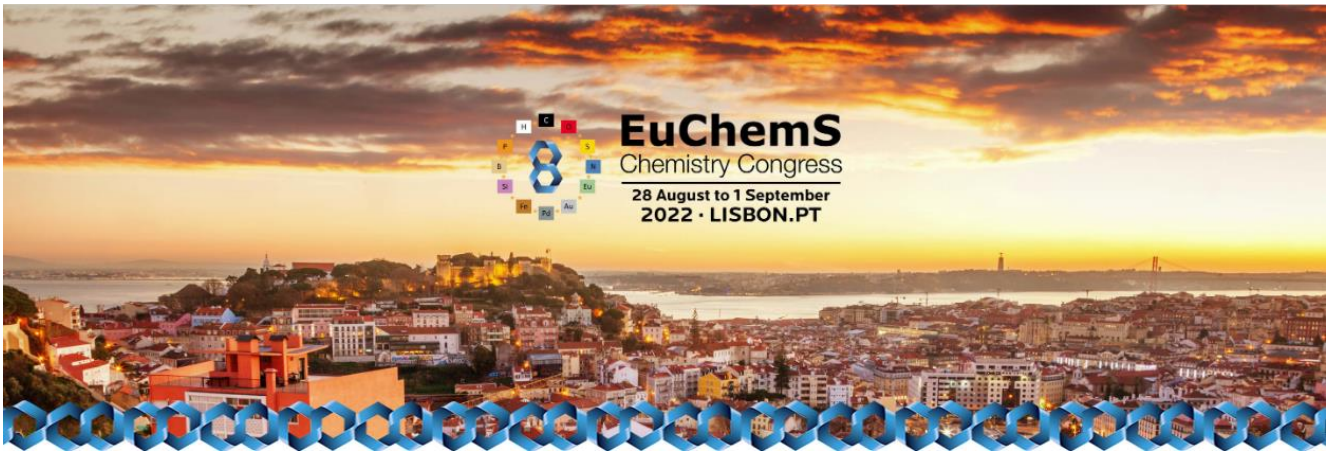
Previous ICI Postgraduate Awardees:

2020: Dr Priyanka Ganguly (currently Marie Curie Early Stage Researcher, University of Glasgow, Scotland)

2020: Dr Conor Crawford (currently postdoctoral researcher, Max Planck Institute of Colloids and Interfaces, Berlin, Germany)

2019: Dr Saoirse Dervin (currently Marie Curie Early Stage Researcher, University of Glasgow, Scotland)

2018: Dr Adele Gabba (currently post-doctoral associate, Marie Skłodowska-Curie individual fellowship, LectiNet- Kiessling Group, Massachusetts Institute of Technology, US)



Postponed to August 28, 2022

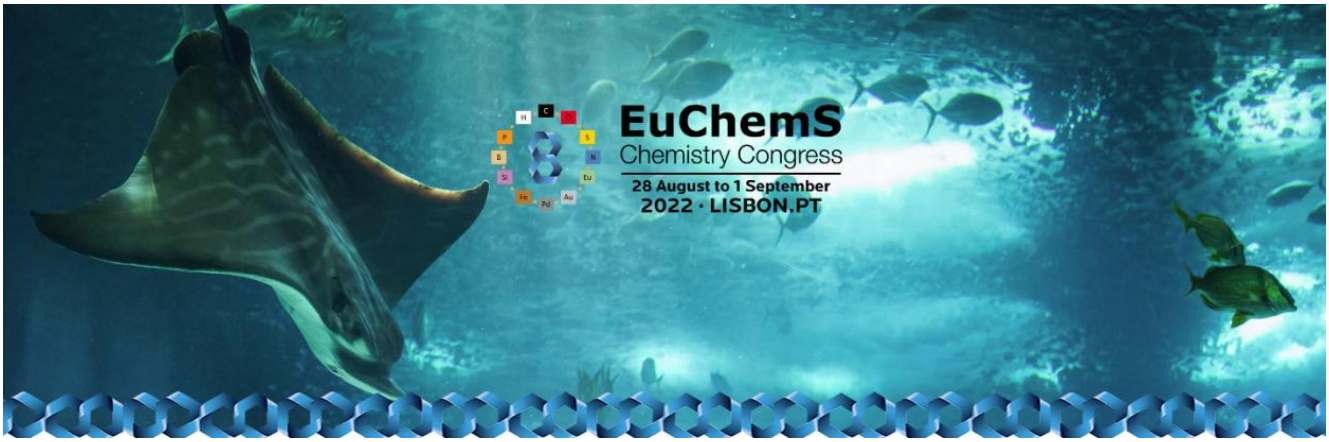
"The COVID-19 pandemic that so deeply affects our lives and countries is not expected to end soon, and its consequences will be felt for a long time. In particular, satisfactory conditions for international scientific conferences to take place will certainly not be fulfilled in the next months. We are thus forced to postpone the 8th EuChemS Chemistry Congress. On the 3rd of May, 2020 the Executive Board of EuChemS, in consultation with the Scientific and Organizing Committee in Portugal were able to settle on a new date for the 8th EuChemS Chemistry Congress.

This was no easy decision but was a necessary one, and the only appropriate option, given the enormous material and immaterial compromise already assumed by the local organization. We praise our supporters and all the body of EuChemS, in particular the organizers of the forthcoming event on the series, for joining the Portuguese Chemical Society (SPQ), with the support of the Portuguese Electrochemical Society (SPE), in the announcement of the new date of 8th EuChemS Chemistry Congress (ECC8), to be held in **Lisbon, Portugal, from August 28 to September 1, 2022".**

Congress Program

Loyal to the initial theme, the 8th EuChemS Chemistry Congress will be built under the unifying theme of **Chemistry the Central Science**. The focus will remain on the central role of chemistry at the interfaces with biology, material and environmental sciences, both for the progress of humankind and for the solution of fundamental problems of modern societies. Some changes will be indeed introduced since nothing remains the same after the enormous test to which we are all being submitted. For the time being, we are still working on an exciting scientific program led by world-class experts, that will develop around the main scientific previously selected.
All previously submitted contributions will not be processed without notice to the 2022 ECC8

program. An opportunity for updating your contributions will be announced in due time. We will keep your pre-registration in our files so that we may send you further information in due time. If you do not agree, please let us know (by a simple e-mail to euchems2020@chemistry.pt) and we will delete your full record. Nevertheless, we hope to see you all in Lisbon in 2022, for celebrating the continuation of this regular series of EuChemS Chemistry Congresses.



Cancellation Procedure and Refund policy

Registrations completed before congress postponement, will remain valid for the 2022, 8th EuChemS Chemistry Congress, if desired. Participants who want a refund, **must cancel their participation by June 30** addressing their request to euchems2020@chemistry.pt. Refunds will be handled promptly with no charges.

Registration is temporarily suspended and will reopen during **2021**.

(https://euchems2022.eu)

EuChemS
European Chemical Society

9th EuChemS European Chemistry Congress to be held in 2022 in Dublin, Ireland, deferred to 2024

At the meeting of its Executive Council, The European Chemical Society (EuChemS) executive awarded the 9th EuChemS European Chemistry Congress to Dublin. This prestigious congress is held every two years and brings together the leading researchers and industry partners in all chemistry disciplines from across Europe and the wider international arena.

Ireland Section

The organisers expect over 1,500 delegates from around the globe to attend the event in The Convention Centre Dublin, in 2024. The five-day programme will consist of plenary and parallel lectures, poster sessions, symposia, networking events, and an industrial exhibition.

The European Chemical Society, was official announced at ECC7 in Liverpool, August 2018. Formerly (2004–2018) the European Association for Chemical and Molecular Sciences (EuCheMS) and before that (1970–2004) the Federation of European Chemical Societies (FECS).

The European Chemical Society (EuChemS) coordinates the work of almost all the European Chemical Societies. As an organization, it provides an independent and authoritative voice on all matters relating to chemistry, and places chemistry at the heart of policy in Europe. Furthermore, EuChemS seeks to develop its members through various activities, workshops and awards.

Under the new EuChemS the next Congress, ECC8 will be hosted by **The Portuguese Chemical Society** (SPQ), with the support of the **Portuguese Electrochemical Society** (SPE), invites you to attend this must go to series of European chemistry conferences, the **8th EuChemS Chemistry Congress (8ECC)**, to be held in Lisbon, Portugal, from 28th August to 1st September, 2022.

CHEMISTRY in Europe
Newsletter for European Chemistry, published by EuChemS

Chemistry in Europe

Chemistry in Europe is a EuChemS quarterly publication mainly intended for an audience of chemists, but everyone is welcome to subscribe! Its objective is to inform about research in Europe, to provide updates from EuChemS Member Organisations, and to look into policy-related developments.

Chemistry in Europe 2021 – 1

"Light at the end of the tunnel"
Welcome words from the new EuChemS President - *Floris Rutjes*

EuChemS President 2021 – 2023

Available here: https://www.euchems.eu/newsletters/chemistry-in-europe-2021-1

Prof Pilar Goya (Spain) retires as President and the Institute would like to thank her for her leadership and dedication of EuChemS and her understanding of the impact of Covid-19 pandemic on the Institute's plans to host the EuChemS Chemistry Congress in 2022 and finding a resolution of the issues in moving to 2024.

Institute of Chemistry of Ireland Annual Award Ceremony 2021 Hosted online onTeams, Thursday 29th April

Institute of Chemistry of Ireland Annual Award Ceremony and AGM	
Thursday, 29th April, 2021 Virtually (MS Teams) MS Teams invitation will be sent directly by email to those who have registered their attendance **Registration via email to Ms Yuan Ge (yuange@rcsi.ie)** **no later than Monday, 26th April, 2021** (Please indicate if you will be attending the ICI award ceremony or ICI AGM or BOTH as there will be a separate MS Teams invitation for each event – please note *only ICI members can attend the AGM*)	
16.00-16.20	**Welcome, ICI Update and ICI Presentation to Dr Raymond G. Leonard, ICI Past President and Council member on the occasion of Dr Leonard's retirement from Council** Professor Celine Marmion, ICI President
16:20-16:35 16:35-16:50	**ICI Postgraduate Awardee 2020 Lectures** *'Photocatalytic application of ternary chalcogenide based Titania composites'* **Dr Priyanka Ganguly** Marie Curie Early Stage Researcher, University of Glasgow, Scotland *'A quest for a cryptococcal vaccine'* **Dr Conor Crawford** Postdoctoral Researcher, Max Planck Institute of Colloids & Interfaces, Berlin, Germany
16.50-17.00	**ICI Young Chemists' Network (ICI YCN) – Update** Dr. Mark Kelada, Chair, ICI YCN
17.00-17.50	**ICI Boyle Higgins Gold Medal and Lecture Award 2020** *'Fluorescent Sensing and Logic Systems'* **Professor Amilra P. de Silva** School of Chemistry and Chemical Engineering, Queen's University Belfast
17.50-18.00	**Closing Remarks** Professor Celine Marmion, ICI President
18.00-18.30	**BREAK**
18.30-19.15	**Annual General Meeting (AGM)** All ICI members are welcome to attend but registration via email to Ms Yuan Ge (yuange@rcsi.ie) is essential in order to receive a separate MS Teams invitation

ICI Postgraduate Award 2020

Dr Conor Crawford delivered the first postgraduate lecture about his work at UCD, titled:

'A quest for a cryptococcal vaccine' using a protein /glycan technology.

Dr Priyanka Ganguly was due to deliver her lecture on her work at Institute of Technology Sligo, titled:

"Photocatalytic application of ternary chalcogenide based Titania composites". Unfortunately she was unable to give the lecture due to personal circumstances and Prof Suresh Pillai (Sligo0 spoke briefly about her achievements. Hopefully Priyanka will give her lecture on another occasion.

The Institute of Chemistry of Ireland
is delighted to announce this year's recipients of the
ICI Postgraduate Award 2020

Conor Crawford
School of Chemistry,
University College Dublin

Professor Stefan Oscarson (supervisor)

Currently postdoctoral researcher
Max Planck Institute of Colloids and Interfaces
Berlin, Germany

Priyanka Ganguly
Institute of Technology, Sligo

Professor Suresh Pillai and
Dr Ailish Breen (joint supervisors)

Currently Marie Curie Early Stage Researcher
University of Glasgow, Scotland

This was followed by Dr Mark Kelada, Chair, ICI YCN who gave an overview of the work the proactive group has achieved and the ambitions they hope to achieve in the future.

Next followed ICI Boyle Higgins Gold Medal and Lecture Award 2020 by Professor Amilra P. de Silva, School of Chemistry and Chemical Engineering, Queen's University Belfast.

The ICI Boyle Higgins Gold Medal and Lecture Award 2020

Professor A.P. De Silva
School of Chemistry and Chemical Engineering
Queen's University Belfast

He delivered his lecture titled 'Fluorescent Sensing and Logic Systems' in his usual jovial upbeat manner. His research has found applications in blood analysis devices in laboratories around the world.

A recording of the proceedings will be made available soon on the ICI website:
https://www.chemistryireland.org

The Institute's Annual General meeting follower the Award lectures after a short break.

The Institute of Chemistry of Ireland

Irish Young Chemists' Network (IYCN)

After the ICI Postgraduate Chemistry Research Symposium held online in September 2020 was a success, an idea was put forward to establish an Irish Young Chemists' Network (IYCN) as part of the Institute of Chemistry of Ireland (ICI). This initiative was highly welcomed and encouraged by both the postgraduates in attendance of the online symposium and approved by the ICI Council Members during their Council meeting on the 1st October 2020.

The committee of the online research symposium was made up of postgraduate students from various institutions in Ireland. As this committee worked in great harmony together, and had already established connections while organising the symposium, it was suggested to keep this committee for the IYCN. The members were all happy and motivated to be part of the IYCN committee. Together, we have summarised some of the benefits of establishing the Irish Young Chemists' Network to include:

1) **Community, network and connection of young chemists**
2) **More opportunities for collaboration between early stage researchers**
3) **Organisation of conferences and events for young chemists**
4) **Opportunity for postgraduate students to present and discuss their work**
5) **A platform to promote upcoming positions suited for young chemists**

The committee feel strongly about the first benefit especially during these times. We feel that the mental health of young chemists, including postgraduate students, is critical and essential. A sense of community and closeness, particularly during moments like these, would surely be beneficial to their mental health. As the chair of the committee, I will work together with the wonderful team of postgraduate students to establish the IYCN, while liaising and updating the ICI Council periodically as well as continue to avail of their expertise and support.

Mark Kelada, B.Sc. MICI Ph.D.

ICI Young Chemist Representative and Chair of Irish Young Chemists' Network

The Institute of Chemistry of Ireland's
YOUNG CHEMISTS' NETWORK

Are you a chemist in Ireland aged between 18-35 years old? Want to be part of a new exciting network of young chemists and be part of a growing community? Join us today by emailing youngchemists@instituteofchemistry.org with your name, age, and where you study or work. If your institution is not listed below, you could even be part of our incredible committee.

Name	Position	Representation
Mark Kelada	Chairperson	Industry
Fionn Ó Fearghail	Secretary	TU Dublin/Industry
Joseph Byrne	Advisor (Non-Voting)	NUIG
Siobhán O'Flaherty	PRO	RCSI
Jessica O'Neill	PRO	DCU
Colm McKeever	Committee Member	MU
Niamh O'Mahoney	Committee Member	UCC
Syl Byrne	Committee Member	NUIG
Lukas Hallen	Committee Member	TCD
Lauryn Bracken	Committee Member	AIT
Keiran Logan	Committee Member	Ulster Uni
Nicolás Rojas Sanabria	Committee Member	UL
Ciara Davis	Committee Member	LIT
Eilidh Matheson	Committee Member	QUB

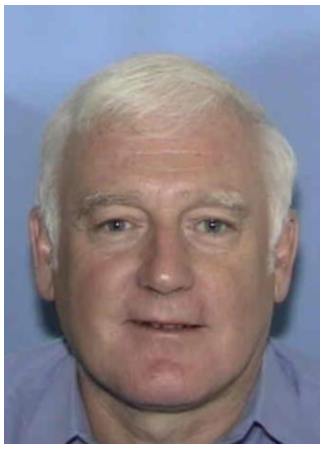
ICI David Brown Award 2021 Recipient

Professor Nicholas P. Farrell

This award was established in 2014 to honor Professor David Brown of University College Dublin in recognition of his enormous contribution to inorganic chemistry both nationally and internationally (https://www.chemistryireland.org/awards-events/#awards)

The ICI David Brown Award recipient is an international leader in this field and delivers their award lecture during the biannual Inorganic Ireland Symposium.

Professor Nicholas P. Farrell is the most recent recipient of this most prestigious award. He very recently delivered his ICI David Brown Award 2021 Lecture: **"Inorganic Drugs - Away from DNA and Back?"** at the Inorganic Ireland Symposium 2021 hosted by NUI Galway on 14th May, 2021.



Professor Nicholas P. Farrell is a graduate of University College Dublin. He obtained his Ph.D. from Sussex University and completed postdoctoral fellowships at Simon Fraser University and The University of British Columbia. He is currently Professor of Chemistry at Virginia Commonwealth University (VCU).

His major research is on platinum-based anticancer agents, on which he is acknowledged as a leading international authority. The first genuinely structurally novel platinum drug to enter human clinical trials in thirty years (Triplatin, BBR3464) arose from his research, and is still the only example of a "non-cisplatin" drug to enter human clinical trials.

In November 2017 VCU designated Prof Farrell as University Professor which recognizes Faculty members who "teach or conduct research that crosses discipline boundaries and have an established prominence in multiple fields of study, with national or international recognition in at least one field of study".

He is a member of VCU Chapter of the National Academy of Inventors (NAI). Prof Farrell has had extensive international collaborations and in 2013 was Elected Corresponding Member of Brazilian Academy of Sciences: "The Corresponding Members shall be foreign researchers with recognized scientific merit, who have provided relevant collaboration to the development of science in Brazil." He was a Jefferson Science Fellow at the US Department of State for the period 2010-2015.

MESSAGE TO PRESIDENT MICHAEL D. HIGGINS ON THE OCCASION OF HIS 80TH BIRTHDAY

On behalf of the Institute of Chemistry of Ireland, ICI President Professor Celine Marmion recorded and submitted a greeting for inclusion in the TG4 online campaign to honour President Higgins on his 80th birthday. This was displayed on the TG4 Twitter page as part of the #MichaelD80 celebrations.

See it on:

https://twitter.com/tg4tv/status/1382312955463790596

ICI Honorary Fellowship

The ICI is delighted to announce that
Professor Dervilla M.X. Donnelly, Emeritus Professor of Phytochemistry at University College Dublin,
has been awarded an honorary fellowship of the Institute.

This is in recognition of her highly distinguished career in academia and her significant contributions to the wider community serving in a variety of leadership roles. Professor Donnelly was elected the first female President of the Royal Dublin Society, and appointed Chairman of the Dublin Institute for Advanced Studies, Chairman of the European Science Research Council, Vice-President of the European Science Foundation, and Senior Vice-President and Vice-President of the Royal Irish Academy. She is a Fellow of the Royal Society of Chemistry, an Institute of Chemistry of Ireland Boyle-Higgins Medallist, a UCD Charter Day Medallist, and a Royal Irish Academy Cunningham Medallist.
Our warmest congratulations to Professor Donnelly on receiving this honorary fellowship, one of the highest honours the Institute can bestow.

The Institute Honours Dr Raymond Leonard for his many years of service and Contributions on Council and to the Institute

After his many years of service on Council, Ray announced his retirement from Council last year.

Dr. Raymond G. Leonard FICI

Educational Background:

BSc (1st Class) 1969 – UCD

PhD "N-Bromosuccinimide Oxidations of Triterpene Olefins and Some Rearrangements" – Supervisor J.B. Thomson 1972 – UCD

Postdoctoral Fellowship, 1972 -1973 – Glasgow University

Career:

Joined Loctite in 1973 as production support chemist, subsequently joining Analytical Laboratory, in 1974. Loctite a US specialist adhesives company was bought out by Henkel/Dusseldorf in 1995 and became Henkel Adhesives. Retired in 2012 as Associate Director R & D with particular responsibility for Materials Testing & Analytical Services.

During my time in Loctite /Henkel I was particularly involved in fundamental research on the chemical processes underlying the manufacture of key reactive monomers and was jointly awarded the "Robert Krieble Enterprise Award" in 1989.

Subsequently for my role in approving new raw materials and validating key suppliers I received the "Henkel U-F Excellence Award, 2008.

I was also cited as an inventor on 3 patents.

Academic Involvement:

From early in my career I developed extensive links with the universities which was encouraged and supported by my superiors in R & D.

In particular arising out of our early participation in DCU's INTRA programme valuable links were established which led to the development of research cooperation most particularly with Prof. Malcolm Smyth and Prof. Fiona Regan which benefited both Loctite/Henkel and DCU. As a result of this cooperation I acted as a joint supervisor for some 9 PhD and 4 MSc students. Arising out of these studies I was a named author on some 20 publications in peer reviewed journals.

I also played a key role in securing the funding which underpinned the above research programmes. Over a period of some 13 years I delivered extensive lecture modules in "Statistics in Analytical Chemistry" to the M.I.A programme and "Industrial Analysis" to the BSc course.

I was appointed an Adjunct Faculty Member in the School of Chemical Sciences in 1992 and an Adjunct Professor in 2004.

I also set up joint research projects with IT/Tallaght with a PhD and MSc student and also with UCC (MSc) and Robert Gordon University/Aberdeen (MSc).

I also presented lectures in industrial chemical analysis in UCC (MSc) and in polymer analysis in TCD (MSc in Pharmaceutical Chemistry.

I also served as an external examiner to the BSc degree programmes in DIT and IT/Tallaght.

Professional Activities:

Former President of the Institute of Chemistry of Ireland

Former Vice-Chair of Eurachem Ireland

Former Chairperson Judging Panel Eurachem Ireland Annual 3rd level Measurement Competition.

Editorial Advisory Board - International Journal of Adhesion & Adhesives

Technical Evaluator for EU SMT Framework 4th & 5th programmes. 1995-1999

HETAC appointee Institute Review Pane to IT/Tallaght 1999

HETAC appointee Review Panel School of Science IT/Tallaght 2001

HETAC appointee Review Panel School of Science/Nursing IT/Athlone 2005

Concluding Comment:

During my term as President of the institute I was particularly well served by the unstinting support of the council members which allowed us to conceive and launch the annual Eva Philbin Award Lecture which continues to stimulate our interest in advances in chemistry sand has been so ably presented by so many distinguished chemists.

I also recall that we dedicated ourselves to revamping and improving the institute website.

IMSS
Irish Mass Spectrometry Society

Event: 5th Mass Spectrometry School

Organisers: The IMSS, IMSF, and Ulster University

Location: Belfast, Northern Ireland

Dates: 15-20th August 2021

Full Details: Here

Registration: Here

About The IMSSc

The International Mass Spectrometry School (IMSSc) is one of the highest priority activities run by the International Mass Spectrometry Foundation (IMSF) in the field of higher education in Mass Spectrometry. The IMSS provides advanced education in

the principles and application of Mass Spectrometry to undergraduates, graduates, PhD researchers and scientists in the areas of Chemistry, Engineering, Biosciences, Nutrition, Environmental Sciences, and Medicine. The IMSSc favours the participation of early career scientists from around the world, to facilitate and promote international collaboration among the next generation of Mass Spectrometrists. The School is run over six days, offering a full immersion, residential program to encourage interaction between early career researchers and internationally renowned experts in the field.

The Program

The School takes the form of lectures 50-90 mins each, aimed at the fundamentals of Mass Spectrometry, as well as new trends in the instruments and applications. The following topics will be covered:

- Ionisation techniques
- Fundamentals: definitions, accurate mass measurements, isotope analysis
- Low and high resolution mass analysers
- Ion Mobility Mass Spectrometry
- Coupling separation techniques with Mass Spectrometry
- Fragmentation mechanisms and fundamentals of decomposition mechanisms
- Databases and information in mass spectrometry
- Imaging Mass Spectrometry
- Quantitative Mass Spectrometry
- Metabolomics and Proteomics
- Applications in Chemistry, Biomedical, Pharmaceutical, Food, Nutrition, and Forensics

The Venue

The IMSSc 2021 will be held at Ulster University Belfast campus. The Belfast campus is situated in the artistic and cultural centre of the city, the Cathedral Quarter. Although traditionally associated with art, the campus spans an increasing and exciting range of subjects including architecture, hospitality, event management, photography and digital animation. The vibrant campus plays host to frequent fashion shows and art exhibitions and is an exciting place to study and work. It is also home to **The Academy training restaurant.**

ICI Members were invited to attend the virtual RCSI award ceremony honouring WHO's Dr Mike Ryan, the recipient of the inaugural Sir Charles Cameron Award.

May 2nd

Dr Mike Ryan, Executive Director of the World Health Organization (WHO) Health Emergencies Programme, has today been awarded the inaugural Sir Charles A. Cameron Award for Population Health by RCSI University of Medicine and Health Sciences, in recognition of his global leadership during the COVID-19 pandemic.

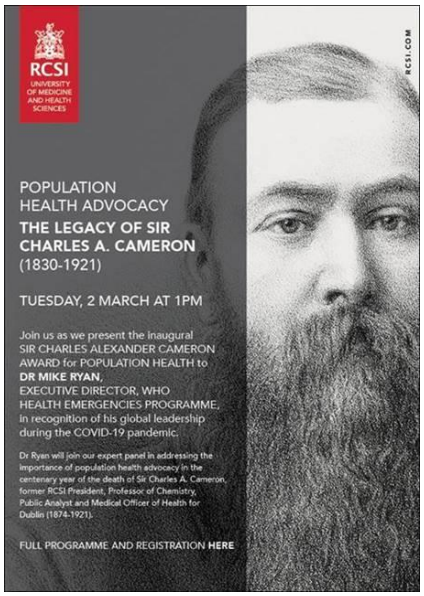
See: WHO's Dr Mike Ryan awarded inaugural Cameron Award by RCSI - Royal College of Surgeons in Ireland

This new RCSI award celebrates the legacy of Sir Charles A. Cameron and was launched to commemorate the centenary of his death. A link to the ceremony may be found here:

https://www.youtube.com/watch?v=yGevw2WSpL8

A former president of RCSI, Cameron was a leading public health doctor in Victorian Dublin, facing frequent outbreaks of diseases including scarlet fever, dysentery, small pox and typhoid. A recording is available at: https://www.youtube.com/watch?v=yGevw2WSpL8

Dr Mike Ryan receives the Sir Charles A. Cameron Award for Population Health



ICI Nominee appointed to ENVIRONMENTAL PROTECTION AGENCY ADVISORY COMMITTEE

Professor John Wenger
ICI Appointee to EPA Advisory Committee

Following a request to the ICI from Minister Ryan of the Department for the Environment, Climate and Communications for nominations for appointment to the Environmental Protection Agency Advisory Committee, the ICI is delighted to advise that Professor John Wenger, Professor of Chemistry and Director of the Centre for Research into Atmospheric Chemistry, UCC, has since been invited to join the Committee. The Institute wishes Professor Wenger every success in his new and exciting role.

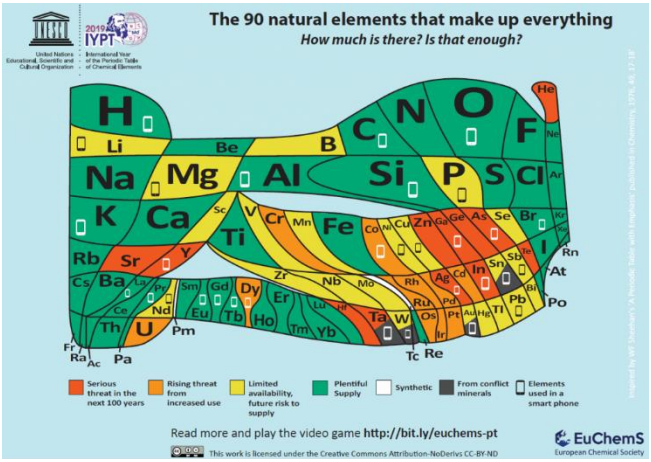
John Wenger is Professor of Chemistry at University College Cork (UCC), where he is also director of the Centre for Research into Atmospheric Chemistry (CRAC Lab) and Principal Investigator at the Environmental Research Institute (ERI). He has over 25 years of research experience in atmospheric chemistry and air pollution, producing over 100 publications in internationally renowned journals. His main research interests are in the atmospheric degradation of volatile organic compounds and the chemical composition and sources of atmospheric aerosols. He has been involved in a large number of National and European projects involving atmospheric simulation chambers and field measurement campaigns to improve our understanding of atmospheric processes and their links with air pollution and climate. Prof Wenger is currently an Associate Editor for the journal Atmospheric Environment and the National Contact Person for the pan-European research infrastructure ACTRIS (Aerosol, Clouds and Trace Gases Research Infrastructure).

EuChemS
European Chemical Society

EuChemS, is organised the webinar 'The Carbon Element – Key towards a sustainable society' which was held on Thursday 22 April 2021and attracted over 250 attendees from across Europe and the US.

Objectives of the workshop

The scope of this webinar was to focus on the scientific and technological challenges of decarbonisation and to discuss some key issues such as the carbon cycle, fossil fuel reserves and the perspectives of carbon sequestration and utilization in the energy and chemical sector. The workshop aimed to discuss whether carbon could be depicted as an endangered or conflict element in the next edition of the EuChemS Periodic Table. The webinar will also provide an opportunity to discuss the EuChemS Periodic Table and there was discussion on how to colour code Carbon in a revised edition the EuChemS Periodic Table. Should it be orange or a combination of colours and in that case striped and changed from green.



Delegated were invited to vote and some more discussion followed and it was then decided to defer a final decision for more consultation.

MORNING SESSION
10:00 to 12:00 CEST

- **10:00 – 10:10** Welcome
  Floris Rutjes (EuChemS President) and Nicola Armaroli (Chair of the webinar)
- **10:10 – 10:20** Introduction: the EuChemS Periodic Table
  David Cole-Hamilton (University of St. Andrews)
- **10:20 – 10:40** Fossil fuels: reserves and resources
  Mark Schaffer (Centre for Energy Economics Research and Policy)
- **10:40 – 11:00** The Carbon Cycle in the Anthropocene
  Pierre Friedlingstein (University of Exeter)
- ***10 MINUTES BREAK***
- **11:10 – 11:30** Geopolitics of carbon
  Jeff Colgan (Brown University)
- **11:30 – 12:10** Panel Discussion about altering the EuChemS Periodic Table and proposal
  led by *Alessandra Quadrelli (CNRS and CPE Lyon)*

AFTERNOON SESSION
13:30 to 16:30 CEST

- **13:30 – 13:50** EU Initiatives for 2050 carbon neutrality
  Søren Bøwadt (DG RTD, European Commission)
- **13:50 – 14:10** Status of carbon capture and sequestration projects worldwide
  Marco Mazzotti (ETH)
- **14:10 – 14:30** Carbon dioxide recycling, perspectives and challenges
  Angela Dibenedetto (University of Bari)
- ***10 MINUTES BREAK***
- **14:40 – 15:00** Biorefineries for the chemical industries
  Robert M'Barek (Joint Research Center of the European Commission)
- **15:00 – 15:20** Steps towards the energy transition, with focus on decarbonization
  Nuno Marinho (Centre for New Energy Technologies)
- **15:20 – 16:00** Panel Discussion
  led by *Floris Rutjes (Radboud University, EuChemS President)*
- **16:00 – 16:15** Conclusions
  Nicola Armaroli (Chair of the webinar)
- **16:15 – 16:20** Closing
  Floris Rutjes (EuChemS President)

Here is a list of the speakers and short biographies:

Nicola Armaroli, member of the EuChemS Executive Board (Chair)
Nicola Armaroli got the Ph.D. in Chemical Sciences in 1994 at the University of Bologna. Since 2007 he has been Research Director at CNR, the Italian National Research Council. He is member of the Italian National Academy of Sciences and Fellow of the Royal Society of Chemistry (FRSC). Within EuChemS, he is the former chairman of the Working Party on Chemistry and Energy and has served as EuChemS representative on several occasions such as the overseas Circular Economy Missions of the European Commission. He serves as associate editor of Photochemical & Photobiological Sciences (Springer Nature), member of the Editorial Board of Chemistry-A European Journal (Wiley-VCH) and Polyhedron (Elsevier Science) as well as director of Sapere, the first Italian science periodical, established in 1935.

His scientific activity is concerned with photochemistry and photophysics, in particular luminescent materials and systems for the conversion of light into electricity and fuels. He also studies the transition of the global energy system towards more sustainable models, also in relation to climate change and scarcity of natural resources. He has published over 220 scientific papers and several books on the subject of energy.

Nicola Armaroli has given invited lectures at international conferences, universities and research centers worldwide and has run international projects as CNR principal investigator or coordinator in the frame of several programmes funded by the European Commission. He is also an active consultant and science communicator for the general public on the issues of energy, natural resources, and environment, also through interviews and contributions on mass media.

He was awarded the Grammaticakis-Neumann International Prize in Photochemistry, the Premio Letterario Galileo for science dissemination, the Gold Medal Enzo Tiezzi of the Italian Chemical Society and the Ravani-Pellati Chemistry Prize of the Turin Academy of Sciences.

Floris Rutjes, EuChemS President

Floris Rutjes (1966) received his PhD at the University of Amsterdam in 1993 under the supervision of the late Prof. Speckamp. After a post-doctoral stay with Prof. Nicolaou at The Scripps Research Institute (La Jolla, USA) and an assistant-professorship at the University of Amsterdam, he became full professor in organic synthesis at Radboud University (Nijmegen, NL) in 1999. His research interests comprise the synthesis of biologically active heterocyclic molecules, new bioorthogonal click-probes for chemical ligation, and continuous flow synthesis in microreactors. He has received several awards including the Gold Medal of the Royal Netherlands Chemical Society (2002), the AstraZeneca Award for Research in Organic Chemistry (2003), and in 2008 was announced 'Most entrepreneurial scientist of the Netherlands'. Currently, he is Director of the Institute for Molecules and Materials at Radboud University, past-president of the Royal Netherlands Chemical Society (KNCV) and president of the European Chemical Society (EuChemS).

Søren Bøwadt, DG RTD, European Commission

Søren Bøwadt is the acting Head of Unit for the "Industry" unit of the Health and Digital Executive Agency (HaDEA) in Brussels. The unit is responsible for the implementation of the industrial research and innovation legacy activities from Horizon 2020 as well as the industry activities in Cluster 4 of Horizon Europe. His main educational background in organic synthetic (MSc) and analytical chemistry (PhD) has been obtained from the University of Odense, Denmark. He joined the Measurement and Testing Unit of the European Commission's Research Directorate at the end of 1999 and since July 2003, he has been working for the Directorate for Industrial Technology and since April 2021 for HaDEA. He has been responsible for over 150 scientific projects in various areas of natural science and has published more than 50 papers in chemistry related research in addition to setting up the SPIRE public private partnership.

David Cole-Hamilton, University of St. Andrews

Following degrees (BSc and PhD) at Edinburgh University, David Cole-Hamilton worked with Nobel Laureate, Sir Geoffrey Wilkinson at Imperial College, where he developed a strong interest in organometallic chemistry and especially homogeneous catalysis. His independent career started at Liverpool University (Lecturer and Senior Lecturer) before moving to be Professor of Chemistry at the University of St. Andrews in 1985. He became Emeritus in 2014.

David is a past President of the European Chemical Society (EuChemS) having been President from 2013-7. This gave him extensive contact with chemical societies and policy makers throughout Europe. On behalf of EuChemS he led a team celebrating the *International Year of the Periodic Table*, which developed a new version of the Periodic Table highlighting element availability and vulnerability as well as which elements can come from conflict minerals and which appear in smart phones.

Jeff Colgan, Brown University

Jeff Colgan is the Richard Holbrooke Associate Professor of Political Science at Brown University and Director of the Climate Solutions Lab at the Watson Institute of Public and International Affairs. His research focuses on international order, especially as it relates to energy and the environment. His forthcoming book is *Partial Hegemony: Oil Politics and International Order* (Oxford University Press, October 2021).

Angela Dibenedetto, University of Bari

Angela Dibenedetto is currently Chair of the National Interuniversity Consortium on Chemical Reactivity and Catalysis-CIRCC, Bari, Italy, and of the Interdepartmental Research Center on Environmental Methodologies and Technologies-METEA, UniBA, Bari, Italy. She is also Chair of the Italian Group for CO_2 Capture and Utilization and Vice-Chair of the International Conference on Carbon Dioxide Utilization.

She is associate Editor of Journal of CO_2 Utilization, Carbon Capture, Storage and Utilization-Frontiers in Energy Research and is also a component of the International Advisory Board of ChemSusChem. Furthermore, she is editorial board member of: Current Green Chemistry; Current Catalysis; International Journal of Green Technology; Catalysts; Molecules.

Her scientific interests are Coordination Chemistry, Metalorganic Chemistry, Catalysis, Oxides as catalysts in innovative, environmentally friendly, sustainable synthetic methodologies; Carbon dioxide utilization in the synthesis of chemicals; Use of supercritical CO_2 as solvent and reagent; Synthesis of heterogeneous catalysts with tunable acid/base properties; Water free lipid conversion into FAMEs; Synthesis of alkyl carbonates from urea and CO_2; Synthesis of cyclic carbonates through oxidative carboxylation of olefins.

She is the author of over 160 papers published in high Impact Factor Journals, of four Books on CO_2 Chemistry and Biorefineries and co-owner of several national and International (EU-World) patents.
She received several awards: Platinum, Energy and Environment Foundation HR Skill Development Award 2018 for "Carbon Recycling: towards circular economy", New Delhi, February 16, 2018; Finalist EUCHEMS award "European Sustainable Chemistry Award 2010"; RUCADI Prize on "Better Carbon Management – An Intelligent Chemical Use of CO_2" awarded by ACP-Belgium, Carburos Metalicos-Spain, ENIChem-Italy. October 8, 2001, Thessaloniki (Greece).

Pierre Friedlingstein, University of Exeter

Pierre Friedlingstein holds a Chair in Mathematical Modelling of the Climate System at the University of Exeter. He is also Research Director at the Laboratoire de Météorologie dynamique (LMD), Centre National de la Recherche Scientifique, France. He has near 30 years research experience in the field of global carbon cycle modelling, global biogeochemical cycles and global climate change, published 180+ peer-reviewed articles.

Professor Pierre Friedlingstein led the Global Carbon Budget, an effort that provides reliable carbon cycle information to assist international climate policy. He has been actively involved in the Intergovernmental Panel on Climate Change (IPCC).

Nuno Marinho, Centre for New Energy Technologies

Nuno Marinho graduated in electrical and computer engineering from the Faculty of Engineering of the University of Porto, Portugal in 2014 and received the PhD degree from Centrale Supélec, Paris, France in 2018.

Since November 2019 he has been working as an innovation project manager at EDP NEW, being responsible for research subjects related with power system's economics and regulation and he is now the project coordinator of IANOS, a H2020 funded research project with 34 partners from 8 different countries and an overall budget of around 8,8M€.

Before this experience, he worked as a Research Engineer for EDF R&D in its "Economic and Technical Analysis of Energy Systems" department on topics related with power system's regulation operation and planning. This includes transmission and distribution network expansion planning, grid integration of storage and renewable energy and regulatory analysis of the European electricity markets.

Marco Mazzotti, ETH

Marco Mazzotti, an Italian and Swiss chemical engineer, has been professor of process engineering at ETH Zurich since May 1997.

He was coordinating lead author of the IPCC Special Report on CCS (2002-2005), President of the International Adsorption Society (2010–2013), and chairman of the Board of the ETH Zurich Energy Science Center (2011-2017). He was a contributor to the 2007 Nobel Peace Prize awarded to the Intergovernmental Panel on Climate Change (IPCC).

He has published more than 350 papers, cited more than 18,000 times, resulting in an H-index of 73 (Google Scholar). Forty-seven doctoral students have graduated with him.

Robert M'Barek, Joint Research Center of the European Commission

Robert M'Barek is an Agricultural Economist at the European Commission's Joint Research Centre, Directorate for Sustainable Resources (Seville). He received his PhD on EU trade relations from the University of Hohenheim, Germany. Since many years he is coordinating and involved in economic modelling analyses related to the Common Agricultural Policy, trade, and the bioeconomy.

Alessandra Quadrelli, CNRS and CPE Lyon

Alessandra Quadrelli is director of research of the French National Centre for Scientific Research, CNRS, at the IRCELYON laboratories and chairs the CPE Lyon Engineering School Sustainable Development Chair. She serves as associate editor of the RSC journal "Green Chemistry". Her research focuses on organometallic mechanisms on surfaces (like silica, MOFs and 2D wafers) for heterogeneous catalytic reduction of N_2 and CO_2 en route to renewable energy storage.

More info: Alessandra considers her Top-3 professional achievements: A new mechanism for N_2 cleavage (SCIENCE, 2007), the creation of the "CO_2 forum" conferences (http://co2forum.cpe.fr) and the synthesis of a MoS_2 monolayer by Atomic Layer Deposition, ALD (NANOSCALE, 2017). Her overall research has

led to 85 publications in international peer reviewed papers (h = 27, S_{cit} 4200 as of 2021), 4 patents, 11 book chapters, 2 co-edited books and 53 invitations to international congresses there included 1 plenary at ICEC 2020 and 5 keynotes (EUROPACAT, ICOMC, EuChemS-GC, ISHHC, ACHEMA).

Mark Schaffer, Centre for Energy Economics Research and Policy

Mark Schaffer is Professor of Economics and Director of the Centre for Social and Economic Data Analytics (CSEDA) at Heriot-Watt University, Edinburgh, UK. His fields of research include emerging and transition economies, labour markets, applied econometrics, economic history, energy economics and evolutionary theory. Prof Schaffer graduated magna cum laude from Harvard University in 1982, and holds degrees in economics from Stanford University and the London School of Economics. Prof Schaffer is a Fellow of the Royal Society of Edinburgh and of the Royal Society of Arts, and a Research Fellow of the Centre for Economic Policy Research (CEPR) and of IZA, the Institute for the Study of Labour. He has worked as a consultant for organizations such as the World Bank, the IMF, EBRD, the United Nations, the European Commission, and the Department for International Development of the UK Government.

Recordings of this seminar are available on YouTube and well worth taking time to watch them on the EuChemS YouTube channel:

Morning sessions https://youtu.be/Ug4f2VDynxM

Afternoon sessions https://youtu.be/FL8voptymCg

You might also like to look back on **2018 EuChemS Lecture Awardee Webinar**. The online event was held on **Friday 13 November, 2020:**

https://youtu.be/rZN1tGk3k4A

7 - 9 JULY 2021 • LJUBLJANA - SLOVENIA

Online Conference

EUROVARIETY 2021

9TH EUROPEAN VARIETY IN UNIVERSITY CHEMISTRY EDUCATION CONFERENCE

For details visit website:

http://www.eurovariety2021.si/?utm_source=newsletter_335&utm_medium=email&utm_campaign=nieuwsbrief-mei-2021

Bringing together

The conference, run under the auspices of the EuCheMS Division of Chemical Education, is a European counterpart of the UK conference "Variety in Chemistry Education" and is devoted to practical aspects of chemical education at tertiary level (general and vocational higher education institutions, HEIs), at both undergraduate and postgraduate levels. The conference brings together chemistry lecturers and educational professionals to improve understanding of chemistry teaching and learning.

From soap to ice-cream: the Irish Seaweed Industry 18th – 21st century - an indigenous science-based industry

Dr Childs came to Ireland in 1978 to teach chemistry at Thomond College of Education, later merged into the University of Limerick from 1991. He had previously worked in the USA, Uganda and the UK. He started Chemistry in Action! Magazine in 1980 and the ChemEd-Ireland conferences in 1982. He is a past president of both the ISTA and the Institute. He has won the ISTAs BP Educator of the Year award, the Boyle Higgins gold medal of the Institute and the Pharmachemical Ireland education award. He retired from UL in 2009 but has continued to be active in chemical education. He has been interested in the early chemical industry in Ireland, especially the kelp industry, for over 20 years, which is a largely forgotten story. In 2020 he was made an Honorary Fellow of the Institute.

Peter E. Childs

Department of Chemical Sciences

University of Limerick, Limerick

Peter.childs@ul.ie

Introduction

> *"For about two hundred years seaweed has been a raw material for chemical industry along our west coast. For not less than that period, the enormous quantity of seaweed thrown up on these shores has been collected, dried and burned, to obtain the ash known as kelp. Until about the first quarter of the last century kelp was one of the world's chief sources of alkali. About 1830, however, chemical science had developed more efficient methods for obtaining this important product, and the kelp industry would then have completely died out but for the discovery of iodine and its application in medicine."*
>
> (Dillon, 1930, p. 271)

This article focuses on the history of the Irish seaweed industry as a source of chemicals. It is an industry that involved the whole island, especially the western and northern coasts; it started around 1700, perhaps even before, and continues to this day. Its heyday was in the second half of the 19th century.

My interest in this topic was sparked by the reference in an article on iodine in Sheridan Muspratt's massive encyclopaedia, *Chemistry, Theoretical and Practical* (Muspratt, 1860), to an iodine factory in Ramelton, Co. Donegal.

> *"The course pursued in its manufacture is simple. The several fuci and algae which contain it, are collected by inhabitants of places adjacent to the sea-shore, and dried in the air, after which shallow rectangular pits are dug wherein the dried material is burned. The semi-vitrified ash that remains is broken up by sprinkling a little water upon it while it is hot. This is the kelp of the Scotch and Irish, and is the same as the varec of the Continental producers; it is purchased by the several manufacturers, in order to extract from it the iodine and other salts. For this purpose it is reduced to a coarse powder, which is placed in rectangular filters, having an inner perforated bottom of sheet-iron. ….*
>
> *Several manufacturers may be found, among whom may be mentioned Mr. Whitelaw of Glasgow, and Mr. John Ward of the country Donegal, Ireland."*

The idea of an iodine factory in Ireland intrigued me. I covered the seaweed industry briefly as part of an article on the 'Early chemical industry and industrialists in Ireland' (Childs, 1998), given at an ICI/RIA conference. I have since given several talks on the topic and continue to be interested in, what is, a largely forgotten and untold story. A shorter account of 'Ireland's forgotten industry' has appeared (Childs, 2001).

This extract from the catalogue for the Great Exhibition in Regent's Park, London, in 1851, describes the products that John Ward exhibited from his factory in Ramelton (aka known as Rathmelton), which he set up in 1845.

> *"I observed in the Great Exhibition a case of chemical stuffs produced from Irish seaweed – viz. Iodine, chloride of potassium, sulphate of potash and alkaline kelp-salt, manufactured in the Ramelton Chemical Works by the exhibitor, Mr. John Ward. These works, the first of their kind started in Ireland, were established by Mr. Ward in March 1845 …to the town of Ramelton these chemical works have been of the greatest benefit by the number of workmen labourers employed in and around it, and by the very considerable shipping trade, in vessels ranging from 50 to 120 tons, which the importation of manufactured stuff has been the means of bringing to Lough Swilly."*
> (Anon, 1851)

The factory was still in existence in 1885. At the same Exhibition there was also a reference to seaweed products from the factory of E. Bullock & Co. in Galway. Thus the iodine from seaweed industry in Ireland was thriving in 1851.

Three historical phases of the Irish seaweed industry involved the extraction of chemicals, and the third phase is still important today. Each of the first two phases lasted about 140 years or more, and the third phase is ongoing 140 years after its inception. The pre-industrial phase involved using seaweed as a green manure in coastal areas, without any processing, and this still continues.

However, the utilisation of seaweed story is still ongoing and in the fourth phase we have a variety of green uses for seaweed, including fuels, fertilizers and food. Ireland has not only been an important location for this industry, but also number of Irish chemists have made important contributions, particularly Thomas Dillon and Vincent Barry at University College Galway, where Michael Guiry continues the tradition at NUIG with the Irish Seaweed Centre.

There are good general accounts of the historical development of the seaweed industry in Chapman (1950 and 1972) and Newton (1951) and in a recent review article by Wisniak (2001).

Phase 0: Seaweed as a manure or fertiliser

There are many types of seaweed around Ireland, growing on the continental shelf and thrown up on the shore by storms. These need to be harvested either by boat or from the shore. Different species grow in the inter-tidal and sub-tidal zones. In winter storms vast quantities of seaweed are thrown up on the shore. Wet seaweed is bulky and dense and harvesting it, whether from the shore or the sea, is wet, hard, back-breaking work. Specialist tools were developed for the seaweed harvest (Figure 1).

Figure 1: An example of a seaweed crook from the Clare County Museum in Ennis.

http://www.clarelibrary.ie/eolas/claremuseum/riches_of_clare/water/seaweed_crook.htm

Seaweed is known as a green manure. There is a long history going back centuries of using seaweed as a mineral-rich fertiliser, and also as human and animal food. This goes back long before its industrial uses and continues until today. You may remember the film *The Field*, based on a play by John B. Keane, which centres on the ownership of a field fertilised with great effort by loads of seaweed by Bull McCabe. Seaweed was used to create lazy beds by mixing with sand. The seaweed rotted down and added organic matter and minerals to the soil. Seaweed was used for this purpose also in Scotland, France, and the Channel Islands. There is a good discussion in Estyn Evans' *Irish Folk Ways* (Evans, 1970).

Phase 1: alkali from seaweed <1700 -~1840s

The oldest industrial use of seaweed was as a source of alkalis: soda and potash. This use goes back probably to the end of the 17th century, probably first in France, and reports suggest that the primitive technology, which involved burning seaweed to produce kelp in open kilns, as a source of soda, was exported to Scotland from Ireland in the early 18th century. The burnt ash of seaweeds was known as kelp from the earliest times, and we will use it in this sense. The 20th century use of kelp for giant seaweeds is a modern name. In this article kelp will always refer to the burnt ash of seaweed, usually in the form of a dense slag.

Many early industries needed alkali, as sodium or potassium salts – soap, paper, gunpowder, bleaching, alum, and glass. The only other source of these in the 17th and 18th centuries was plant ash. Wood ash is rich in potash, and was imported from the Baltic and N. America, and a material called Barilla rich in soda, obtained from a seaside plant, imported from Spain, is richer in soda than kelp. Someone discovered that seaweed ash also contains sodium and potassium salts and that the aqueous extract can be used as a cheap alkali. It was cheap and available locally in large quantities, even if it was not as rich in alkali as

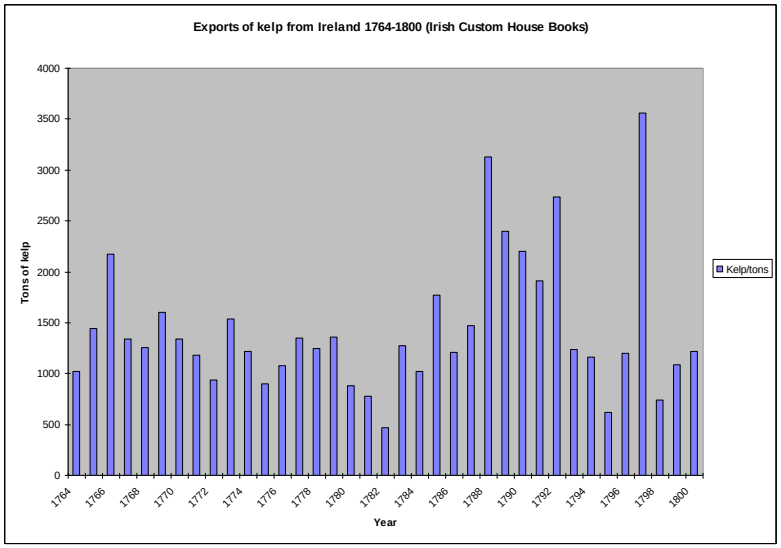


Figure 2: Exports of kelp from Ireland 1764-1800 (L'Amie, 1984)

other sources, and it became a widely used and traded commodity. Figure 2 gives an idea of the importance of the trade: from to 1764-1800 53,074 tons of kelp were exported from Ireland, not counting the quantities used locally. Each ton required the harvesting of *at least* 20 tons of wet seaweed, so this quantity of kelp amounts to over a million tons of seaweed collected and processed.

(We will use the imperial ton = 2,240 lbs., 20 cwt., in this article as these are the units used in contemporary accounts. Likewise for monetary values we will use £ s d.)

The 18th and 19th century gazetteers and surveys of Ireland very often mention kelp as a local product, along with agricultural produce. It was an important cash crop and many coastal communities came to rely of this source of income in the late 18th and early 19th century centuries. Its production was also labour intensive, involving whole families, and was one factor which led to over-population and the creation of what became known as the Congested Districts in Ireland. This was true in Scotland as well as Ireland, and the collapse of the kelp industry in the early 19th century was another factor which led to mass emigration, even before the great mid-century famines in Ireland and Scotland.

It is worth mentioning that the collecting of seaweed and burning it to produce kelp features in many paintings from the 19th century and early 20th century, and also in photographs from the late 19th century onwards, especially in Scotland.

Figure 3: A contemporary painting showing kelp production by Samuel Glover

The painting in Figure 3 of The Kelp Gatherers by Samuel Lover (1797-1868) was done in 1830 in White Strand, Renvyle, Connemara and depicts a scene that was common in the 18th and 19th centuries along Irish coasts. The people look rather too well dressed for the period and location.

Production of alkali from seaweed

This diagram in Figure 4 shows the sources of alkali from seaweed and other plant ashes, which contains both soda and potash, and their uses. Initially kelp was used as a source of soda but this switched to potash after the 1820s.

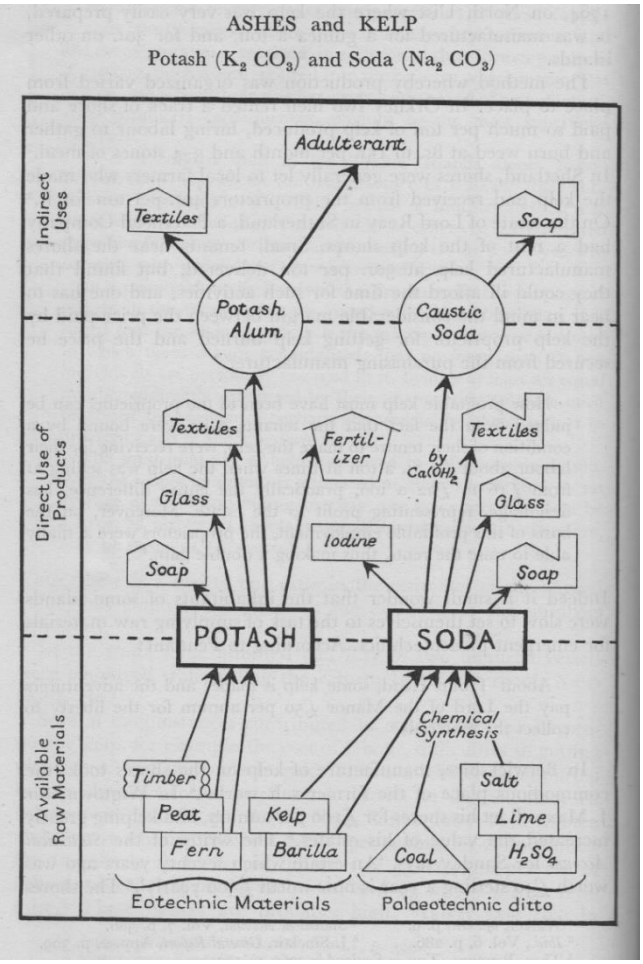


Figure 4: Outline of the extraction of alkali from seaweed in relation to other sources (Clow and Clow, 1952, p. 78)

Seaweed was collected, either on foot or from a boat, and dried in air by laying it out on the seashore or over low walls. When dry after a few days (subject to the weather) it was burnt in simple open kilns, made from local stones, to give a dense, glassy mass – called kelp. This ash was broken up and shipped, usually by sea, to the end-users in the glass, soap, alum or textile industries. The kelp was broken or crushed and then leached with water, in a series of iron tanks, and the resulting solution was then concentrated by evaporation to crystallise out the various salts. It was usually shipped abroad as kelp, the name given to the glassy, solid ash, and extracted by the end-user. This was a paleotechnic (i.e. prescientific) industry; the processes were poorly controlled and even more poorly understood.

The easiest seaweeds to harvest were those that grew in the intertidal region and these were also the richest in sodium salts. The chemical composition of seaweeds depends on the species, the season and

their location. Seaweed was also thrown up in the winter storms and was also harvested from boats in the sub-tidal zone.

The basic process, conducted on the shores and islands of Ireland, Scotland, France, Spain, the Scillies, the Channel Islands, Norway etc. by unskilled rural dwellers, remained unchanged until the middle of the 19th.century when a more scientific approach was developed.

In recent years there has been considerable interest in the archaeology of the kelp industry in Ireland (see Forysthe, 2014; McErlean *et al*., 2002; McErlean, 2007; Harper, 1972)

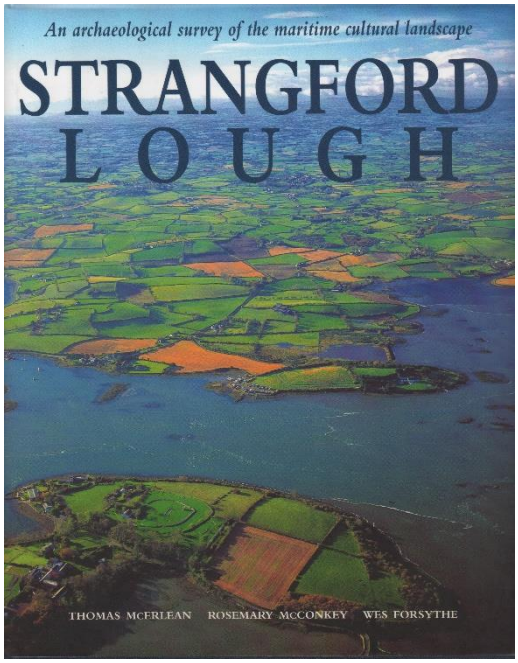


Figure 5: Strangford Lough: An Archaeological Survey of the Maritime Cultural Landscape (2002) Thomas McErlean, Rosemary McConkey, Wes Forsythe

The archaeological survey of Strangford Loch (McErlean *et al*, 2002) has a whole chapter devoted to the kelp industry (Figure 5).

Figure 6: Remains of a kelp house on Rathlin Island (Harper, 1972)

Rathlin Island is a fairly small island off the Antrim coast and had up to 150 kilns in operation (Forsythe, 2006). This photo (Figure 6) shows the remains of the kelp house on Rathlin Island, where kelp was stored awaiting shipment, to protect it from the weather.

Many written descriptions survive back to the 18th century and into the 19th and early 20th centuries, in Ireland and Scotland, together with a wealth of paintings and in the 20th century, also photographs. We thus have a good idea what the early industry was like as many aspects remained unchanged, even into the 1930s. We also have the archaeological remains such as kilns, kelp houses, drying walls and even fucus farms (seaweed farms).

These advertisements (Box 1) are typical of many advertisements that appeared in Irish newspapers in the 18th and 19th centuries advertising kelp for sale or the lease of shores for making kelp. They give a flavour of the importance of the kelp industry in the Irish coastal economy.

Box 1 Some 18th century adverts for kelp

Friday, 5th. August 1763 *Belfast Newsletter*

'Cargo of excellent new kelp made last May on the Western coast near Sligo, remarkable for good strong Wrack is arrived to be sold on the Kay out of the ship by James Hamilton at the corner of Linenhall Street.'

Tuesday 12th. July, 1768 *Belfast Newsletter*

'40 tun of kelp, pure and well-made now lying at Gransha shore, in the Barony of Ardes and County of Down, to be disposed of. Apply the Reverend Nicholas Hamilton, Ballyabigin or Mr. James Neill, Greyabbey.'

Friday, 28th. January 1780 *Belfast Newsletter*

'About 30 tons Galway kelp and the like quantity of Kelp made in the Lough of Strangford to be sold exceedingly cheap by a person leaving this Kingdom. Apply William Johnston, Co. Down.'

Tuesday, 16th. August 1785 *Belfast Newsletter*

'To let from November next Island Mahee with the kelp shores thereof; the particular good qualities of its kelp and Grazing are well known. Apply Robert Hamilton, Ardmillan'

How big was the 18th. Century industry?

The export figures in Figure 2 give an idea of the size of the industry in the late 18th century. Kelp was also used locally by the linen industry and glass industry, and was imported as well as exported. There was an active trade in kelp inside and outside Ireland. The maximum export in the 18th century was ~3,500 tons pa, which corresponds to ~70,000 tons of wet seaweed. Over this 35-year period around a million tons of seaweed had to be harvested just for the export market. This was a large-scale industry, which employed thousands of people along the West and North-West coasts, in the poorest areas of Ireland. The industry undoubtedly contributed to the population increase in what were to be called the 'Congested Districts', as it did in the islands off Scotland.

But disaster loomed and the industry collapsed almost overnight. Its heyday was during the American and Napoleonic wars, when imported wood and plant ashes dried up. Normally worth £3-£5 a ton, kelp fetched up to £20 a ton in the early 1800s. The industry made vast profits for the landlords, particularly in Scotland, but very little for the workers, although it was an important source of cash income and it paid their rents. As late as 1860 (Stanford, 1862), 6,000 tons of kelp were imported from Ireland to Glasgow for processing.

Hardiman (1820, pp. 297-298) in his *History of Galway* gives a snapshot of the industry in 1820. He states that the industry started in Galway in 1700. Note that production from Galway ranged from 4,000 to 2,500 tons a year at the start of the 19th century.

> *"Kelp is also an old and considerable article of trade. It is principally manufactured in Conamara, and is brought to the town by sea. For some years past about 4,000 tons were annually exported, a considerable portion to the northern parts of Ireland, where it was much used in the manufacture of linen, and the remainder to England and Scotland. The price and consumption of this article, however, have of late very much diminished. Although, in 1808, it sold in Galway for £13 a ton, at present it seldom exceeds £4; and the yearly exportation is also reduced to about 2,500 tons, which is supposed to be occasioned by its inferiority to the Scottish kelp in foreign markets."*

The burning of seaweed to produce kelp

This was an atmospheric process, to say the least, performed in simple kilns along the Irish coast. These kilns were often just a ring of stones on the beach. The process was also very wasteful of iodine, most of which volatilised (see later). The hotter the kiln, the less iodine was left and it was hard to change the habits of a lifetime to select both different seaweeds and burn them to ash not slag, when iodine became more important than soda (from ~1840s onwards in Phase 2).

The passage below was written in the 1920s, but kelp burning had been going on for around 200 years by then. It must have been an amazing sight in the summer months, and although it caused a lot of airborne pollution, it also meant that these areas and inland them from the kelp coasts, did not suffer from iodine deficiency.

> *"At the end of summer and the beginning of Autumn the coast of Connemara is alight. There are hundreds of kilns to be seen. Aren't they a lovely sight, their smoke rising slowly skywards in the quiet of the evening … The smell from the same smoke is healthy fragrance.*
>
> *The burning is hard work. There are two lines of stone and it's heaped with wrack between them. Fires are lit in every part of that bed within a couple of feet of each other; then a mat of sea rods above the glow. A mat of seaweed above that, and from then until midday there are two men keeping it topped up with seaweed with all their heart and soul. At about twelve-o-clock midday, it's let burn down and cleaned. Whatever kelp is in it is then well and truly mixed, with kelp rakes and loys; it's then topped up again until evening. There are five or six men, feeling as if their skins are on fire, mixing and agitating until they are tired and exhausted.*
>
> *The following morning, it's a hard slab like a rock, about a ton weight. It's then broken into twelve pieces so as it can be brought easily to the coast. In the area I'm talking about, Caiseal and Cill Chiarain are the two places for the kelp market. During the burning season the market takes place every fortnight. There are hundreds of kelp makers there, and piles of kelp next to each other from*

the top to the bottom of the pier, small piles and big piles, according to the capabilities of the teams of workers.

The sampling man goes around with a hammer and bucket, taking a small bit off each slab. The kelp makers know him as well as a bad halfpenny. When the sample is taken he brings it into the assayer's office, and the name of the person who owns the pile is on the ticket on the bucket. The man inside has a glass as a means of assaying, and according to what the glass shows he will pay its value to the kelp maker."

(Mac an Iomaire, 2000, p. 140)

Figure 7: Burning kelp on the Aran Islands, probably in the 1930s

James Muspratt & synthetic alkali – another Irish connection

The Napoleonic wars were the golden years of the soda from kelp industry, as imports of potash and barilla were curtailed. Efforts by chemists were going on since the end of the 18th century to make soda from sodium chloride, a problem solved by Nicholas LeBlanc in 1791. It took some time for this new process to transfer to the United Kingdom. From around 1822 synthetic alkali became available, when it started to be made on a large scale from salt using the Le Blanc Process. James Muspratt, originally from Dublin, was a pioneer of the alkali industry in and around Liverpool and the father of Sheridan Muspratt, mentioned earlier. (Childs, 2002) Synthetic alkali, using salt, sulphuric acid and coal, was purer, more concentrated, and was available in larger and more secure supplies. But it was a new product and to overcome resistance to its use, Muspratt gave away his first production. Once established, the alkali industry, as it came to be known, dramatically reduced the price of alkali and cut the bottom out of the kelp for soda industry. The effects on Scotland were dramatic, but perhaps less so in Ireland. In Scotland the collapse of the kelp industry led to massive depopulation and emigration. Soap and glass manufacturers continued to use kelp as a source of alkali up until the 1840s, but its days were numbered. The production and price of kelp fell and its production became uneconomic, hardly covering its costs. But salvation for the seaweed industry was in sight from the serendipitous discovery of a new chemical product in seaweed in France.

Phase 2: iodine from seaweed 1811- ~1950s

Iodine, a new product from seaweed became the basis of a new phase of the industry. In 1811 Bernard Courtois, a French saltpetre manufacturer, noticed his copper pans, where he boiled down kelp liquor as a source of potash for the French gunpowder industry, were being corroded. Cleaning the kelp residue from the pans with concentrated sulphuric acid produced purple fumes, which condensed to shiny, blue-black crystals – a new element, later called iode/iodine, had been discovered.

This distinctive substance was quickly investigated and its discovery formally announced by Courtois in 1813. Gay-Lussac in France and Davy in England showed it to be a new element, similar to chlorine, and it was named iodine (*iode* in French) from its colour. This discovery started a scientific feeding frenzy to investigate the new element and its chemistry, and possible uses, similar to that created by the discovery of C_{60} and graphene in more recent times. Iodine became a hot research topic and it became a material in search of uses. It quickly became an article of commerce - first for medicine, when it was found to cure goitre, and as an antiseptic, and then for photography and in chemical synthesis.

Soon chemists in France and Scotland were investigating better ways of extracting iodine from seaweed. The first commercial manufacture was in France in 1824, and in Scotland sometime before 1840. Scotland a major player in the kelp industry, particularly Glasgow with its existing soap boilers and glass makers, was to become the world centre for iodine production from seaweed, whose only competition at first was from France, especially Brittany. The first iodine works in Ireland were opened by John Ward in 1845 in Ramelton, Co. Donegal, on Lough Swilly, probably an offshoot of a Glaswegian firm of the same name. Figure 8 shows the location of iodine works in Ireland – in Ramelton, Buncrana, Galway and Freagh.

Figure 8: Map of Ireland showing location of 19th century iodine works – Buncrana and Ramelton in Co. Donegal, Galway and Freagh, Co. Clare.

The production of iodine from seaweed

The process was very similar to the earlier process except that more chemical treatment was needed to release iodine from the kelp salts (see Figure 9).

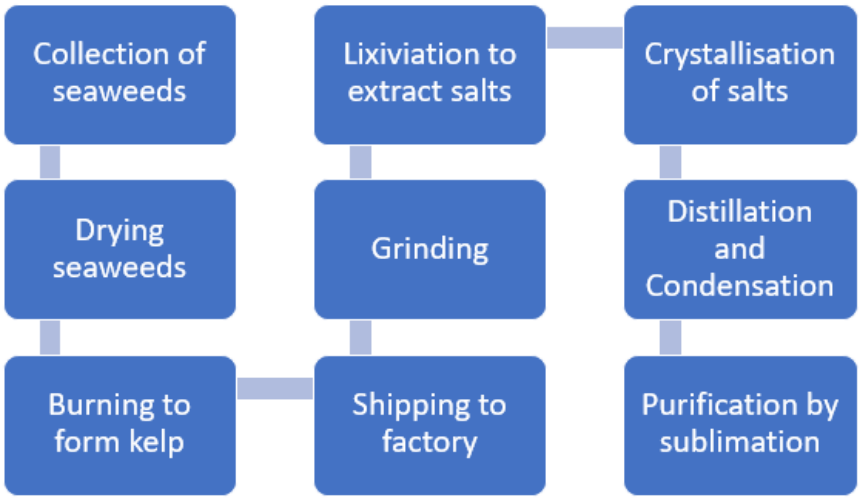


Figure 9: Outline of the process for producing iodine from seaweed

Instead of cutweed or rockweed, intertidal seaweeds, which had been used for soda, it was found that driftweed, sub-tidal seaweeds, were richer in iodine and potash (Table 1). This required some change in harvesting methods and also in the way the dry seaweed was burnt. The traditional method of burning was long and hot and vaporised over half the iodine and lost some of the other salts. Burning at a lower temperature to produce an ash, rather than a dense slag, meant a higher iodine content, but it was difficult to convince the kelpers to adopt new methods, as they had been doing it the old way since time immemorial. The alkali industry had used varieties of intertidal Fucus seaweeds (cutweed) but the Laminaria are richer in iodine and this required a change in ways of collecting seaweed - from intertidal to deep sea, sub-tidal seaweeds (driftweed). These were either collected from weed thrown up by winter and spring storms, especially the rods or stipes, or harvested from boats. Some common seaweeds are shown in Figure 10.

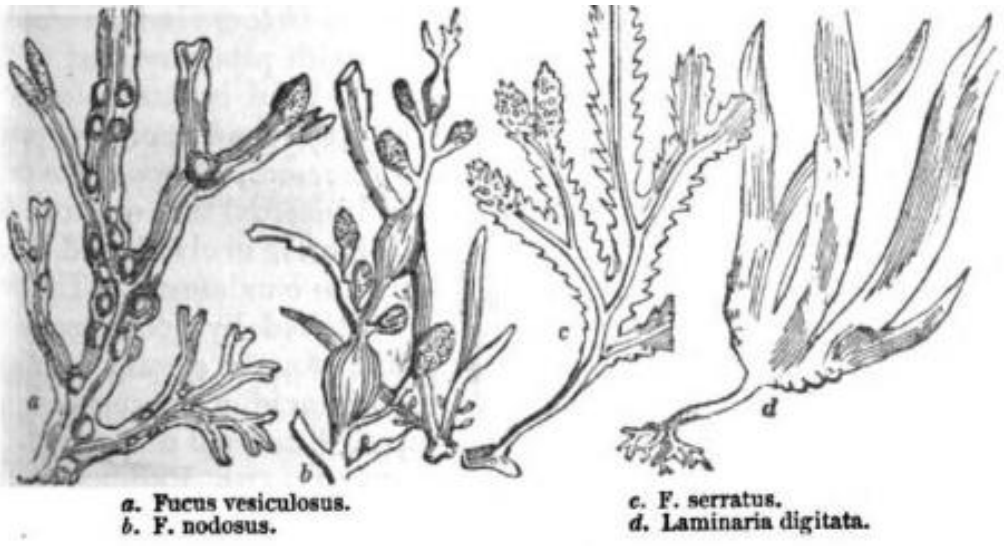


Figure 10: Some common seaweed species (Pereira, 1842, p. 233)

Table 1: Comparison of iodine levels in different species of seaweed

Species	Relative amount of iodine #	% dry weight+	Lbs. iodine per ton of ash+
Laminaria digitata (sea girdles)	100	Leaf 0.13-0.49 Stem 0.17-0.63	38.0
Laminaria bulbosa	65	-	-
Laminaria saccharina (sugar wrack)	35	Leaf 0.2-0.28 Stem 0.05 – 0.49	-
Laminaria hyperborean (tangle)	-	Leaf 0.09 – 0.42 Stem 0.40 – 0.76	30.5 23.4
Fucus serratus (black wrack)	20	0.04 – 0.177	4.9
Fucus bulbosa	15	-	-

Pereira, J., (1842), *The Elements of Materia Medica and Therapeutics*, vol. 2, p.233, data from Mr. Whitelaw, a manufacturer in Glasgow.

+ Table 10, p. 43 in Chapman, 1972, The uses of seaweed, 2nd. Edition

The % of iodine and other products obtained depends on several factors: the species of seaweed, whether the stem and leaf, location, season, post-harvest treatment and method of burning. Table 2 shows the range of yields of the main products – potash, soda and iodine – in good and bad kelp. Accidental or deliberate adulteration was always a problem and affected both the value of the kelp and also the reputation of the kelpers.

Table 2: The difference between good and bad kelp (Chapman, 1972, p. 31 quoting Henrick, 1898)

	Good kelp/% (lbs per ton)	Bad kelp/% (lb per ton)
Potash	15.1 – 21.95 (338-492)	5.75 – 8.5 (129 – 190)
Soda	13.7 – 16.85 (307 – 377)	2.55 – 10.05 (57.1 – 225)
Iodine	0.55 – 0.67 (12.3 – 15.0)	0.1 = 0.3 (2.2 – 6.7)

Economics of the kelp industry

After 1841 iodine was the main product obtained from kelp, but not the only one, and it would not have been economic to extract only iodine from kelp, at around 10-15 lbs. per ton of kelp, especially with its

fluctuating price. In fact, the other chemicals obtained from kelp helped to make the whole process worthwhile.

Thomas Porteous gave an interesting snapshot of the industry in 1854 from an American perspective, describing the industry in Glasgow, and thus he quotes prices in US $. (Porteous, 1856) I have converted these into £ using the contemporary exchange rates. He worked on the basis of an annual use of 9,000 tons of kelp, from Scotland and Ireland, and uses an average of 9 lbs. iodine/ton of kelp. 6,000 tons were worked in Glasgow, 2,000 tons in Borrowtouness (Bo'ness) and 1,000 tons in Ireland. In total 7,000 tons of kelp were produced by Ireland and 1,000 tons were worked in Ireland, presumably mostly by John Ward in Ramelton. This shows the importance of Ireland at this time as a source of kelp. Porteus describes the industries in Scotland, Ireland and France, which he judges to be considerably smaller at that time than that in Scotland and Ireland. I will just focus on the industry in Scotland and Ireland. Collection and freight of kelp cost $25 per ton (£5 per ton) and he estimated that $175,000 (£35,000) was distributed along ~ 200 miles of coast in Ireland. In 2020 this would be worth £3,794,000, which gives an idea of the importance of the industry to the local economy. His estimate for the total amount of kelp processed and the yield of iodine are probably both underestimated, but they give a good idea of the scale of the industry. Porteous estimates that 9,000 ton of kelp would produce on average:

- **81,000 lbs. iodine at 9 lbs. per ton**
- **4,500,000 lbs. potash at 500 lbs. per ton**
- **1,250,000 lbs. sulphate of potash at 150 lbs. per ton**
- **2,700,000 lbs. mixed carbonate, muriate (chloride) and sulphate of soda (kelp salt) at 300 lbs. per ton.**

All of these had some value, including the solid kelp waste, which was sold to Glasgow glass makers, who mixed it with sand and used it as a flux.

Porteous uses current values (in $) to estimate the value of these products to Scotland and Ireland. It is clear that iodine was worth 63% of the saleable products. Thus, even when potash from Stassfurt reduced the price of potash, it was still possible for iodine manufacturers to continue operating. In 1856 a US $ was worth about 4s and the converted figures are shown in brackets below in Table 3.

Table 3: Production figures and value of the Glasgow iodine industry (Porteus, 1856)

Iodine:	
81,000 lbs. at $3.00 per lbs:	$243,000 (£48,600)
Chloride and sulphate of potash:	
2,600 tons at $50 per ton:	$130,000 (£26.000)
Soda salts:	
1,350 tons at $5 per ton:	$6,750 (£1,350)
Kelp waste:	
4,000 tons at $1 per ton:	$ 4,000 (£800)
Total:	**$383,750 (£76,750)**

From these figures, iodine amounts to 62.5% of the total income, and so the profits of the industry were very dependent on the price of iodine. This oscillated widely in the mid-19th century due to speculation. The income from potassium salts was also important (33.9%) at this time but was soon to be undercut by imports from the Stassfurt salt deposits in Germany. The production of iodine estimated here amounts to 36.2 tons, and the Scottish industry seems to have produced typically 40-60 tons iodine per year. Porteous goes on to give a detailed description of the process for producing iodine from seaweed. Interestingly, the USA did not produce its own iodine until the early 20th century, when it turned to Californian seaweed to produce potash and iodine, and also acetone, during WW I.

After collection, drying and burning to kelp, the kelp was shipped by sea to the iodine works, mainly in Glasgow, but as we shall see, a number of small iodine factories were also built in Ireland from 1845 onwards. The various salts were removed by successive crystallisations, giving potassium and sodium salts as important and valuable by-products. The residual kelp liquor was first treated with sulfuric acid, to remove sulphur compounds produced during burning. It was then heated in a retort to ~ 100^{o}C with conc. sulphuric acid and manganese dioxide, which liberated iodine vapour.

$$\mathbf{2KI(aq) + MnO_2(s) + 2H_2SO_4(aq) \rightarrow K_2SO_4(aq) + MnSO_4(aq) + I_2(g) + 2H_2O}$$

The vapour was condensed in glass or clay aludels (ludels) as shown in Figure 11. The crude iodine was refined, if needed, by sublimation or converted into potassium iodide. Iodine was traditionally packed and shipped in 1 cwt. (112 lbs) wooden barrels, known as kegs.

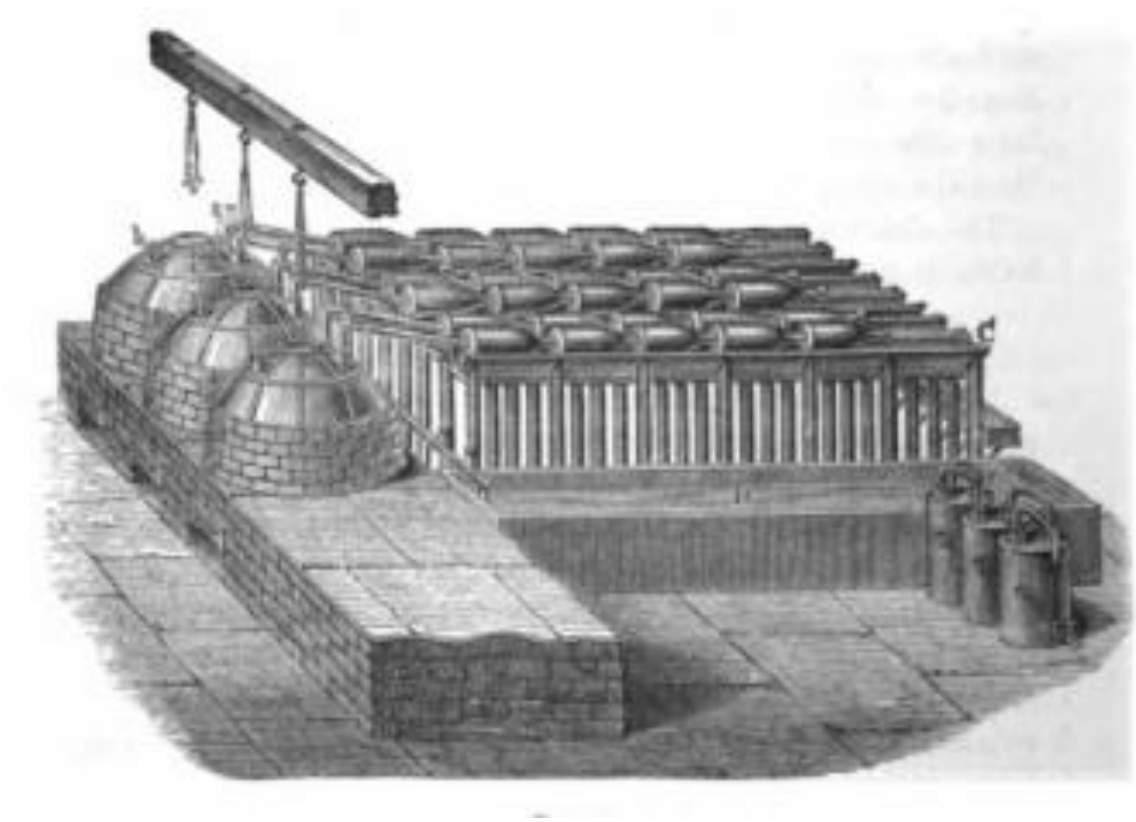


Figure 11: Iodine still (Roscoe, 1878, p.152)

The final process of producing iodine by distillation was common to all the different processes and Figure 12 shows the iodine crystals in the opened ludels in Chile.

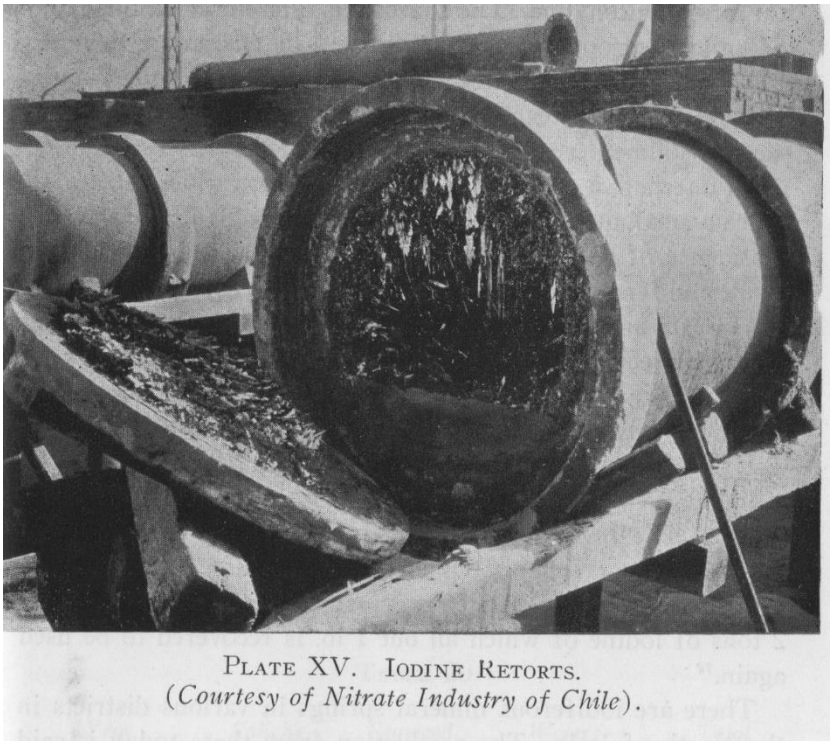


PLATE XV. IODINE RETORTS.
(*Courtesy of Nitrate Industry of Chile*).

Figure 12: Sublimed iodine (from the Chilean industry) (Armstrong and Miall, 1946, p.117)

Scotland became an important centre for iodine production, initially from the soap boiler's wastes, but later importing kelp specifically for dedicated iodine works. This production started sometime before 1840, and Andrew Ure (1817) described iodine production from soap wastes using MnO_2 as the oxidant in 1817. This modification of Courtois' method had evidently been suggested by the chemist William Wollaston, and became the main method used in Scotland and Ireland. The French lixiviators (the name given to iodine manufacturers from kelp), used chlorine (a stronger oxidising agent than iodine) to liberate iodine from the kelp liquor. Burning seaweed to produce kelp for alkali had been imported into Scotland from Ireland (see Clow and Clow, 1947 and 1950). Now the reverse happened, and Scottish industrialists imported iodine production from kelp into Ireland. Interestingly also, Irish kelp was richer in iodine than Scottish kelp and over 60% of the kelp used in Glasgow came from Ireland. The Scottish manufacturers had agents in Ireland who bought up kelp and shipped it to Glasgow. A notable Scottish manufacturer was William Paterson, who lixiviated 80% of the kelp in Glasgow and dominated the industry in the second half of the 19th century.

The iodine works in Ramelton (1845 - ~1885)

The first iodine works reported in Ireland was that of John Ward in Ramelton, on an arm of Lough Swilly, so it had sea access. The shores and islands off Donegal were rich in seaweed and Ramelton had good sea access to import coal and export kelp.

This report from the *Ballina Chronicle* 1850 shows that the iodine works was established in Ramelton (Rathmelton) by that date.

"An extensive manufactory has been established at Rathmelton and a good deal of kelp found in the Rosses is bought up by the agents from Scotland."

John Ward exhibited his products at the Great Exhibition in London in 1851 and also at the Cork Exhibition in 1852, along with Messrs. E. Bullock of Galway (Anon, 1851).

There was a lot of competition in the iodine industry from Glasgow manufacturers – they wanted to control both kelp supplies and the extraction of iodine. The mid 1840s saw a boom in manufacture, going from 4 to 20 companies, but this soon settled down to about 4-5 manufacturers in Glasgow and the Scottish lowlands. It would appear that John Ward (a branch of the Glasgow company J. Ward/Ward and Smith) was bought out by E.C.C. Stanford in 1867 and sold on to an Irishman sometime later.

The Ramelton firm appears under the names of John Loughran and James Mahony (1881 and 1885). It would appear from a passage in the baseline reports of the Congested Districts Board in 1892 that the Ramelton works was closed down by buying out the owner. It had been in Irish hands in 1885. There was a suggestion that the owner was paid £300 a year not to buy up and process kelp but rather leave it for the Glasgow manufacturers. The Ramelton iodine works thus appears to have been the longest-lasting of the several Irish factories.

Other iodine works in Donegal

The map In Figure 8 shows the location of iodine works in Ireland, all with the important sea access. There is a mention of iodine works in both Buncrana and Fahan on Lough Swilly. This quote referring to the situation in 1854 probably refers to Buncrana and Ramelton.

"Beside these, there were two in Ireland, located at the head of Loch Swilly, as being conveniently situated in the centre of the kelp district." (Porteus, 1856, 113)

Figure 13: Tullyarvan Mill, Buncrana, Co. Donegal location on John Hamill's iodine works. https://Tullyarvanmill.com/history/

The Buncrana works was run by Mr Hamill and was located in Tullyarvan Mill, Bunrana (Figure 13), which still stands. Mr Hamill was declared bankrupt in 1858, so presumably the works closed. There was also reference to an iodine works at Fahan, down the coast from Buncrana owned by a Mr Bond, which closed in 1900 due to bankruptcy. Nothing much seems to be known about either of these works. Apart from the works mentioned in Donegal above, there were other iodine works in Galway and Freagh, Co. Clare.

Iodine works in Galway

Various companies set up in Galway to process kelp from the Aran Islands and the West coast into iodine. We have already mentioned Edward Bullock who was making iodine and other products in 1851. From 1863 to 1877 the Irish Marine Salts set up a factory to extract iodine and other salts on Long Walk in Galway, on the docks, and also built a factory on the river at Terryland to process the waste from the kelp process into fertiliser, which was and is known locally as 'The iodine' (Figure 14) and the remains can

still be seen. It was set up to exploit James McArdle's patent process, which sounds a lot like that of Edward Stanford (Stanford , 1862), who sued for breach of patent. We have an interesting report on the Long Walk factory from 1865 (Anon, 1865), describing the process in use. The firm also built factories on the Aran Islands, and the remains of one can be seen at Port Chorruch.

Figure 14: 'The Iodine' on the banks of the Corrib, where the waste from the iodine works was turned into fertiliser (see (67) Ruins of the iodine factory Terryland Galway - YouTube)

> *"Iodine Manufactory. The Marine Salts Co. of Ireland (Ltd.) want to increase their operation. They have a factory at Long Walk, Galway, and buildings in Arran for drying and burning kelp to be taken as ash to Galway. The Company has originated a process of converting seaweed to ash which is patented. There are twenty-six men employed under Mr Glassford in Galway. The following substances are produced in abundance: Muriate of potash (used in the manufacture of powder, for which there is a brisk demand in Liverpool), Sulphate of potash (used in the manufacture of fine glass), Glauber salts, Soda salts (for the manufacture of coarse glass). The grand result produced from the factory is Iodine, with a standing order from London for as much as possible. The refuse makes manure."* (Anon, 1865)

Figure 15: 1865 photo showing The Iodine Works on Long Walk in Galway.

There is still local knowledge in Galway of 'The iodine', the remains of which can be seen on the Corrib (Figure 14). However, this is not where the kelp was processed to give iodine, as this was done in a factory on The Long Walk, adjacent to the docks, although this only operated from 1865-1877 (Figure 15). The kelp waste was shipped up-river to 'The Iodine' compound, where it was processed into fertiliser, a valuable by-product of the works.

"Another was the Iodine Factory on Long Walk which was owned by McArdle and Bullock. They were the only factory in the County in the period after the Famine to harvest seaweed.

The Long Walk factory consisted of a number of sheds, floored with perforated flags, under which were situated large tanks. Raw seaweed was stored in the sheds, and as it decomposed, liquid matter flowed into the tanks. This was then distilled into something resembling charcoal from which was extracted a number of substances including iodine.

The decomposed seaweed was then taken by barge up the canal and river to an auxiliary factory at Terryland, where it was rendered into fertiliser. This was quite an extensive operation as we can see from today's photograph, which dates from about 1865, and was given us by the National Library. This building has been known to generations of oarsmen going up and down the Corrib simply as "The Iodine".

People living close to the Long Walk operation had complained about emissions from the plant, which were regarded as poisonous, so the company erected a depot on the Aran Islands for the collection of seaweed. Eventually much of the processing was done on Aran, which meant less raw material having to be transported to Galway. In 1866, the Long Walk factory was extended, and, for a number of years, thrived. Sadly, however, by 1876, it had become uncompetitive, and closed down. The premises was eventually taken over by a Mr. Irvine, and he manufactured sulphuric acid there.

The above information and photograph are extracted from a publication entitled "Galway, A Town Tormented By The Sea", written by John Cunningham."

http://www.kennys.ie/News/OldGalway/02122004-TheIodine/

In the reports of Dáil Eireann of the Irish Free State in the 1920s and 30s there was extensive discussion about reviving the kelp industry and the production of iodine to provide local employment. It appears that an iodine factory was set up ~1930 in Galway but closed soon after, when iodine prices collapsed in the Great Depression, and with the demise of the Iodine Cartel, which was set up in the 1870s between Chile and European iodine manufacturers to stabilise iodine prices.

An eye-witness account from 1905 by J.M. Synge (1907)

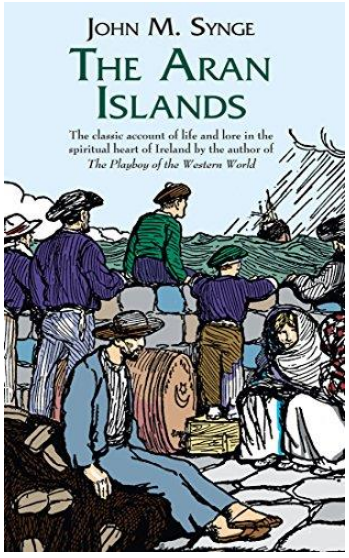


Figure 16: Cover of John Millington Synge's 'The Aran Islands'

The book (Figure 16) by J.M. Synge, *The Aran Islands* (Synge, 1907) has an account of kelp burning on Aran, which was also published earlier in 1905 in *The Manchester Guardian*. Although this is written much later than the hey-day of the industry, it was being conducted in much the same manner, well over 100 years after its inception.

> *The people had taken advantage of this dry moment to begin the burning of the kelp, and all the islands are lying in a volume of grey smoke. There will not be a very large quantity this year, as the people are discouraged by the uncertainty of the market, and do not care to undertake the task of manufacture without a certainty of profit.*
>
> *The work needed to form a ton of kelp is considerable. The seaweed is collected from the rocks after the storms of autumn and winter, dried on fine days, and then made them into a rick, where it is left till the beginning of June.*
>
> *It is then burnt in low kilns on the shore, an affair that takes from twelve to twenty-four hours of continuous hard work, though I understand that the people here do not manage it well and spoil a portion of what they produce by burning it more than is required.*
>
> *The kiln holds about two tons of molten kelp, and when full it is loosely covered with stones, and left to cool. In a few days the substance is as hard as the limestone, and has to be broken with crowbars before it can be placed in curraghs for transport to Kilronan, where it is tested to determine the amount of iodine it contains, and paid for accordingly. In former years good kelp would bring seven tons a ton, now four pounds are not always reached.*
>
> *In Aran even manufacture is of interest. The low flame-edged kiln, sending out dense clouds of creamy smoke, with a band of red and grey clothed workers moving in the haze, and usually some petticoated boys and women who come down with drink, forms a scene with as variety and colour as any picture from the East.*
>
> *The men feel in a certain sense the distinction of their island, and show me their work with pride. One of them said to be yesterday, 'I'm thinking you never saw the like of this before this day?'*
>
> *'That is true,' I answered, 'I never did'.*
>
> *'Bedad, then,' he said, 'Isn't it a great wonder that you've seen France, and Germany, and the Holy Father, and never seen a man making kelp till you come to Inishmaan.'"*

Edward Stanford's scientific approach

In 1862 a young English chemist called Edward C.C. Stanford won a silver medal from the Royal Society for Arts for an essay on 'The economic utilisation of seaweed' (Stanford, 1862).

The burning of seaweed to kelp was a traditional process and as such it was wasteful, uneconomic and unselective in almost every aspect. Stanford's new process was known as the char process, and in it he burnt the seaweed in an enclosed kiln and recovered more iodine and salts in the ash, as well as other valuable products (Table 4.) The Duke of Argyle persuaded him to try out his new 'Char Process' on the Island of Tiree (Booth, 1978). He built factories in the Hebrides, on Tiree and N. Uist, and on Clydebank, Glasgow. Stanford gave up a promising academic career as a pharmaceutical chemist in London and set out to put his ideas into practice in the depths of winter on a wild, Scottish shore. He succeeded against many odds and was to spend the rest of his life, until he died in 1899, in the service of seaweed chemistry

and in trying to bring prosperity to the Scottish crofters. It was this process he introduced to Ireland in the Freagh works, in 1878. The factory on Tiree operated from 1863 to 1901, with some success. It wasn't an ideal location in many ways and Stanford opened a larger factory on N. Uist. Eventually Stanford shifted the processing of the ash to Glasgow.

This process involved the heating of dry seaweed in a kiln to produce charcoal, with the collection of gaseous by-products. The salts and iodine remained in the char and because the burning was controlled and at a lower temperature, the yields of iodine were much higher than in the traditional kelp process (see Table 4.)

Table 4: Comparison of products from Laminaria digitate by the kelp and char processes. (Stanford, 1862; Chapman, 1970)

Laminaria digitata produces 1 ton kelp, 2240 lb.

Traditional process	
Potash	**728 lb.**
Soda	**717 lb.**
Ash	**425 lb.**
Iodine	**12.5 lb.**
+ in addition	
From Stanford's char process	
Volatile oil	**4.75 gal.**
Paraffin oil	**0.75 gal.**
Naphtha	**3 gal.**
Ammonium sulphate	**158 lb.**
Calcium acetate	**17.5 lb.**
Charcoal	**931 lb.**
Gas	**3,615 ft^3**
Iodine	**19.4 lb.**

This meant the yield of iodine was more than doubled in the char process. The factory on Tiree was operated from 1863 to 1901, and another factory was opened on North Uist at Loch Eport, though the process was never a great commercial success. Around 1878, Stanford of the North British Chemical Company of Clydebank, Glasgow was prevailed upon by local interests in Clare to build an iodine works at Freagh, near Miltown Malbay, to utilise the seaweed thrown up on this coast, using his char process. (Booth, 1979) It was built and operated for a couple of years but was closed due to an industrial accident. From then on, the kelp works was used to store kelp made locally, for shipment to Stanford's factory in Glasgow. It is not clear when this operation closed.

Stanford continued researching the use of seaweeds and he also invented the wet process, which involved no heating, produced the biggest yield of iodine and salts, and also another by-product, which he named 'algin', now known as alginic acid. This organic compound found in seaweed formed the basis of the third and ongoing phase of the industry.

The LeBlanc process had destroyed the soda from kelp industry in the 1820s. Now iodine was discovered in Chilean nitrate deposits in the 1860s, which were being exploited for fertilisers and explosives. The first commercial shipment of iodine to Europe arrived in 1874, breaking the 60 year-old seaweed monopoly on iodine. Iodine in the form of iodate, was an impurity in the nitrate deposits, and was available in large quantities. The Chilean industry could easily produce 5,000 tons of iodine a year when the world demand was only 500 tons and the iodine from seaweed industry could not compete on cost or quantity. However, the iodine industry from seaweed struggled on to the 1930s, thanks to a cartel (syndicate) between the Scottish, French and Chilean producers, set up in the 1870s, which kept prices up and stabilised the market. But that is another story. Also, deposits of potassium chloride were discovered in Stassfurt, Germany around 1860 and this destroyed the market for potash from kelp and other plant ashes, then the only sources. Potassium salts had been an important by-product of the iodine industry. This was a double whammy, which almost destroyed the seaweed industry for a second time. But Edward Stanford had another card up his sleeve due to his continuing researches, as we will see later.

The death of the iodine industry in Ireland

Despite several attempts to produce iodine from Irish seaweed, from 1845 onwards, by the end of the century all the factories had closed. Dillon (1930, p. 272) commented in 1930:

"Notwithstanding the competition of Chile and the restricted market, there is an iodine factory in every kelp producing country in the world except Ireland."

At that time there were still iodine factories in Scotland and in France. Kelp was still being produced and exported to Scotland, but Dillon (1930, p. 273) laments that:

> *"Ireland's function is to fill up the requirements of the Scotch manufacturers when they have bought all the kelp they can at home. Although the raw material is on the spot, the necessary combination of capital, enterprise and knowledge has not appeared for the revival of iodine production in this country. The consequence of this to the kelp industry is serious. The kelp-makers are in the hands of agents for foreign buyers, and the price paid for the commodity is not very high and is by no means certain."*

Interestingly around this time (1929 onwards) there was considerable discussion in Dail Eireann about starting a new iodine factory in Galway, and it would appear that one was built in Galway, but was closed in a year or two due to the collapse of iodine prices. The profitability of the kelp industry was always dependent on the price of iodine. This was the last gasp of the Irish iodine industry, although kelp continued to be produced and exported and after WW2 a new seaweed industry, based on alginates, was started.

Phase 3: alginates from seaweed 1881 - today

Following the partial success of his char process, Stanford continued to do research on seaweed to find cheaper and more efficient ways to extract iodine and other salts from seaweed. In 1883 he published his

researches (patented in 1861) on the extraction of a new substance from seaweed, which he called algin, which he extracted together with iodine and salts (Stanford, 1883). This was known as the wet process. Alginic acid is a complex carbohydrate (Figure 17).

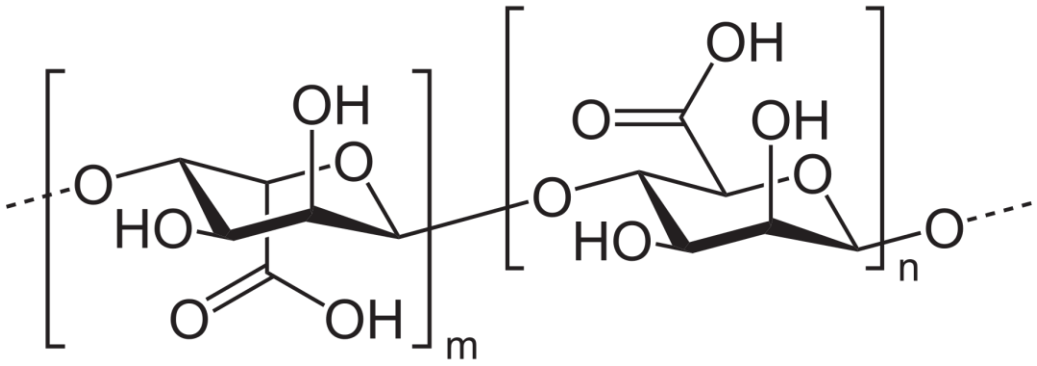


Figure 17: Structure of alginic acid (Alginic acid - Wikipedia)

It was an interesting material, responsible for the sliminess of seaweed, and Stanford tried to find uses for this novel product. It only became widely used in the 1930s but is now the basis of a large, worldwide industry. Alginates are found in many food products including ice-cream. Seaweed is still collected in Ireland, initially through Arramara Teoranta, set up in 1947, though this company is now owned from 2014 by a Canadian company, Acadian Seaplants. The seaweed was dried and ground and seaweed meal was exported to factories in Scotland for conversion into alginates, though these closed in 2009 and production of alginates was shifted to Norway. (Bailey, 2020)

These products are now widely used in the food industry, for example, for stabilising ice-cream and in cosmetics, fibres, glues etc., although their importance wasn't recognised until the early 20th.century, and new uses continue to be developed.

Stanford's alginate process used cold, solution processing to extract alginates as well as iodine and salts from raw seaweed. The expensive and inefficient burning and distillation processes were thus avoided. Treatment with acid dissolved out the soluble salts, and the organic matter was then dissolved in sodium carbonate to separate and purify the alginates. Alginic acid was then precipitated out by adding acid or by precipitating calcium alginate. The initial extract contained the iodine as iodide and other salts. This is known as the wet process, by comparison with the original kelp process and Stanford's char process.

Thomas Dillon and Vincent Barry did a lot of research on the chemistry of seaweed and alginates in the 1930s and 40s, at University College, Galway. Thomas Dillon was very eager to see the seaweed industry revived to provide employment on the western seaboard. (Dillon, 1930) The tradition of seaweed research at, what is now, NUI Galway continues, with the Seaweed Research Centre under Michael Guiry. (www.seaweed.ie)

From 1947 Ireland had an industry harvesting seaweed on the west coast and converting it into meal, most of which was exported to Scotland. It was originally known as Alginate Industries (Ireland) Limited and from 1949, the government took a share, and later in 1954 was renamed Arramara Teoranta (www.arramara.ie) . In 2014 it was controversially sold to a Canadian company, Acadian Seaplants. Over 40,000 tonnes of seaweed were harvested each year for this industry at its peak in Ireland. (Seaweed in Ireland (bordbia.ie).

Phase 4: Biomass and biofuel – a new future for seaweed?

The seaweed story isn't finished – one of the latest developments is to try and extract biofuel from marine algae. A joint Scottish, N. Ireland and ROI project was launched in Belfast in 2009 called Biomara. There is continuing worldwide interest is using algae as a source of biofuel.

Seaweed is a renewable green resource and vast resources are available on every coast. Annual harvesting of seaweed is estimated at over 2 million tonnes. The green credentials of seaweed, its variety (there are thousands of species) and wide availability, means that it has spawned a myriad of small industries. Kerry Algae was set up by Henry Lyons in Tralee to produce organic fertilisers from seaweed. Many other indigenous companies produce foodstuffs and health products, including seaweed baths, as well as cosmetics, all from seaweed. It truly is the gift that goes on giving in abundance. The Irish seaweed industry is indeed an unfinished story

The seaweed industry in the arts

Considering how important the seaweed industry was in Ireland and Scotland, it is not surprising that it has featured in the arts – in literature, poetry, painting and photography, as it lasted well into the 20th century. The history of the utilisation of seaweed in Ireland is an interesting and unfinished story, going back three centuries, which has been celebrated by in writing by various writers including J. M. Synge, Tomás O'Flaherty, Pat Mullen, Seamus Mac an Iomaire and Tim Robinson amongst others, and by artists such as Aloysius O'Kelly, Sean Keating, Samuel Lover, Jack Yeats and others. Jack Yeats illustrated with line drawings a series of articles in 1905 in the *Manchester Guardian* by John Millington Synge and they appeared in John M. Synge's book (Figure 18). The site Coast: The harvest of the sea – The Eclectic Light Company has a number of seaweed paintings.

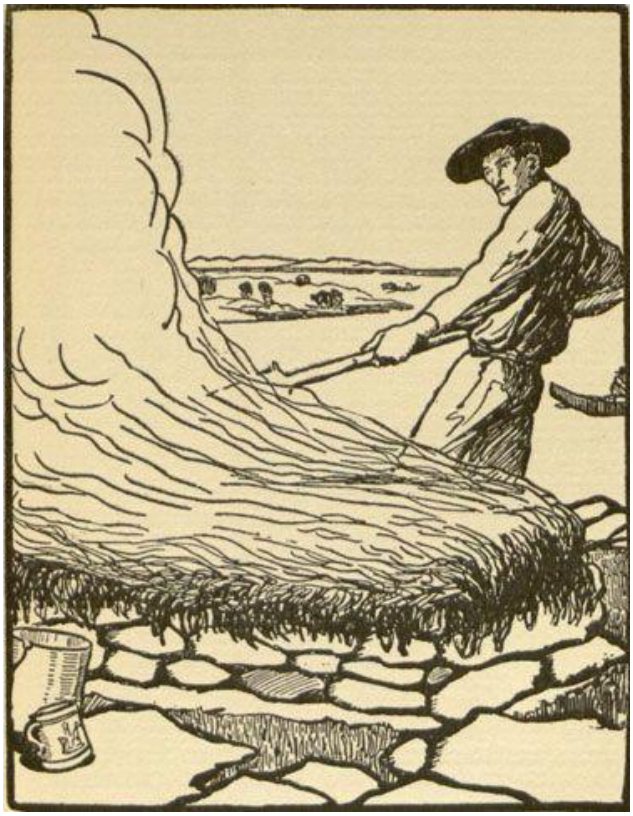


Figure 18: Jack B. Yeats drawing of the Kelp Burners in *The Aran Islands* by John M. Synge.

I gave a talk with this title in a National Science Week in the Limerick City Art Gallery some years ago, and discovered a painting showing seaweed burning in the gallery by Sean Keating (Figure 19). This captures the intensity of the kelp burning process, towards the end of its long life, probably in the 1930s.

Figure 19: The Kelp Burners, (nd), Seán Keating, PPRHA, HRA, HRSA (1889-1977) Oil on linen, 101 x 121 cm (unframed); Part of the Permanent Collection of Limerick City Gallery of Art.

Many of the paintings of the late 19th and early 20th century show the gathering of seaweed on the shore and much of this was destined as a green manure, rather than for producing of chemicals. The use of seaweed to improve the land was at the heart of John B. Keane's play and film *'The Field'*. Seaweed is still used for this purpose by some farmers and smallholders on the coast. There is an evocative poem by Moira O'Neill (the pseudonym of Agnes Shakespeare Higginson. 1864–1955) titled 'Seawrack'. Wrack is an alternative name for seaweed.

SEA WRACK

The wrack was dark an' shiny where it floated in the sea,
There was no one in the brown boat but only him an' me;
Him to cut the sea wrack, me to mind the boat,
An' not a word between us the hours we were afloat.

The wet wrack,
The sea wrack,
The wrack was strong to cut.

We laid it on the grey rocks to wither in the sun,
An' what should call my lad then, to sail from Cushendun?
With a low moon, a full tide, a swell upon the deep,
Him to sail the old boat, me to fall asleep.

The dry wrack,
The sea wrack,
The wrack was dead so soon.

There' a fire low upon the rocks to burn the wrack to kelp,
There' a boat gone down upon the Moyle, an' sorra' one to help!
Him beneath the salt sea, me upon the shore,
By sunlight or moonlight we'll lift the wrack no more.

The dark wrack,
The sea wrack,
The wrack may drift ashore.

Moira O'Neill

Conclusion

I hope that this overview of the development of seaweed as a chemical raw material in Ireland – first for alkali for soap and glass, then for iodine for medicine and photography, and potash for fertiliser, and finally for alginates for food and cosmetics - over a period of over 300 years, has thrown a spotlight on Ireland's industrial development and a largely forgotten industry. The seaweed industry was also important in Scotland, the Scillies, Channel Islands, France, Spain and Norway, as well as in Japan, China and America. It was and is a renewable and mostly underutilised resource.

It is an unfinished story and incomplete story, as seaweed is still harvested, and I still have many unanswered questions about the historic Irish industry, as much more has been written about Scotland than about Ireland.

This industry lasted over 300 years and yet you will have to work hard to find out any mention of it in Ireland. France also had a thriving seaweed industry, located in Brittany, and it only died out in the 1950s. However, there is an excellent museum of the industry in Brittany at Plouguerneau, which keeps the memory of the industry alive. (Plouguerneau's Eco museum, the museum dedicated to seaweeds and seaweed gatherers, maritime heritage in Finistère, Brittany (ecomusee-plouguerneau.fr)) Why is there no such museum in Ireland to preserve the tradition and memory of thousands of Irish people who laboured in this industry? The obvious locations would be either Ramelton (for the Donegal industry) or Galway (for the west coast industry, including the Aran Islands.) The last remains of the industry have largely disappeared and it is a pity to lose the memory as well, although there is a welcome increase in interest in the archaeology of the industry.

I would be happy to hear from anyone with more details about the iodine works in Ireland, at Buncrana, Fahan, Ramelton, Galway or Freagh.

During the 19th century the kelp industry, in Scotland and Ireland, went from boom to bust, from localised to centralised, from small-scale to large-scale, and from craft-based to science-based. It was finally destroyed not by lack of resources, as seaweed is an abundant, renewable resource, or lack of energy and innovation, but by the discovery of cheaper and more abundant and more easily won sources of soda, potash and iodine in mineral deposits. In the long-term these are all finite resources and will eventually be used up and then seaweed may again become an important source of chemicals.

References

Anon**,** (1851), *Freeman's Journal*, 27th. Sept., (reprinted in the *Donegal Annual*, **2**(1), **1951)**

Anon, (1866), *Galway Vindicator*, 6 May (quoted in Robinson, 1986)

Armstrong, E.F. & Miall, L.M., (1946), 'Iodine and the seaweed industry', ch. 7 in *Raw Materials from the Sea*, Brooklyn: Chemical Publishing Co. Inc., pp. 110-130

Bailey, J., (2020) 'The history of alginate extraction', available at https://www.gracesguide.co.uk/The_History_of_Alginate_Extraction_by_Jim_Bailey Accessed 15/3/21

Booth, E., (1978), "The history of the seaweed industry Part 2: E.C.C. Stanford and the iodine industry", *Chemistry & Industry*, pp. 838-840

Booth, E., (1979), "The history of the seaweed industry Part 3: the iodine industry", *Chemistry & Industry*, pp. 52-55.

Chapman, V.J. (1950), *Seaweeds and their uses*, 1st. edition, London: Methuen & Co. Ltd.

Available at:

Seaweeds And Their Uses : V. J. Chapman : Free Download, Borrow, and Streaming : Internet Archive

Accessed 11/3/21. Especially chs. 2 'Mainly historical' and ch. 3, 'The kelp industry and iodine.'

(A second edition was published in 1970 and a 3rd edition in 1980, with D.J. Chapman)

Chapman, V.J., (1972), *Seaweeds and their uses*, London: Methuen & Co. Ltd

Childs, P.E., 1998, 'The early chemical industry and industrialists in Ireland', *Irish Chemical News*, **XII**(1), 18-25, Summer 1998

Childs, P.E., (2001), "Ireland's forgotten industry", *Earthwatch*, 54 Autumn 2001, p. 28

Childs, P.E., (2002), "James Muspratt, Industrial Chemist", in *Irish Innovators in Science and Technology* , edited by Charles Mollan, Samton, Dublin, pp. 68-69. Also C. Mollan, "James Muspratt (1793-1886)", *It's Part of Who We Are: Science and Irish Culture*, Vol. 1, 2007, Royal Dublin Society, Dublin, pp. 406-415

Clow, A. and Clow, N.L., (1952), "The trade in ashes and kelp", ch. III in *The Chemical Revolution*, London: The Batchworth Press, pp. 65-90

Clow, A. and Clow ,N., (1947), "Natural and economic history of kelp", *Annals of Science*, **5**(4), pp. 297-316

Dillon, T., (1930), "Iodine and Potash from Irish Seaweed", *Studies*, pp. 267-278

Evans, E. E., (1972), *Irish Folk Ways*, London: Routledge and Kegan Paul

Forsythe, W., (2006), The Archaeology of the Kelp Industry in the Northern Islands of Ireland, *International Journal of Nautical Archaeology*, **35**(2), pp. 218 - 229

Hardiman, J., (1820), *History of the town and county of Galway*, Dublin: Folds and Sons

Harper, D., (1972), 'Kelp burning in the Glens of Antrim', *The Glynns*, **2** (reprinted online 2014) Available online at Kelp Burning In The Glens of Antrim by Douglas Harper – Glens Of Antrim Historical Society (antrimhistory.net) Accessed 11/3/21

Hendrick, J., (1898), 'The use and value of seaweed as a manure', *Trans. Highl. Agric. Soc. Scotland*, Series 5, **10**, 118-134

L'Amie, A., (1984), *Chemicals in the Eighteenth Century Irish Linen Industry*, unpublished Master's Thesis, Queen's University, Belfast, 1984

Mac an Iomaire, S., (2000), *The Shores of Connemara*, translated by Padraic de Bhaldraithe, Kinvara, Tir Eolas, p. 140. The book has chapters on Kelp making and on Seaweed, pp. 139-173. The book was written in the 1920s by an Irish emigrant to America, who came from Connemara in 1926, and was first published in Irish in 1938 by the Irish Department of Education.

McErlean, T., McConkey, R. and Forsythe, W., (2002), "The archaeology of the 18th and early 19th century kelp industry in Strangford Lough", Ch. 11 in *Strangford Lough: An archaeological survey of the maritime cultural landscape*, Belfast: Blackstaff Press, Belfast, pp. 334-358

McErlean, T.C., (2007), ‘Archaeology of the Strangford Lough Kelp Industry in the Eighteenth- and Early-Nineteenth Centuries’, *Maritime Archaeology in Ireland*, 41(3), pp. 76-93

Newton, L., (1951), *Seaweed Utilisation*, London Sampson Low

Especially Ch. 3 ‘Extraction of soda, potash and iodine’ and Ch. 4, Algin Childs, P.E., (1998), “The early chemical industry and industrialists in Ireland”, *Irish Chemical News, XII(1),* pp.18-25 (also reprinted in *Chemistry in Action!*, 55, 1998, 10-20)

Pereira, J., (1842), *The Elements of Materia Medica and Therapeutics*, 2nd. Edition,volume 1, London: Longman, Brown, Green and Longmans

Porteus, T., (1856), ‘On the manufacture of iodine from the ashes of seaweed’, P*roceedings of the American Pharmaceutical Association at the Annual Meeting,* Volume 6, 110-120

Robinson, T., (1986), *Stones of Aran: Pilgrimage*, Dublin: Wolfhound Press

Roscoe, H.E. & Schorlemmer, (1878*), A Treatise on Chemistry*, New York: D. Appleton

Stanford, E.C.C., (1862), “On the Economic Applications of Seaweed”, *J. Society of Arts*, Feb. 14, pp. 185-199

Stanford, E.C.C., (1883), ‘New substance obtained from the commoner species of marine algae,’ *Chem. News.*, 47, pp. 267-269

Synge, J.M., (1961) *The Aran Islands*, George Allen & Unwin, London, 1961, pp.45-46

First published in 1907 in *The Manchester Guardian* and as vol. III of the *Collected Works* in 1910.

Wisniak, J., (2001), ‘The History of Iodine From Discovery to Commodity’, *Indian J. Chem. Tech.*, 8, pp. 518-526

The Institute of Chemistry of Ireland and
the Irish Biological Inorganic Chemistry Society
are delighted to be co-hosting a webinar entitled:

COVID – A Year Like No Other, Where Next?

by
Dr Fidelma Fitzpatrick
RCSI, University of Medicine and Health Sciences

on Friday, 28th May, 2021 from 13.00-13.45 (via MS Teams)
To register, please complete the registration form
by clicking this link ICI/IBICS Webinar Registration Form (office.com)

no later than **Tuesday, 25th May, 2021**

Dr Fitzpatrick is a Senior Lecturer in RCSI, University of Medicine and Health Sciences and a Consultant Microbiologist in Beaumont Hospital, Dublin. As the first national clinical lead for the prevention of healthcare-associated infection (HCAI) and antimicrobial resistance (AMR), Dr Fitzpatrick established the national clinical programme, coordinated the national HCAI and AMR work plan, lead the national public information campaign on antibiotics, national hand hygiene and antimicrobial stewardship programme and oversaw the establishment of the National AMR Inter-Sectoral Coordinating Committee between the Dept of Health and Dept of Agriculture. Dr. Fitzpatrick is the chair of the National Sepsis Governance Committee in the Health Services Executive, the chair of the Scientific Advisory Committee of the Health Protection Surveillance Centre and a member of the Board of the Dublin Dental Hospital. In addition, Dr. Fitzpatrick retains an interest in public engagement in HCAI and AMR.

Chemistry Europe

European Chemical Societies Publishing

ChemPubSoc Europe becomes Chemistry Europe: a new look for a new future

31st March 2020

ChemPubSoc Europe is proud to announce that from today it becomes **Chemistry Europe**. It is unveiling a new identity and a renewed purpose, fit for the future of chemistry and of publishing.

Founded 25 years ago with the creation of *Chemistry A European Journal*, now the societies' flagship publication, Chemistry Europe is an association of 16 European chemical societies, representing over 75,000 chemists.

The redefining of our core values and visual representation of our identity has been in motion since June 2018, driven by a team made up of stakeholders from our societies, our Council and from our publishing partner Wiley-VCH. During the project, researchers and society members were asked about what they value and what they need from their scientific community, learned societies and scholarly journals: the result is Chemistry Europe.

'*To ensure we continue to grow our successful publishing partnership into the future, we have been working together, to redefine our identity and to reflect on our core values and mission. Our aim is to maximise the impact of Chemistry Europe and its journals now and into the future by sharing the broadest range of quality chemistry research to researchers and practitioners across the globe.'* Jan-Willem Toering, Director of KNCV, the Royal Netherlands Chemical Society, and member of the Chemistry Europe Council.

'*Our 16 journals are at the heart of what we do and what we stand for, so to be launching their new identity is a landmark occasion for us. It clearly showcases the journals as a family, encompassing a very broad range of chemistry disciplines, offering vital research to address global issues such as climate change and energy consumption.*' Professor Dr Wolfram Koch, Executive Director of GDCh, the German Chemical Society, and member of the Chemistry Europe Council.

'*We are delighted to have worked so closely with the societies on this project and feel privileged to have been publishing partners for 25 years. We move forwards together ready to embrace the open future of science, chemistry and publishing*.' Guido Herrmann, VP and Managing Director, Wiley-VCH.

Today we also formally announce 37 new Fellows, who are nominated to honour their extraordinary support and service to us and our societies. The Fellowship is the highest award given by Chemistry Europe and this year the nomination of the Fellows will be celebrated at a reception during the 8th EuChemS Chemistry Congress in Lisbon.

https://chemistry-europe.onlinelibrary.wiley.com

Open Science - Chemistry Europe (wiley.com)

About Chemistry Europe

Founded in 1995, Chemistry Europe is an association of 16 European chemical societies, representing over 75,000 chemists. Our mission is to evaluate, publish, disseminate and amplify the scientific excellence of chemistry researchers from around the globe in high-quality publications. We support our members at every stage of their careers as they strive to solve the challenges that impact humankind. We value integrity, openness, diversity, cooperation and freedom of thought. www.chemistry-europe.org.

About the Chemistry Europe Fellows

The Chemistry Europe Fellows Program was established in 2015 under the name ChemPubSoc Europe Fellowship. In that year 35 chemists were honoured; in 2018 another 37 chemists were recognized for their outstanding support as authors, advisors, guest editors, referees as well as their service to their national chemical societies.

Please meet the Chemistry Europe Fellows, Class 2018/2019:

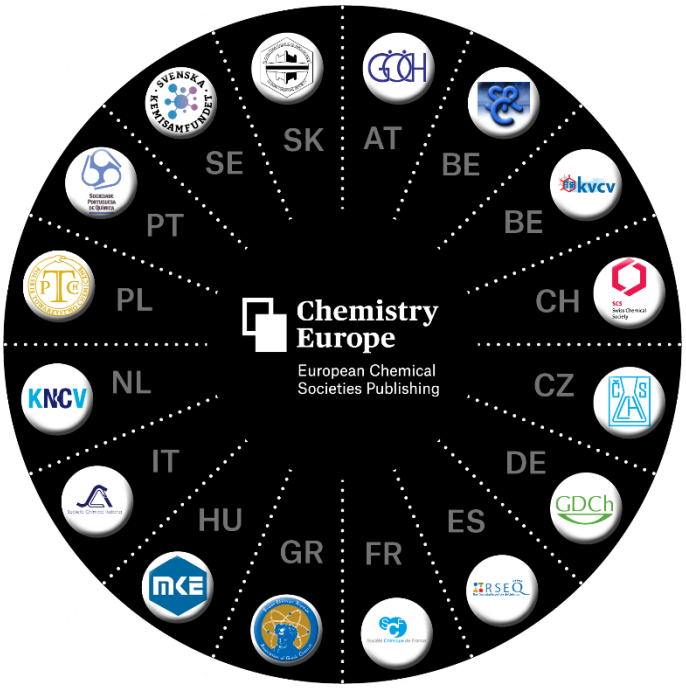
Ana Albéniz (Spain), *Annette Beck-Sickinger* (Germany), *Matthias Bickelhaupt* (Netherlands), *Silvia Bordiga* (Italy), *Uwe T. Bornscheuer* (Germany), *Bas de Bruin* (Belgium), *Anthony J. Burke* (Portugal), *Gilberte Chambaud* (France), *Benoît Champagne* (Belgium), *Iris Cornet* (Belgium), *Pier Giorgio Cozzi* (Italy), *Gianluca Farinola* (Italy), *Ivana Fleischer* (Slovakia), *Katharina Fromm* (Switzerland), *Karl Gademann* (Switzerland), *Piet Herdewyn* (Belgium), *Nicola Hüsing* (Austria), *Lene Hviid*, (Netherlands), *Ferenc Joó* (Hungary), *Karl Anker Jørgensen* (Denmark), *Burkhard König* (Germany), *Martin Kotora*, (Czech Republic), *Mário Nuno de Matos Sequeira Berberan E Santos* (Portugal), *Ronald Micura* (Austria), *Viktor Milata* (Slovakia), *Jean-François Nierengarten* (France), *Marcin Opałło* (Poland), *Pedro J. Pérez* (Spain), *Amélia Pilar Rauter* (Portugal), *Vladimír Šindelář* (Czech Republic), *Agneta Sjögren* (Sweden), *Matthieu Sollogoub* (France), *Peter Somfai* (Sweden), *Sir J. Fraser Stoddart* (USA), *Nikos Tagmatarchis* (Greece), *Tomás Torres* (Spain), *Anna Trzeciak* (Poland).

United through global chemical challenges, these 37 chemists of different generations live and work in more than 18 countries.

Media contact: Lucy White, **luwhite@wiley.com**.

Chemistry Europe Members

A partnership of 16 European chemical societies nurturing a family of high-quality chemistry journals. To become a member of Chemistry Europe simply join one of the societies.



Austria
Gesellschaft Österreichischer Chemiker (GÖCh)
SOCIETY VOLUME

Belgium
Société Royale de Chimie (SRC) and
Koninklijke Vlaamse Chemische Vereniging (KVCV)
SOCIETY VOLUME

Czech Republic
Česká společnost chemická (ČSCH)
SOCIETY VOLUME

France
Société Chimique de France (SCF)
SOCIETY VOLUME

Germany
Gesellschaft Deutscher Chemiker (GDCh)
SOCIETY VOLUME

Greece
Association of Greek Chemists (EEX)
SOCIETY VOLUME

Hungary
Magyar Kémikusok Egyesülete (MKE)
SOCIETY VOLUME

Italy
Società Chimica Italiana (SCI)
SOCIETY VOLUME

The Netherlands
Koninklijke Nederlandse Chemische Vereniging (KNCV)
SOCIETY VOLUME

Poland
Polskie Towarzystwo Chemiczne (PTC)
SOCIETY VOLUME

Portugal
Sociedade Portuguesa de Química (SPQ)
SOCIETY VOLUME

Slovakia
Slovenská chemická spoločnosť (SCS)
SOCIETY VOLUME

Spain
Real Sociedad Española de Química (RSEQ)
SOCIETY VOLUME

Sweden
Svenska Kemisamfundet (SK)
SOCIETY VOLUME

Switzerland
Swiss Chemical Society (SCG)
SOCIETY VOLUME

Irish University & 3rd Level Chemistry News

Note:

The source material for the following section is taken from the institutions web site, general the news section of the web site for this part of ICN covering Universities and Higher Institutes of Education.

I will be endeavouring to improve this section of ICN by getting timely update feeds from the institutions.

This section is still under development and should be in place for the next Issue.

Two important announcements on TU developments hot off the press are included here.

Editor

Technological University of South East Ireland (TUSEI)

30 April 2021

Today, the chairs of Waterford Institute of Technology (WIT) Governing Body and Institute of Technology Carlow (IT Carlow) Governing Body, on behalf of the governing bodies, management, staff and students of the two institutes, submitted an application to the Minister for Further and Higher Education, Research, Innovation and Science Simon Harris, T.D. to become a technological university (TU).

https://www.tuse.ie

The aim of the Technological University of South East Ireland (TUSEI) consortium is that the TU – yet unnamed but with the working title of TUSEI – will be established on 1 January 2022.

Earlier this week the governing bodies of both institutes approved the application for technological university designation.

Commenting on the historic occasion John Moore, Chair of IT Carlow Governing Body said: "Submitting the application for technological university designation is a major milestone in our decade-long work to create a TU of international standing in our region which will, above all, benefit our students and successive generations of students."

Jim Moore, Chair of WIT Governing Body acknowledged the part of staff, students and stakeholders: "The sterling work completed by our staff, students and many important stakeholders over many years to develop the TU is evident in the strong and ambitious application that has been submitted, which we hope is well placed to stand up to the rigours of panel review."

In a communication today to staff and students, the presidents of the institutes, Dr Patricia Mulcahy and Prof Willie Donnelly, expressed their confidence in the success of the application. The email said:

"Our confidence is based on the hard work of our staff and students in the years since this project was first mooted, and especially the very intense effort put in by you in the past year or so."

Staff, the presidents noted, while under unusual pressure due to the pandemic "rose to the occasion and made that extra effort in working groups and other activities to bring us to this point."

They also singled out the "unstinting support to TUSEI" given by students and their leaders and the encouragement and support of external stakeholders over a long period "reflecting the wider support and enthusiasm there is for TUSEI in our region".

The submission of the application to the Minister starts a process which will include a review by a panel of international experts. The board of the Higher Education Authority (HEA) will consider the panel's report, and report to the Minister, who after consideration of both reports will make a formal decision.

Midlands & Mid-West Technological University Status Granted to Athlone and Limerick Institutes of Technology

5 May 2021

Note: The official name of this new TU has not been designated yet.

Green Light for New TU in the Midlands and Mid-West

Minister for Further and Higher Education, Research, Innovation and Science Simon Harris TD has designated AIT and LIT Ireland's next technological university.

Announcing the designation of the new TU, Minister Harris TD said, "This is another hugely important day for higher education in Ireland and in particular for the Midlands and Mid-West regions.
"The higher education landscape is rapidly evolving and the people of the Midlands and Mid-West will henceforth be at the heart both geographically and practically of that evolution. This new technological university designate will increase higher education access, provide enhanced research-led teaching and learning, drive enhanced regional development and increase opportunities for students, staff, business and enterprise, local communities and regional stakeholders, thereby facilitating and promoting deepened socio-economic progression.

"This new TU – our third since 2019 - will now take its rightful place in the higher education landscape in the country's heartlands. I would like to warmly congratulate and sincerely thank the very many people from the two Institutions including their management, governing bodies, staff, students and the wider regional and community stakeholders who have enabled today's announcement and who can now look forward to an exciting future for this new university and the regions it will serve."

Minister of State with responsibility for Skills and Further Education Niall Collins TD added, "This is a transformational event for the people of the Midlands and the Mid-West. We know the many faceted benefits of TUs and we are seeing how they can transform regions elsewhere. This will allow people across the Midlands and Mid-West and beyond through digital connectivity to obtain a university degree in their home places. As a former LIT lecturer and a proud Limerick man, I am delighted to see this milestone being reached, and I want to congratulate all involved."

"The higher education landscape is rapidly evolving and the people of the Midlands and Mid-West will henceforth be at the heart both geographically and practically of that evolution."

- Minister for Further and Higher Education, Research, Innovation and Science Simon Harris TD

Welcoming the announcement, the presidents of both institutes of technology, LIT's Professor Vincent Cunnane and AIT's Professor Ciarán Ó Catháin, described the designation of the new TU as the conclusion of a strong and dedicated collaboration process between two institutions with a shared vision and ethos. AIT President Professor Ciarán Ó Catháin said, "This is a historic day for the Midlands and Mid-West of Ireland, as we see our ambition of achieving technological university status realised. Unique in its geography, the new university will border almost half of Ireland's 26 counties, providing unprecedented levels of access to higher education. This will be a transformative change in accessibility and one that we are proud to lead.

Professor Ciarán Ó Catháin, President of Athlone Institute of Technology

Today's designation will see AIT and LIT come together to form a new educational powerhouse, linked by the River Shannon. Unique in its geography, the new university will border almost half of Ireland's 26 counties, providing unprecedented levels of access to higher education. This will be a transformative change in accessibility and one that we are proud to lead.
"As a new university, we will be bold and ambitious. We will drive future development and technological innovation across Ireland and on an international stage through cross-cutting, high-TRL research and knowledge transfer to stakeholders in industry. Today marks the start of an exciting future for all."

LIT President Professor Vincent Cunnane said, "Today is a Red-Letter Day for the Midlands and Mid-West, and a significant day in the educational history of the regions and indeed Ireland. Receiving TU designation is a huge achievement – an achievement based on a strong, comparable strategic direction in both organisations over a number of years, and a real concerted effort for the last 18 months.
"The new TU promises to be a university with a strengthened regional focus and a national and international outlook that will benefit our staff, our students and the communities we serve. It will take its place as an economic driver for the regions in a post pandemic Ireland, rebuilding our economy and our society, researching new ideas, providing solutions, supporting business and industry, while ensuring a first-class education for its students."

Professor Vincent Cunnane, President of Limerick Institute of Technology

"The new TU promises to be a university with a strengthened regional focus and a national and international outlook, that will benefit our staff, our students and the communities we serve."

- Professor Vincent Cunnane, LIT President

Chair of Governing Body AIT Liam Rattigan added, "I am delighted to see the progress that has been made over the last 18 months, which has now culminated in the creation of Ireland's third technological

university. The new TU will be a powerful educational entity that will serve with dedication and distinction, futureproofing higher education across the Midlands and Mid-West through practical learning, applied research and strong industry engagement. The future is indeed bright, and we can now look forward to opening our doors and starting a new chapter in our story."

Chair of Governing Body LIT Tony Brazil said, "This new university points to a strong future serving a region that stretches along the River Shannon, making this area even more attractive to indigenous SMEs and foreign direct investment, by linking knowledge, research, education and innovation. The new TU will require significant public investment and support to reach its full potential, as it opens up educational opportunities to areas previously underserved. This new university will carry with it the student-centred ethos of its predecessors ensuring access to education for the communities it serves."

Professor Tom Collins, Project Facilitator of the AIT-LIT Consortium, said, "It has been a great privilege to have been able to play a small part in the formation of this newest Irish university. The region to be served by this technological university, a region which is unified and defined by the Shannon, will be enabled by this new university to face and shape the future with confidence, resilience and expertise."

New SU President-Elect Áine Daly and LIT SU President Dylan Ryan added, "We were delighted to be part of the process that brought us to TU designation today, and proud of our students who ensured they had their say in the formation of Ireland's next technological university."

The TU Agenda

https://www.gov.ie/en/press-release/06d75-minister-harris-grants-technological-university-status-to-athlone-and-limerick-institutes-of-technology

The development and progression of technological universities is an established policy objective of Government in the context of higher education landscape restructuring. It has its genesis in recommendations contained in the National Strategy for Higher Education to 2030 published in 2011.

Since the publication of the National Strategy a number of consortia of Institutes of Technology (IoTs) have with Exchequer co-funding support been progressing proposals to become TUs. The process to do so is prescribed in the Technological Universities Act 2018 which then Minister of State for Higher Education Mitchell O'Connor brought to enactment March 2018.

Under the statutory framework provided in the 2018 Act, two or more IoTs may jointly seek TU designation through a prescribed legislative process. Section 29 of the 2018 Act provides for the application jointly by two or more applicant institutes to the Minister of Further and Higher Education, Research, Innovation and Science for an order seeking designation as a TU subject to their jointly meeting specified eligibility criteria. Section 38 of the 2018 Act provides that an applicant institute and an established technological university may apply to the Minister for an order.

In October 2019 the TU Research Network (TURN) high level advisory group, comprising the president of TU Dublin and all presidents of HEIs then seeking TU status and chaired by an independent UK higher education transformation expert Professor Phil Gummett, produced their seminal report 'Technological Universities: Connectedness & Collaboration enabled by Connectivity'.

The report details the case for and requirements necessary for a state change in higher education reform in Ireland whereby TUs will assist in the delivery of national strategic objectives for regional socio-economic development, higher education access, research and skills progression. The TURN report is available at https://www.education.ie/en/Publications/Education-Reports/connectedness-collaboration-through-connectivity.pdf

On foot of the TURN report Government announced in Budget 2020 the provision of €90 million over the next three years under a TU Transformation Fund to support IoTs to jointly achieve TU designation and to further the advancement of established TUs. This dedicated funding is additional to the €31 million in Exchequer funding invested in TU development and progression since 2013. In October 2020 Minister Harris announced the first tranche of the Transformation Fund of €33.44 million allocated to relevant HEIs.

The first TU in the history of the state, TU Dublin, was established on 1 January 2019 followed by the second, Munster Technological University or MTU (formerly Cork IT and IT Tralee) on 1 January 2021.

The latest application for TU designation was submitted by the TUSEI consortium of Waterford IT and IT Carlow to the Minister on 30 April and an application from the Connacht Ulster Alliance of GMIT, IT Sligo and Letterkenny IT is anticipated soon. Both Dundalk IT and IADT Dun Laoghaire are working on trajectories to achieve TU status with the continued assistance of the Transformation Fund with technical advice and support provided by the Higher Education Authority.

University College Dublin
Ireland's Global University

Irish University & 3rd Level Chemistry News

Irish University & 3rd Level Chemistry News

NUI Galway
OÉ Gaillimh

Irish University & 3rd Level Chemistry News

RCSI

Irish University & 3rd Level Chemistry News

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh
School of Chemistry
Scoil na Ceimic

Irish University & 3rd Level Chemistry News

Maynooth University
National University of Ireland Maynooth

Irish University & 3rd Level Chemistry News

QUEEN'S UNIVERSITY BELFAST

Irish University & 3rd Level Chemistry News

DCU
Ollscoil Chathair Bhaile Átha Cliath
Dublin City University

Irish University & 3rd Level Chemistry News

TU DUBLIN
OLLSCOIL TEICNEOLAÍOCHTA BHAILE ÁTHA CLIATH
TECHNOLOGICAL UNIVERSITY DUBLIN

Irish University & 3rd Level Chemistry News

lyit
Institiúid Teicneolaíochta Leitir Ceanainn
Letterkenny Institute of Technology

Irish University & 3rd Level Chemistry News

Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Irish University & 3rd Level Chemistry News

IT Sligo

Irish University & 3rd Level Chemistry News

Waterford Institute *of* Technology
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

Irish University & 3rd Level Chemistry News

PMBrc
Pharmaceutical & Molecular Biotechnology Research Centre

MTU
Ollscoil Teicneolaíochta na Mumhan
Munster Technological University

Irish University & 3rd Level Chemistry News

AIT
Institiúid Teicneolaíochta Bhaile Átha Luain
Athlone Institute of Technology

Irish University & 3rd Level Chemistry News

LIT
ACTIVE LEADERSHIP IN EDUCATION, ENTERPRISE AND ENGAGEMENT

Irish University & 3rd Level Chemistry News

GMIT
INSTITIÚID TEICNEOLAÍOCHTA NA GAILLIMHE-MAIGH EO
GALWAY-MAYO INSTITUTE OF TECHNOLOGY

Irish University & 3rd Level Chemistry News

institiúid teicneolaíochta dhún dealgan
DUNDALK
INSTITUTE OF TECHNOLOGY

Irish University & 3rd Level Chemistry News

Institute of Chemistry of Ireland as a Co-Owner Benefits when you publish in PCCP

Support our Institute by publishing your new research results in the prestigious peer reviewed journal.

Scope

PCCP (*Physical Chemistry Chemical Physics*) is an international journal for the publication of cutting-edge original work in physical chemistry, chemical physics and biophysical chemistry. To be suitable for publication in *PCCP*, articles must include significant new physical insights; this is the prime criterion that referees and the Editors will judge against when evaluating submissions.

The journal has a broad scope which includes spectroscopy, dynamics, kinetics, statistical mechanics, thermodynamics, electrochemistry, catalysis, surface science, quantum mechanics and theoretical developments play an important part in the journal. Interdisciplinary research areas such as polymers and soft matter, materials, nanoscience, surfaces/interfaces, and biophysical chemistry are especially welcomed whenever they include a physico-chemical approach.

PCCP is proud to be a Society journal and is co-owned by 19 national chemical societies. The journal is published by the Royal Society of Chemistry on a not-for-profit basis for the benefit of the whole scientific community.

Impact factor: 4.493*
Publishing frequency: 48 per year
Indexed in MEDLINE and Web of Science

Chemistry and related Science around the World

Green Hydrogen Looms
1 February 2021
Green Hydrogen Looms | Chemical Processing

Report Examines Carbon Dioxide As Chemical Feedstock For Polymers
1 February
Report Examines CO2 As Chemical Feedstock For Polymers | Chemical Processing

UL and MTU to benefit from €193m investment in SFI Research Centres
1 February
UL and MTU to benefit from €193m investment in SFI Research Centres (irishexaminer.com)

Irish renewable energy firm Amarenco will have its first Irish solar farms built by summer, says CEO - Independent.ie
1 February
Irish renewable energy firm Amarenco will have its first Irish solar farms built by summer, says CEO - Independent.ie

Minister Harris announces €193 million investment in five world- leading SFI Research Centres
1 February
Minister Harris announces €193 million investment in five world- leading SFI Research Centres

Shell to ignore wind and solar in push towards greener energy output
1 February
Shell to ignore wind and solar in push towards greener energy output (irishexaminer.com)

Beyond Declining Battery Prices: 6 Ways to Evaluate Energy Storage in 2021
1 February
Beyond Declining Battery Prices: 6 Ways to Evaluate Energy Storage in 2021 | Greentech Media

A blueprint for scaling voluntary carbon markets to meet the climate challenge
29 January
A blueprint for scaling voluntary carbon markets | McKinsey

"The Biggest Bang" – Physicists Create Tunable Superconductivity in Twisted Graphene "Nanosandwich"
1 February
"The Biggest Bang" – Physicists Create Tunable Superconductivity in Twisted Graphene "Nanosandwich" (scitechdaily.com)
DOI: 10.1038/s41586-021-03192-0

Chemistry, Not Magic: Batteries That Can Be Assembled in Ambient Air

1 February
Chemistry, Not Magic: Batteries That Can Be Assembled in Ambient Air (scitechdaily.com)
DOI: 10.1016/j.ensm.2021.01.018

Scientists Create Advanced, More Powerful Superconducting Magnet for Next Generation Light Sources

1 February
Scientists Create Advanced, More Powerful Superconducting Magnet for Next Generation Light Sources (scitechdaily.com)

Organic Biomorphs: Experiments Show the Record of Early Life Could Be Full of "False Positives"

1 February
Organic Biomorphs: Experiments Show the Record of Early Life Could Be Full of "False Positives" (scitechdaily.com)
https://doi.org/10.1130/G48152.1

New Strategies for Designing Efficient Electroluminescent Materials

31 January
New Strategies for Designing Efficient Electroluminescent Materials (scitechdaily.com)
https://doi.org/10.1038/s41566-020-00732-4

This Trippy Optical Illusion Can Reveal if You Have 'Curvature Blindness'

2 February
This Trippy Optical Illusion Can Reveal if You Have 'Curvature Blindness' (sciencealert.com)

A room-temperature ultrasonic hydrogen sensor based on a sensitive layer of reduced graphene oxide

28 January
A room-temperature ultrasonic hydrogen sensor based on a sensitive layer of reduced graphene oxide | Scientific Reports (nature.com)
https://doi.org/10.1038/s41598-020-80875-0

Chart: Why Battery Electric Vehicles Beat Hydrogen Electric Vehicles Without Breaking A Sweat

1 February
Chart: Why Battery Electric Vehicles Beat Hydrogen Electric Vehicles Without Breaking A Sweat (cleantechnica.com)

Pyroelectric nanoplates for reduction of CO2 to methanol driven by temperature-variation

12 January
Pyroelectric nanoplates for reduction of CO 2 to methanol driven by temperature-variation | Nature Communications

Discoveries at the Edge of the Periodic Table: First Ever Measurements of Einsteinium Reveals Unexpected Properties

3 February

Discoveries at the Edge of the Periodic Table: First Ever Measurements of Einsteinium Reveals Unexpected Properties (scitechdaily.com)

Chemists Succeed in Synthesis of Aminoalcohols by Utilizing Blue Light

1 February
Chemists Succeed in Synthesis of Aminoalcohols by Utilizing Blue Light (scitechdaily.com)
https://doi.org/10.1038/s41929-020-00553-2

Quantum Biology May Help Solve Some of Life's Greatest Mysteries (Outside the box fascinating, more publications on this topic)

1 June 2019
Quantum Biology May Help Solve Some of Life's Greatest Mysteries | The Scientist Magazine® (the-scientist.com)

Redox-Flow Cell Stores Renewable Energy as Hydrogen - IEEE Spectrum

13 April 2020
Redox-Flow Cell Stores Renewable Energy as Hydrogen - IEEE Spectrum

MECHANOCHEMISTRY: The liberating force of ultrasound

29 January
The liberating force of ultrasound | Nature Chemistry

Waste-to-Energy Technology Future for Hydrogen Fuel Cells - FuelCellsWorks

26 January
Waste-to-Energy Technology Future for Hydrogen Fuel Cells - FuelCellsWorks

Identification of O2 formation: enabling O-redox technology in Li-ion batteries

1 February
Identification of O2 formation: enabling O-redox technology in Li-ion batteries | Innovation News Network

Hydrogen Drives for E-Scooters: Fraunhofer Institute Develops POWERPASTE for Hydrogen Storage – FuelCellsWorks (Amazing – one to watch)

2 February
Hydrogen Drives for E-Scooters: Fraunhofer Institute Develops POWERPASTE for Hydrogen Storage - FuelCellsWorks

Chemists create and capture einsteinium, the elusive 99th element

2 February
Chemists create and capture einsteinium, the elusive 99th element | Live Science

Cell-free biotech enables shelf-stable vaccines on demand

3 February
Cell-free biotech enables shelf-stable vaccines on demand | Cornell Chronicle

Bayesian reaction optimization as a tool for chemical synthesis | Nature

3 February
Pay to read paper. Abstract with some active references. Relatively new approach to synthesis.
Bayesian reaction optimization as a tool for chemical synthesis | Nature

A new design for better redox flow batteries - Advanced Science News

19 August 2020
A new design for better redox flow batteries - Advanced Science News

Boosting the Efficiency of Electrochemical Carbon Capture and Conversion Systems

31 January
Boosting the Efficiency of Electrochemical Carbon Capture and Conversion Systems (scitechdaily.com)
https://doi.org/10.1016/j.xcrp.2020.100318

Q&A: How cartoonists skewer tensions between science and society

1 February
Q&A: How cartoonists skewer tensions between science and society (nature.com)

Chris Horn: A rundown on the evolution of batteries

4 February
Chris Horn: A rundown on the evolution of batteries (irishtimes.com)

Key Step Toward Cleaner, More Efficient Mass-Production of Hydrogen From Water

11 January 2021
Key Step Toward Cleaner, More Efficient Mass-Production of Hydrogen From Water (scitechdaily.com)

Driving the Hydrogen Industry Forward with Energy Storage

8 December 2020
Driving the Hydrogen Industry Forward with Energy Storage (azocleantech.com)

Rechargeable salt battery could be applied to metal-air batteries for electric vehicles

3 February
Rechargeable salt battery could be applied to metal-air batteries for electric vehicles (innovationnewsnetwork.com)

Silicon Anode Nanostructure Generates New Potential for Lithium-Ion Batteries

5 February
Silicon Anode Nanostructure Generates New Potential for Lithium-Ion Batteries (scitechdaily.com)
https://doi.org/10.1038/s43246-021-00119-0

How to Reduce Greenhouse Gas? Tips From Methane-Eating Microbes

4 February
How to Reduce Greenhouse Gas? Tips From Methane-Eating Microbes (scitechdaily.com)
https://doi.org/10.1021/jacs.0c05613

Mysterious Organic Scum Boosts Chemical Reaction Efficiency – Discovery May Reduce Environmental Impact of Manufacturing

4 February
Mysterious Organic Scum Boosts Chemical Reaction Efficiency – Discovery May Reduce Environmental Impact of Manufacturing (scitechdaily.com)
https://science.sciencemag.org/content/371/6529/626

Harvard Scientists Trilayer Graphene Breakthrough Opens the Door for High Temperature Superconductors

4 February
Harvard Scientists Trilayer Graphene Breakthrough Opens the Door for High Temperature Superconductors (scitechdaily.com)

Hydrogen? Just add water and sunlight - Research Outreach

Hydrogen? Just add water and sunlight - Research Outreach
https://www.google.com/search?q=10.1038%2Fs41586-020-2278-9&ie=&oe=

A novel biofuel system for hydrogen production from biomass | Biomassmagazine.com

3 March 2020

A novel biofuel system for hydrogen production from biomass | Biomassmagazine.com

A unified theory for organic matter accumulation

9 February

A unified theory for organic matter accumulation | PNAS

https://doi.org/10.1073/pnas.2016896118

Breaking Seawater into Hydrogen Fuel and Oxygen | Machine Design

20 March 2019

Breaking Seawater into Hydrogen Fuel and Oxygen | Machine Design

Secretary of State for the Environment: UK REACH to have "great similarities" - but not alignment - with EU REACH

4 February

Secretary of State for the Environment: UK REACH to have "great similarities" - but not alignment - with EU REACH, Simon Tilling (burges-salmon.com)

Building batteries: Why lithium and why lithium hydroxide?

4 February

Battery materials: Why lithium and why lithium hydroxide? (innovationnewsnetwork.com)

Rust as an alternative to silicon in computer technology

4 February

Rust as an alternative to silicon in computer technology (innovationnewsnetwork.com)

Next-Generation Hybrid Photovoltaic-Thermal Solar Technology Efficiency Limits

8 February

Next-Generation Hybrid Photovoltaic-Thermal Solar Technology Efficiency Limits (scitechdaily.com)

https://doi.org/10.1038/s41377-021-00465-1

Enzyme mediated synthesis of hybrid polyedric gold nanoparticles

5 February

Enzyme mediated synthesis of hybrid polyedric gold nanoparticles | Scientific Reports (nature.com)

https://doi.org/10.1038/s41598-021-81751-1

The Hydrogen Economy Is No Longer A Pipe Dream | OilPrice.com

8 February

The Hydrogen Economy Is No Longer A Pipe Dream | OilPrice.com

Finger-print for the for-ma-tion of nit-rous oxide emis-sions

8 February

Fingerprint for the formation of nitrous oxide emissions (uibk.ac.at) and

Denitrifying pathways dominate nitrous oxide emissions from managed grassland during drought and rewetting

5 February

Denitrifying pathways dominate nitrous oxide emissions from managed grassland during drought and rewetting | Science Advances (sciencemag.org)

DOI: 10.1126/sciadv.abb7118

Dope new organocatalysts for ATRP

21 January
Dope new organocatalysts for ATRP | Nature Reviews Chemistry
https://doi.org/10.1038/s41570-021-00252-x

Nanomaterials: The Invisible Killer Lurking in Our Consumer Products

9 February
Nanomaterials: The Invisible Killer Lurking in Our Consumer Products (scitechdaily.com)
DOI: 10.1038/s41467-021-21164-w

Antibiotic Game-Changer: Phages Can Anticipate Bacteria's Location and Destroy Them Before They Cause an Infection

9 February
Antibiotic Game-Changer: Phages Can Anticipate Bacteria's Location and Destroy Them Before They Cause an Infection (scitechdaily.com)
DOI: 10.1128/mBio.03474-20

Researchers Advance Simple and Inexpensive Diagnostic Blood Test

9 February
Researchers Advance Simple and Inexpensive Diagnostic Blood Test | Technology Networks
https://www.nature.com/articles/s41587-020-00775-6#citeas

Humanity Is Flushing Away One of Life's Essential Elements

8 February
Phosphorus: Humanity Is Flushing Away the Element - The Atlantic

New coating is a breakthrough for hydrogen fuel

9 February
New coating is a breakthrough for hydrogen fuel (techxplore.com)
http://dx.doi.org/10.1073/pnas.2023552118

Genomic Visions: Where Are We Now?

On the 20th anniversary of the publications heralding the first drafts of the human genome sequence, GEN *revisits the bold 40-year outlook then offered by Francis Collins.*
3 February
Genomic Visions: Where Are We Now? (genengnews.com)

Transparent wood is coming, and it could make an energy-efficient alternative to glass

10 February
Transparent wood is coming, and it could make an energy-efficient alternative to glass (theconversation.com)

Nanoscale engineering for sustainable catalysis

10 February
Nanoscale engineering for sustainable catalysis | Nature Nanotechnology
https://doi.org/10.1038/s41565-021-00862-y

A Previously Unseen Chemical Reaction Has Been Detected on Mars

11 February
A Previously Unseen Chemical Reaction Has Been Detected on Mars (sciencealert.com)

New Way to Power Up Nanomaterials to Create Better Solar Cells and LEDs
10 February
New Way to Power Up Nanomaterials to Create Better Solar Cells and LEDs (scitechdaily.com)

Chameleon-Like Material Spiked With Boron Helps Bring Brain-Like Computing to Silicon Chips
11 February
Chameleon-Like Material Spiked With Boron Helps Bring Brain-Like Computing to Silicon Chips (scitechdaily.com)

The Chemistry Lab Inside Cells
11 February
Finding May Lead to Novel Biological Catalysts | Lab Manager

E-fuels project awarded €3.3m to develop high-temperature electrolysers
9 February
E-fuels project awarded €3.3m to develop high-temperature electrolysers (innovationnewsnetwork.com)

Plasma Processing of Catalyst Enables Simple Synthesis of Hydrogen Peroxide
10 February
Plasma Processing of Catalyst Enables Simple Synthesis of Hydrogen Peroxide (azom.com)

The global race to produce hydrogen offshore - BBC News
12 February
The global race to produce hydrogen offshore - BBC News

Diamond Batteries From Nuclear Waste That Last Thousands Of Years
8 February
Diamond Batteries From Nuclear Waste That Last Thousands Of Years (electronicsforu.com)

‘Designer molecules’ could create tailor-made quantum devices
9 February
‘Designer molecules’ could create tailor-made quantum devices | Science News

Clocking the Movement of Electrons Inside an Atom – Down to a Millionth of a Billionth of a Second
13 February
Clocking the Movement of Electrons Inside an Atom – Down to a Millionth of a Billionth of a Second (scitechdaily.com)
https://doi.org/10.1038/s41567-020-01111-0

UK industry bodies demand UK REACH divergence from EU
11 February
UK industry bodies demand UK REACH divergence from EU - Lexology

Turntable-like catalytic reactor that promises more sustainable chemical manufacturing wins funding
11 February
Turntable-like catalytic reactor that promises more sustainable chemical manufacturing wins funding (bath.ac.uk)

A "One-and-Done" Treatment To Protect Against Heart Disease?
8 February

A "One-and-Done" Treatment To Protect Against Heart Disease? | Technology Networks

An Introduction to PCR

10 February
An Introduction to PCR | Technology Networks

Chemicals in Areas Surrounding Tumors Subvert the Immune System and Enable Cancer to Evade Attack

15 February
Chemicals in Areas Surrounding Tumors Subvert the Immune System and Enable Cancer to Evade Attack (scitechdaily.com)
https://doi.org/10.1038/s41586-020-03045-2

Bendable concrete and other CO2-infused cement mixes could dramatically cut global emissions

14 February
Bendable concrete and other CO2-infused cement mixes could dramatically cut global emissions (theconversation.com)

Can Cargo Ships Use Hydrogen Power to Become Carbon Neutral?

24 July 2019
Can Cargo Ships Use Hydrogen Power to Become Carbon Neutral? (triplepundit.com)

Why We Need Green Hydrogen

7 January
Why We Need Green Hydrogen (columbia.edu)

Theory of the sp–d coupling of transition metal impurities with free carriers in ZnO

15 February
Theory of the sp – d coupling of transition metal impurities with free carriers in ZnO | Scientific Reports (nature.com)

Flow biocatalysis 101: design, development and applications (Francesca Paradisi ex UCD)

3 February
Flow biocatalysis 101: design, development and applications - Reaction Chemistry & Engineering (RSC Publishing)
https://doi.org/10.1039/D0RE00483A

Irish company designs floating solar platform for green hydrogen production - Offshore Energy

15 February
Irish company designs floating solar platform for green hydrogen production - Offshore Energy (offshore-energy.biz)

Structure of novel coronavirus inspires design of nanoparticles for drug delivery

17 February
Structure of novel coronavirus inspires design of nanoparticles for drug delivery | AGÊNCIA FAPESP and
Nano-targeting lessons from the SARS-CoV-2 - ScienceDirect and
https://doi.org/10.1016/j.nantod.2020.101012

A better pH measurement approach
2 February
A better pH measurement approach (pharmamanufacturing.com)

Scientists Just Confirmed The Existence of a New Crystalline Structure of Ice
18 February
Scientists Just Confirmed The Existence of a New Crystalline Structure of Ice (sciencealert.com)

Chemistry can help make plastics sustainable — but it isn't the whole solution
17 February
Chemistry can help make plastics sustainable — but it isn't the whole solution (nature.com)
https://doi.org/10.1038/d41586-021-00391-7

Fukushima Continues To Supply Surprises
18 February
Fukushima Continues To Supply Surprises | Technology Networks

Test for All Human Coronaviruses, Including SARS-CoV-2 Variants
17 February
Test for All Human Coronaviruses, Including SARS-CoV-2 Variants | Technology Networks

Measuring the Antibody Response to SARS-CoV-2
16 February
Measuring the Antibody Response to SARS-CoV-2 | Technology Networks

Antibiotic tolerance study paves way for new treatments
18 February
Antibiotic tolerance study paves way for new treatments | Cornell Chronicle

Wind generates almost 40% of electricity used in Republic
18 February
Wind generates almost 40% of electricity used in Republic (irishtimes.com)

Green hydrogen production via 20 MW electrolyzer at Italian oil refinery – pv magazine International
17 February
Green hydrogen production via 20 MW electrolyzer at Italian oil refinery – pv magazine International (pv-magazine.com)

Some 70 jobs to go at pharmaceutical company Viatris in north Dublin
18 February
Some 70 jobs to go at pharmaceutical company Viatris in north Dublin (irishtimes.com)

Computer-aided enzymatic retrosynthesis
19 February
Computer-aided enzymatic retrosynthesis | Nature Catalysis
https://doi.org/10.1038/s41929-021-00582-5

CO2 fixation gets a second chance
19 February
CO 2 fixation gets a second chance | Nature Catalysis
https://doi.org/10.1038/s41929-021-00581-6

Discovering Tiny Antibody Fragments With Big Potential for Therapeutic Development

16 February
Discovering Tiny Antibody Fragments With Big Potential for Therapeutic Development | Technology Networks
https://www.cell.com/cell-systems/fulltext/S2405-4712(21)00037-5

Footage of a DNA helix shows it dancing inside the cell

18 February (The video link is inside this article.)
Footage of a DNA helix shows it dancing inside the cell | Innovation News Network

Fuel for world's largest fusion reactor ITER is set for test run

22 February
Fuel for world's largest fusion reactor ITER is set for test run (nature.com)
https://doi.org/10.1038/d41586-021-00408-1

How Fructose Affects Our Immune System

23 February
How Fructose Affects Our Immune System (genengnews.com)

New Material Breakthrough for Stable High-Voltage Long-Life Solid-State Batteries

23 February
New Material Breakthrough for Stable High-Voltage Long-Life Solid-State Batteries (scitechdaily.com)
https://doi.org/10.1038/s41467-021-21488-7

Electrochemical Route Improves Acetic Acid Synthesis

23 February
Electrochemical Route Improves Acetic Acid Synthesis | Chemical Processing

Improving the accuracy of genetic sequencing

ADVERTISEMENT FEATURE https://www.nature.com/natrescust
Improving the accuracy of genetic sequencing (nature.com)

Breakthrough Boost for Solar-Powered Fuel Made by Splitting Water

23 February
Breakthrough Boost for Solar-Powered Fuel Made by Splitting Water (scitechdaily.com)
https://doi.org/10.1038/s41560-021-00777-x

Now on Base, Rutgers Team Reveals New Genome Editing Approach

24 February
Now on Base, Rutgers Team Reveals New Genome Editing Approach (genengnews.com)

NTR buys solar and battery storage projects in Wexford - Independent.ie

24 February
NTR buys solar and battery storage projects in Wexford - Independent.ie

Irish biotech Amarin gears up for drug launch in Europe

24 February
Irish biotech Amarin gears up for drug launch in Europe (irishtimes.com)

Dublin clinical trials group Icon buys PRA in $12bn deal

25 February
Dublin clinical trials group Icon buys PRA in $12bn deal (irishtimes.com)

Engineered viruses can fight the rise of antibiotic-resistant bacteria

24 February
Engineered viruses can fight the rise of antibiotic-resistant bacteria (theconversation.com)

Metabolic Pathway for Memory T-Cell Production Mapped

25 February
Researchers map metabolic signalling machinery for producing memory T cells - St. Jude Children's Research Hospital and
https://www.cell.com/cell/fulltext/S0092-8674(21)00171-9?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS0092867421001719%3Fshowall%3Dtrue#secsectitle0020

Supporting women in academia during and after a global pandemic

24 February
Supporting women in academia during and after a global pandemic | Science Advances (sciencemag.org)
DOI: 10.1126/sciadv.abg9310

New Catalyst Promises Lighter, Cheaper, Higher-Capacity, Next-Generation Rechargeable Batteries

27 February
New Catalyst Promises Lighter, Cheaper, Higher-Capacity, Next-Generation Rechargeable Batteries (scitechdaily.com)
https://doi.org/10.1002/cssc.202002140

Using Vibrating Molecules to Investigate the Wave Properties of Matter

27 February
Using Vibrating Molecules to Investigate the Wave Properties of Matter (scitechdaily.com)
https://doi.org/10.1038/s41567-020-01150-7

New Design Improves Efficiency of Next-Generation Perovskite Solar Cells

27 February
New Design Improves Efficiency of Next-Generation Perovskite Solar Cells (scitechdaily.com)

Biopolymer-coated nanocatalyst can help realize a hydrogen fuel-driven future

23 February
Biopolymer-coated nanocatalyst can help realize a hydrogen fuel-driven future (phys.org)

Atomic arrangements of flat electrocatalysts define fate of denitrification

26 February
Atomic arrangements of flat electrocatalysts define fate of denitrification | Mirage News

Interesting view on nuclear chemistry:

There's a Giant Mystery Hiding Inside Every Atom in the Universe | Live Science

2 January 2020
There's a Giant Mystery Hiding Inside Every Atom in the Universe | Live Science

Physical Chemistry Breakthrough: Ultrafast Electron Dynamics in Space and Time

1 March
Physical Chemistry Breakthrough: Ultrafast Electron Dynamics in Space and Time (scitechdaily.com)

https://science.sciencemag.org/content/early/2021/02/17/science.abf3286

Radioactivity in Meteorites Sheds Light on Origin of Heaviest Elements in Our Solar System

1 March
Radioactivity in Meteorites Sheds Light on Origin of Heaviest Elements in Our Solar System (scitechdaily.com)
https://science.sciencemag.org/content/371/6532/945

Atomic nuclei in quantum swing

19 February
Atomic nuclei in quantum swing | Mirage News

Is an electric car better for the planet?

28 February
Is an electric car better for the planet? | Live Science

Tuning Electrode Surfaces to Drive the Sunlight-Powered Reactions That Split Water Into Clean Fuel

1 March
Tuning Electrode Surfaces to Drive the Sunlight-Powered Reactions That Split Water Into Clean Fuel (scitechdaily.com)
https://doi.org/10.1038/s41560-021-00777-x

Astrophysicist's 2004 Theory Confirmed: Why the Sun's Chemical Composition Varies

2 March
Astrophysicist's 2004 Theory Confirmed: Why the Sun's Chemical Composition Varies (scitechdaily.com)

Yara Kickstarts Green Ammonia Industry With Green Hydrogen

2 March
Yara Kickstarts Green Ammonia Industry With Green Hydrogen (cleantechnica.com)

New Catalyst Makes Styrene Manufacturing Cheaper, Greener

26 February
New Catalyst Makes Styrene Manufacturing Cheaper, Greener | NC State News (ncsu.edu)
DOI: 10.1038/s41467-021-21374-2

Experimental tests of relativistic chemistry will update the periodic table

17 February
Experimental tests of relativistic chemistry will update the periodic table - ResOU (osaka-u.ac.jp)
https://doi.org/10.1038/s41557-020-00634-6

Virtually Unlimited Solar Cell Experiments

2 February
Virtually Unlimited Solar Cell Experiments | Lab Manager
https://doi.org/10.1002/adfm.202011168

A common soil pesticide cut wild bee reproduction by 89% – here's why scientists are worried

2 March

A common soil pesticide cut wild bee reproduction by 89% – here's why scientists are worried (theconversation.com)

Lithium-metal batteries for electric vehicles | MIT Technology Review: Lipid nanoparticle-mediated codelivery of Cas9 mRNA and single-guide RNA achieves liver-specific in vivo genome editing of Angptl3 (Subscription)

(9 March 2021)
https://doi.org/10.1073/pnas.2020401118 and
Lithium-metal batteries for electric vehicles | MIT Technology Review

New PhD scholarships pave way for future technological university researchers

3 March
New PhD scholarships pave way for future technological university researchers - TechCentral.ie

Institutes set 1 January 2022 as TUSEI start date

23 September 2020
https://www.wit.ie/news/other/institutes-set-1-january-2022-as-tusei-start-date

Astrochemical origins of water on Earth

10 February
Astrochemical origins of water on Earth | Innovation News Network

Using Phase Change Materials For Energy Storage | Hackaday

3 March. (Interesting but Editor not familiar with this publication)
Using Phase Change Materials For Energy Storage | Hackaday

Revolutionary hydrogen technology unveiled that could unlock the emerging hydrogen aviation market

3 March
Using Phase Change Materials For Energy Storage | Hackaday

Why do men publish more papers than women? Motherhood plays key role

25 February
Why do men publish more papers than women? Motherhood plays key role | CU Boulder Today | University of Colorado Boulder

Antibiotic tolerance study paves way for new treatments

18 February
Antibiotic tolerance study paves way for new treatments | Cornell Chronicle

Energy storage boom to propel zinc battery demand, industry association says - MINING.COM

3 March
Energy storage boom to propel zinc battery demand, industry association says - MINING.COM

Step Closer to Eco-Friendly Fungicides Thanks to Protein Discovery

4 February
Step Closer to Eco-Friendly Fungicides Thanks to Protein Discovery | Technology Networks
https://www.nature.com/articles/s41477-021-00863-8#article-info

Scientists Reprogram E. coli To Produce Designer Polysaccharide Molecule

2 March

Scientists Reprogram E. coli To Produce Designer Polysaccharide Molecule | Technology Networks
https://www.nature.com/articles/s41467-021-21692-5

Microwave Processing Isolates Red Ginseng Compounds That Suppress Lung Cancer Metastasis

5 March
Microwave Processing Isolates Red Ginseng Compounds That Suppress Lung Cancer Metastasis (genengnews.com)

Catnip's Effectiveness as a Natural Mosquito Repellent Linked to Irritant Receptor Activation

5 March
Catnip's Effectiveness as a Natural Mosquito Repellent Linked to Irritant Receptor Activation (genengnews.com)

Dozens of leading scientists speak up for Harvard chemist Charles Lieber

5 March
Dozens of leading scientists speak up for Harvard chemist Charles Lieber | News | Chemistry World

New Form of Synthetic Melanin: "Fungal Ghosts" Protect Skin, Fabric From Toxins, Radiation

5 March
New Form of Synthetic Melanin: "Fungal Ghosts" Protect Skin, Fabric From Toxins, Radiation (scitechdaily.com)
https://doi.org/10.1128/mBio.03014-20

Dozens of leading scientists speak up for Harvard chemist Charles Lieber | News | Chemistry World

5 March
Dozens of leading scientists speak up for Harvard chemist Charles Lieber | News | Chemistry World

Roche is gearing up to knock down an Irish plant—and it's complicated

4 March
Roche is gearing up to knock down an Irish plant—and it's complicated | FiercePharma

Dethroning Electrocatalysts for Hydrogen Production with Inexpensive Alternative Material | Mirage News

3 March
Dethroning Electrocatalysts for Hydrogen Production with Inexpensive Alternative Material | Mirage News

MIT Chemists Boost Boron's Utility for Designing New Drugs

7 March
MIT Chemists Boost Boron's Utility for Designing New Drugs (scitechdaily.com)
https://doi.org/10.1073/pnas.2013691118

Fueling the Future: Novel Two-Polymer Membrane Boosts Hydrogen Fuel Cell Performance – FuelCellsWorks

28 February
Fueling the Future: Novel Two-Polymer Membrane Boosts Hydrogen Fuel Cell Performance - FuelCellsWorks

Celebrating Women in Science

8 March
Celebrating Women in Science | Technology Networks

Warped nanographene at odds with aromaticity
8 March
Warped nanographene at odds with aromaticity | Research | Chemistry World

Extinct Atom and a Clever Trick Reveals the Long-Kept Secrets of the Solar System
7 March
Extinct Atom and a Clever Trick Reveals the Long-Kept Secrets of the Solar System (scitechdaily.com)
https://doi.org/10.1073/pnas.2017750118

A better pH measurement approach (Compliance Management / Single Use)
2 February
A better pH measurement approach (pharmamanufacturing.com)

Get A Cold Eyes Review Of Pilot Plant Design
8 March
Get A Cold Eyes Review Of Pilot Plant Design | Chemical Processing

WIT research centre receives international quality management certification
WIT research centre receives international quality management certification - TechCentral.ie

Pandemic prompts lab-supply shortages
9 March
'Does anyone have any of these?': Lab-supply shortages strike amid global pandemic (nature.com)
https://doi.org/10.1038/d41586-021-00613-y

Without these lipid shells, there would be no mRNA vaccines for COVID-19
6 March
Without these lipid shells, there would be no mRNA vaccines for COVID-19 (acs.org)
https://doi.org/10.1038/d41586-021-00613-y

Sequencing Key Molecules in Just Minutes Instead of Years
8 March
Sequencing Key Molecules in Just Minutes Instead of Years (scitechdaily.com)

Autonomous Materials: Researchers Design Patterns in Self-Propelling Liquid Crystals
8 March
Autonomous Materials: Researchers Design Patterns in Self-Propelling Liquid Crystals (scitechdaily.com)
https://doi.org/10.1038/s41563-020-00901-4

Biopolymer-Coated Nanocatalyst Can Help Realize a Hydrogen Fuel-Driven Future – FuelCellsWorks
8 March
Biopolymer-Coated Nanocatalyst Can Help Realize a Hydrogen Fuel-Driven Future - FuelCellsWorks

High-Performance Single-Atom Catalysts Developed for High-Temperature Fuel Cells
10 March
High-Performance Single-Atom Catalysts Developed for High-Temperature Fuel Cells (scitechdaily.com)
https://doi.org/10.1039/D0EE01680B

Ultralow-Temperature Supercapacitors Using Porous Carbon Aerogel – Could Power Mars & Polar Missions

10 March

Ultralow-Temperature Supercapacitors Using Porous Carbon Aerogel – Could Power Mars & Polar Missions (scitechdaily.com)

Moiré Than Meets the Eye: Carbon Nanotubes Self-Assemble Into Complex Structures for Materials Research

10 March

Moiré Than Meets the Eye: Carbon Nanotubes Self-Assemble Into Complex Structures for Materials Research (scitechdaily.com)

DOI: 10.1038/s41467-021-21889-8

Artificial Intelligence Solves Schrödinger's Equation, a Fundamental Problem in Quantum Chemistry

2 January

Artificial Intelligence Solves Schrödinger's Equation, a Fundamental Problem in Quantum Chemistry (scitechdaily.com)

https://doi.org/10.1038/s41557-020-0544-y

A 360-Degree View of AAV Production

4 March

A 360-Degree View of AAV Production (genengnews.com)

New Discovery Explains Blood Pressure-Lowering Properties of Green and Black Tea

10 March

New Discovery Explains Blood Pressure-Lowering Properties of Green and Black Tea (scitechdaily.com)

https://doi.org/10.33594/000000337

New High-Temperature Superconductor Synthesized by Scientists

11 March

New High-Temperature Superconductor Synthesized by Scientists (scitechdaily.com)

https://doi.org/10.1002/adma.202006832

Shutting the Nano-Gate: Breakthrough May Lead to Single-Molecule Sensors and Cheaper Genomic Sequencing

12 March

Shutting the Nano-Gate: Breakthrough May Lead to Single-Molecule Sensors and Cheaper Genomic Sequencing (scitechdaily.com)

DOI: 10.1038/s43246-021-00132-3

The secret of catalysts that increase fuel cell efficiency | EurekAlert! Science News

10 March

The secret of catalysts that increase fuel cell efficiency | EurekAlert! Science News

The fuel that could transform shipping - BBC Future

30 November

The fuel that could transform shipping - BBC Future

Aviation — Fuel Cell & Hydrogen Energy Association

9 December 2019
Aviation — Fuel Cell & Hydrogen Energy Association (fchea.org)

Why interest in Hydrogen as an aviation fuel has reignited | Aerospace Testing International

28 October 2020
Why interest in Hydrogen as an aviation fuel has reignited | Aerospace Testing International

Solving the Puzzle of Polymers Binding to Ice for Biological Cryopreservation

15 March
Solving the Puzzle of Polymers Binding to Ice for Biological Cryopreservation (scitechdaily.com)
https://doi.org/10.1038/s41467-021-21717-z

Twisting, Flexible Crystals Key to Advanced New Solar Cells

15 March
Twisting, Flexible Crystals Key to Advanced New Solar Cells (scitechdaily.com)
DOI: 10.1038/s41563-021-00947-y

Irish diaspora leaders honoured with SFI St Patrick's Day Science Medal

16 March
Irish diaspora leaders honoured with SFI St Patrick's Day Science Medal - TechCentral.ie

Oxygen adsorption on (100) surfaces in Fe–Cr alloys

15 March
Oxygen adsorption on (100) surfaces in Fe–Cr alloys | Scientific Reports (nature.com)
https://doi.org/10.1016/0025-5416(80)90025-7

Single-particle chemical force microscopy to characterize virus surface chemistry

1 October 2020
Single-particle chemical force microscopy to characterize virus surface chemistry | BioTechniques (future-science.com)
https://doi.org/10.2144/btn-2020-0085

Five tips for understanding and managing your emotions to build flourishing connections

16 March
Five tips for understanding and managing your emotions to build flourishing connections (nature.com)

Electric train technology increases the success of battery electric vehicles

15 March
Electric train technology increases the success of battery electric vehicles (innovationnewsnetwork.com)

Phosphorus for Earth's earliest life may have been forged by lightning

16 March
Phosphorus for Earth's earliest life may have been forged by lightning | Science News

Breakthrough in Polystyrene Recycling

18 March
Breakthrough in Polystyrene Recycling | Technology Networks
https://doi.org/10.1039/D0NJ05984F

Molecules Never Before Seen in Space Have Been Identified Among The Stars
18 March
Molecules Never Before Seen in Space Have Been Identified Among The Stars (sciencealert.com)

ICP-OES – ICP Chemistry, ICP-OES Analysis, Strengths and Limitations
17 March
ICP-OES – ICP Chemistry, ICP-OES Analysis, Strengths and Limitations | Technology Networks

New Plutonium Breakthrough: Measuring the Previously "Unmeasurable" Helps Distinguish Nuclear Power Pollution From Global Fallout
19 March
New Plutonium Breakthrough: Measuring the Previously "Unmeasurable" Helps Distinguish Nuclear Power Pollution From Global Fallout (scitechdaily.com)
DOI: 10.1038/s41467-021-21575-9

Swiss Scientists Generate Electricity From Wood
17 March
Swiss Scientists Generate Electricity From Wood (scitechdaily.com)
https://advances.sciencemag.org/content/7/11/eabd9138

Semi-Transparent Solar Cells Can Power Greenhouses Without Stunting Plant Growth
21 March
Semi-Transparent Solar Cells Can Power Greenhouses Without Stunting Plant Growth (sciencealert.com)

We All Do It, But Is It Actually Safe to Reuse Plastic Water Bottles?
21 March
We All Do It, But Is It Actually Safe to Reuse Plastic Water Bottles? (sciencealert.com)

Can room-temperature superconductors work without extreme pressure?
19 March
Can room-temperature superconductors work without extreme pressure? | Science News

Will This NASA Award-Winning Fuel Cell Tech Catalyze Hydrogen Aircraft? - Simple Flying
21 March
Will This NASA Award-Winning Fuel Cell Tech Catalyze Hydrogen Aircraft? - Simple Flying

Ancient Mystery Solved on How Cells Tell Apart RNA and DNA
20 March
Ancient Mystery Solved on How Cells Tell Apart RNA and DNA (genengnews.com) and
The mechanism of the nucleo-sugar selection by multi-subunit RNA polymerases
4 February
Ancient Mystery Solved on How Cells Tell Apart RNA and DNA (genengnews.com)
https://doi.org/10.1038/s41467-021-21005-w

Forget batteries, is hydrogen the holy grail for carbon-free commercial aviation? | Analysis | Flight Global
9 July 2020
Forget batteries, is hydrogen the holy grail for carbon-free commercial aviation? | Analysis | Flight Global

Aviation — Fuel Cell & Hydrogen Energy Association
9 December 2019
Aviation — Fuel Cell & Hydrogen Energy Association (fchea.org)

More than 50 new environmental chemicals detected in people
23 March
More than 50 new environmental chemicals detected in people | Live Science

Developments in Differential Scanning Calorimetry
8 March
Developments in Differential Scanning Calorimetry | Lab Manager

Big breakthrough for 'massless' energy storage – ScienceDaily
22 March
Big breakthrough for 'massless' energy storage -- ScienceDaily
http://dx.doi.org/10.1002/aesr.202000093

Opinion: Preprints in the Public Eye
18 March
Opinion: Preprints in the Public Eye | The Scientist Magazine® (the-scientist.com)

The fight against fake-paper factories that churn out sham science
23 March
The fight against fake-paper factories that churn out sham science (nature.com)

The fight against fake-paper factories that churn out sham science
23 March
The fight against fake-paper factories that churn out sham science (nature.com)
https://doi.org/10.1038/d41586-021-00733-5

Automated Chemistry Combines Chemical Robotics and AI to Accelerate Pace for Advancing Solar Energy Technologies
23 March
Automated Chemistry Combines Chemical Robotics and AI to Accelerate Pace for Advancing Solar Energy Technologies (scitechdaily.com)
https://doi.org/10.1021/acsenergylett.0c01749

Analysis Reveals Plunge in Lithium-Ion Battery Costs – Further Steep Declines Possible
23 March
Analysis Reveals Plunge in Lithium-Ion Battery Costs – Further Steep Declines Possible (scitechdaily.com)
https://doi.org/10.1039/D0EE02681F

In Search for New Flu Treatments, Chemists Gain New Insights Into the Behavior of Water in an Influenza Virus Channel
22 March
In Search for New Flu Treatments, Chemists Gain New Insights Into the Behavior of Water in an Influenza Virus Channel (scitechdaily.com)

MIT Chemists Discover the Structure of a Key Coronavirus Protein
24 March

MIT Chemists Discover the Structure of a Key Coronavirus Protein (scitechdaily.com)
https://doi.org/10.1038/s41594-020-00536-8

NMR Spectroscopy Reveals How Cholesterol Molecules Bind to a Flu Protein

20 November 2017
NMR Spectroscopy Reveals How Cholesterol Molecules Bind to a Flu Protein (scitechdaily.com)
http://www.pnas.org/content/early/2017/11/14/1715127114.abstract

Steel is vital to the green transition – here's how to scrub out the industry's emissions

23 March
Steel is vital to the green transition – here's how to scrub out the industry's emissions (theconversation.com)

Probing the Molecules of Life

26 January
Probing the Molecules of Life | Technology Networks

Proteomics: Principles, Techniques and Applications

9 December 2020
Proteomics: Principles, Techniques and Applications | Technology Networks

Saliva Test Can Accurately Diagnose Concussion, Rugby Study Shows

24 February
Saliva Test Can Accurately Diagnose Concussion, Rugby Study Shows | Technology Networks

Rugby Study Identifies RNAs in Saliva as Biomarkers for Diagnosing Concussion

24 March
Rugby Study Identifies RNAs in Saliva as Biomarkers for Diagnosing Concussion (genengnews.com)

Carbon Capture & Storage: Stanford and Carnegie Mellon Researchers Reveal Cost of Key Climate Solution

25 March
Carbon Capture & Storage: Stanford and Carnegie Mellon Researchers Reveal Cost of Key Climate Solution (scitechdaily.com)

Chemists Warn: Toxic Air Pollutants From Fossil Fuels "Multiply" in Sunlight

25 March
Chemists Warn: Toxic Air Pollutants From Fossil Fuels "Multiply" in Sunlight (scitechdaily.com)
https://doi.org/10.1016/j.chemosphere.2020.129386

Researchers Warn: Preservative Used in Hundreds of Popular Foods May Harm the Immune System

24 March
Researchers Warn: Preservative Used in Hundreds of Popular Foods May Harm the Immune System (scitechdaily.com)
https://doi.org/10.3390/ijerph18073332

Progress towards fast charging lithium-ion batteries

25 March
Progress towards fast charging lithium-ion batteries (innovationnewsnetwork.com)

Scientist tells of relief after speaking out over weedkiller fears | Pesticides | The Guardian
24 March
Scientist tells of relief after speaking out over weedkiller fears | Pesticides | The Guardian

Scientists develop method of preventing short-circuiting in lithium-ion batteries
17 March
Scientists develop method of preventing short-circuiting in lithium-ion batteries (innovationnewsnetwork.com)

Ireland secures more than €1bn as part of a new research and innovation programme
25 March
Ireland secures more than €1bn as part of a new research and innovation programme (irishexaminer.com)

New Perovskite Fabrication Method for Solar Cells Paves Way to Low-Cost, Large-Scale Production
26 March
New Perovskite Fabrication Method for Solar Cells Paves Way to Low-Cost, Large-Scale Production (scitechdaily.com)
https://doi.org/10.1016/j.joule.2021.02.012

Seaweed Supplements Significantly Reduce Livestock Greenhouse Gas Emissions
26 March
Seaweed Supplements Significantly Reduce Livestock Greenhouse Gas Emissions (scitechdaily.com)

New Design Could Enable Longer Lasting, More Powerful Lithium-Ion Batteries
26 March
New Design Could Enable Longer Lasting, More Powerful Lithium-Ion Batteries (scitechdaily.com)
https://doi.org/10.1038/s41560-021-00792-y

Cooling Homes Without Warming the Planet – New Technology for More Efficient AC
26 March
Cooling Homes Without Warming the Planet – New Technology for More Efficient AC (scitechdaily.com)
By ZACH WINN, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Microplastics Turn Into “Hubs” for Antibiotic-Resistant Bacteria and Pathogens
25 March
Microplastics Turn Into “Hubs” for Antibiotic-Resistant Bacteria and Pathogens (scitechdaily.com)

Changes in Ocean Chemistry Reveal How Sea Level Affects the Global Carbon Cycle
25 March
Changes in Ocean Chemistry Reveal How Sea Level Affects the Global Carbon Cycle (scitechdaily.com)
DOI: 10.1126/science.aaz9266

Funding awarded for Dundalk Technology Gateway
26 March
Funding awarded for Dundalk Technology Gateway - TechCentral.ie

Structural tuning of heterogeneous molecular catalysts for electrochemical energy conversion
26 March

Structural tuning of heterogeneous molecular catalysts for electrochemical energy conversion | Science Advances (sciencemag.org)
DOI: 10.1126/sciadv.abf3989

Reproductive Problems in Both Men and Women Are Rising at an Alarming Rate A likely culprit is hormone-disrupting chemicals

16 March
Reproductive Problems in Both Men and Women Are Rising at an Alarming Rate - Scientific American

Turning Wood Into Recyclable, Biodegradable Plastic

26 March
Turning Wood Into Recyclable, Biodegradable Plastic (scitechdaily.com)
https://doi.org/10.1038/s41893-021-00702-w

Quantum mechanics gives new insights into the Gibbs paradox – Physics World

20 March
Quantum mechanics gives new insights into the Gibbs paradox – Physics World
https://doi.org/10.1038/s41467-021-21620-7
DOI: 10.1056/NEJMoa2102214

Catalytic hydrogenation of carbon dioxide to methanol

22 March
Catalytic hydrogenation of carbon dioxide to methanol (phys.org)
http://dx.doi.org/10.1038/s41929-021-00584-3

New Nanotransistors Keep Their Cool at High Voltages – Perform Highly Efficient Power Conversion

28 March
New Nanotransistors Keep Their Cool at High Voltages – Perform Highly Efficient Power Conversion (scitechdaily.com)
https://doi.org/10.1111/febs.15784

Chemists Achieve Breakthrough in Light-Mediated Synthesis of Three-Dimensional Molecular Structures

27 March
Chemists Achieve Breakthrough in Light-Mediated Synthesis of Three-Dimensional Molecular Structures (scitechdaily.com)
https://science.sciencemag.org/content/371/6536/1338

MIT Method Offers Inexpensive Imaging With Unprecedented Accuracy – At the Scale of Virus Particles

29 March
MIT Method Offers Inexpensive Imaging With Unprecedented Accuracy – At the Scale of Virus Particles (scitechdaily.com)
DOI: 10.1038/s41565-021-00875-7

‘We must adapt’: EU research chief on Europe’s €100-billion funding programme

29 March
‘We must adapt’: EU research chief on Europe’s €100-billion funding programme (nature.com)
https://doi.org/10.1038/d41586-021-00834-1

Gearing Up Nanoscale Machines: Molecular-Scale Gear Trains for Transmitting Rotational Force

30 March
Gearing Up Nanoscale Machines: Molecular-Scale Gear Trains for Transmitting Rotational Force (scitechdaily.com)
https://doi.org/10.1039/D0SC06379G

Colossal Voltage: Uranium Compound Achieves Record Anomalous Nernst Conductivity

29 March
Colossal Voltage: Uranium Compound Achieves Record Anomalous Nernst Conductivity (scitechdaily.com)
https://advances.sciencemag.org/content/7/13/eabf1467

Charged Up: Scientists Find New Pathway to Harnessing the Sun for a Clean Energy Future

29 March
Charged Up: Scientists Find New Pathway to Harnessing the Sun for a Clean Energy Future (scitechdaily.com)
https://doi.org/10.1038/s41467-021-21454-3

Stiff Competition: Lab-Made Hexagonal Diamonds Stiffer Than Natural Cubic Diamonds

31 March
Stiff Competition: Lab-Made Hexagonal Diamonds Stiffer Than Natural Cubic Diamonds (scitechdaily.com)
https://doi.org/10.1103/PhysRevB.103.L100101

Powering the Energy Transition With Better Long-Duration Power Storage (LDES)

1 April
Powering the Energy Transition With Better Long-Duration Power Storage (scitechdaily.com)
https://doi.org/10.1038/s41560-021-00796-8

Chemical found in 1,000 processed foods may harm the immune system

1 April
Chemical found in 1,000 processed foods may harm the immune system | Live Science

AI Capable of Generating Novel, Functionally Active Proteins to Speed Up Drug Development

2 April
AI Capable of Generating Novel, Functionally Active Proteins to Speed Up Drug Development (scitechdaily.com)
https://doi.org/10.1038/s42256-021-00310-5

Do You Know the Way to Berkelium, Californium? Scientists Map Uncharted Paths With Heavy Elements

2 April
Do You Know the Way to Berkelium, Californium? Scientists Map Uncharted Paths With Heavy Elements (scitechdaily.com)
https://doi.org/10.1038/s41467-021-21189-1

Asdex Upgrade: Paving the Way for a Fusion Power Plant

1 April

Asdex Upgrade: Paving the Way for a Fusion Power Plant (scitechdaily.com)

Two dimensional (2D) reduced graphene oxide (RGO)/hexagonal boron nitride (h-BN) based nanocomposites as anodes for high temperature rechargeable lithium-ion batteries

5 February
Two dimensional (2D) reduced graphene oxide (RGO)/hexagonal boron nitride (h -BN) based nanocomposites as anodes for high temperature rechargeable lithium-ion batteries | Scientific Reports (nature.com)
https://doi.org/10.1038/s41598-020-58439-z

Silicon-Nanographite Aerogel-Based Anodes for High Performance Lithium Ion Batteries

10 October 2019
Silicon-Nanographite Aerogel-Based Anodes for High Performance Lithium Ion Batteries | Scientific Reports (nature.com)
https://doi.org/10.1038/s41598-019-51087-y

An Organic Material for Next Generation Energy-Efficient HVAC Technologies

4 April
An Organic Material for Next Generation Energy-Efficient HVAC Technologies (scitechdaily.com)
https://doi.org/10.1016/j.memsci.2020.119006

Outsmarting Cheaters: Doping by Athletes Tougher to Hide With New Detection Method

5 April
Outsmarting Cheaters: Doping by Athletes Tougher to Hide With New Detection Method (scitechdaily.com)

Making Cleaner, Greener, Biodegradable Plastics From Waste Fish Parts

5 April
Making Cleaner, Greener, Biodegradable Plastics From Waste Fish Parts (scitechdaily.com)

Double-Duty: New Catalyst Generates Hydrogen Fuel While Cleaning Up Wastewater

4 April
Double-Duty: New Catalyst Generates Hydrogen Fuel While Cleaning Up Wastewater (scitechdaily.com)
https://doi.org/10.1021/acsestengg.1c00003

Scientists invent home COVID-19 test using coffee machine capsules

6 April
Scientists invent home COVID-19 test using coffee machine capsules (theconversation.com)

Green Hydrogen Peroxide Process Looms

5 April
Green Hydrogen Peroxide Process Looms | Chemical Processing

Study provides first evidence of DNA collection from air

31 March
SE - Study provides first evidence of DNA collection from air - Queen Mary University of London (qmul.ac.uk)

SNP-Chip: CRISPR-Based Transistor Detects Single Point Mutations

5 April

SNP-Chip: CRISPR-Based Transistor Detects Single Point Mutations (genengnews.com)

Dalian Coherent Light Source Reveals the Origin of S2 Fragments in the Interstellar Medium

6 April
Dalian Coherent Light Source Reveals the Origin of S2 Fragments in the Interstellar Medium (scitechdaily.com)
https://doi.org/10.1021/acs.jpclett.0c03386

Record number of IRC awards support science for a better society

6 April
Record number of IRC awards support science for a better society - TechCentral.ie

The World's Top Solar Firm Joins Hydrogen Frenzy | OilPrice.com

5 April
The World's Top Solar Firm Joins Hydrogen Frenzy | OilPrice.com

Watching mRNA Do Its Thing, In Living Cells | In the Pipeline

5 April
Watching mRNA Do Its Thing, In Living Cells | In the Pipeline (sciencemag.org)

Chemists reconsider the impact of through-space effects

7 April
Chemists reconsider the impact of through-space effects | Research | Chemistry World

Scientists Create a New Electronegativity Scale

7 April
Scientists Create a New Electronegativity Scale (scitechdaily.com)
https://doi.org/10.1038/s41467-021-22429-0 and

Thermochemical electronegativities of the elements

7 April
Thermochemical electronegativities of the elements | Nature Communications

A New Natural Brilliant Blue for Food Coloring

7 April
A New Natural Brilliant Blue for Food Coloring (scitechdaily.com)
DOI: 10.1126/sciadv.abe7871

Synthetic Mucus Can Mimic the Real Thing – Including Unique Antimicrobial Properties

7 April
Synthetic Mucus Can Mimic the Real Thing – Including Unique Antimicrobial Properties (scitechdaily.com)

Surprising Entropy Measurements Reveal Exotic Effect in "Magic-Angle" Graphene

7 April
Surprising Entropy Measurements Reveal Exotic Effect in "Magic-Angle" Graphene (scitechdaily.com)
https://doi.org/10.1038/s41586-021-03319-3

Biden, Congress roll out big plans to expand National Science Foundation

6 April
Biden, Congress roll out big plans to expand National Science Foundation | Science | AAAS (sciencemag.org)

First commercial electrochemical CO2 conversion system

8 April

First commercial electrochemical Co2 conversion system (innovationnewsnetwork.com)

New Type of Battery Created That Can Charge 10x Faster Than Lithium-Ion Batteries

9 April

New Type of Battery Created That Can Charge 10x Faster Than Lithium-Ion Batteries (scitechdaily.com)
https://doi.org/10.1002/batt.202000220

CO2 Mitigation on Earth and Magnesium Civilization on Mars – Just Add Water

9 April

CO2 Mitigation on Earth and Magnesium Civilization on Mars – Just Add Water (scitechdaily.com)
https://doi.org/10.1039/D1SC01113H

Levelling the cost and carbon footprint of circular polymers that are chemically recycled to monomer

9 April

Leveling the cost and carbon footprint of circular polymers that are chemically recycled to monomer | Science Advances (sciencemag.org)
DOI: 10.1126/sciadv.abf0187

Dalian Coherent Light Source Reveals the Origin of S2 Fragments in the Interstellar Medium

6 April

Dalian Coherent Light Source Reveals the Origin of S2 Fragments in the Interstellar Medium (scitechdaily.com)
https://doi.org/10.1021/acs.jpclett.0c03386

Uncovering Exotic Molecules of Astrochemical Interest

9 April

Uncovering Exotic Molecules of Astrochemical Interest (scitechdaily.com)
https://doi.org/10.1002/anie.202016052

New Exotic Isotope of Fluorine Discovered: Fluorine-13 | Featured, Physics | Sci-News.com

5 April

New Exotic Isotope of Fluorine Discovered: Fluorine-13 | Featured, Physics | Sci-News.com (sci-news.com)

ESB ready for green pivot with Moneypoint renewable energy hub

10 April

ESB ready for green pivot with Moneypoint renewable energy hub (irishtimes.com)

Peering inside the atom

April

How physicists revealed subatomic particles and cracked matter’s secrets | Science News

Trinity College Dublin names Linda Doyle as first woman provost in 429 years

10 April

https://www.irishtimes.com/news/education/trinity-college-dublin-names-linda-doyle-as-first-woman-provost-in-429-years-1.4534221

Bioenergy is the undervalued pillar of the clean energy transition - Energy Post

17 December 2020
Bioenergy is the undervalued pillar of the clean energy transition - Energy Post

Prehistoric amber: the answer to the antibiotic resistance crisis?

6 April
Baltic Amber vs Antibiotic Resistant Bacteria - BioTechniques

Sulfur Compounds in Green Vegetables Promote Growth of Important Gut Bacteria

12 April
Sulfur Compounds in Green Vegetables Promote Growth of Important Gut Bacteria | Technology Networks
https://doi.org/10.1038/s41396-021-00968-0

Major Milestone Reached for Sewage and Food Waste Biocrude Conversion Process

12 April
Major Milestone Reached for Sewage and Food Waste Biocrude Conversion Process (scitechdaily.com)

Scientists Discover Sugar Molecules in SARS-CoV-2 Coronavirus Spike Protein Play Active Role in Infection

23 September 2020
Scientists Discover Sugar Molecules in SARS-CoV-2 Coronavirus Spike Protein Play Active Role in Infection (scitechdaily.com)
https://doi.org/10.1021/acscentsci.0c01056 and

Beyond Shielding: The Roles of Glycans in the SARS-CoV-2 Spike Protein

23 September 2020
Beyond Shielding: The Roles of Glycans in the SARS-CoV-2 Spike Protein | ACS Central Science
https://doi.org/10.1021/acscentsci.0c01056

Newly Discovered Virus-Cell Interaction May Explain COVID-19's High Infection Rate

11 April
Newly Discovered Virus-Cell Interaction May Explain COVID-19's High Infection Rate (scitechdaily.com)
https://doi.org/10.1016/j.bpj.2021.02.007 and

Biomechanical characterization of SARS-CoV-2 spike RBD and human ACE2 protein-protein interaction

17 February
Biomechanical characterization of SARS-CoV-2 spike RBD and human ACE2 protein-protein interaction: Biophysical Journal (cell.com)

X-Ray Study Recasts Role of Battery Material from Cathode to Catalyst

9 April
X-Ray Study Recasts Role of Battery Material from Cathode to Catalyst (lbl.gov)

Not Your Average Refinery: Sustainable Energy Production Through Electrochemical Reduction

13 April
Not Your Average Refinery: Sustainable Energy Production Through Electrochemical Reduction (scitechdaily.com)

COVID-19 may become nanomedicine's finest hour yet

14 April
COVID-19 may become nanomedicine's finest hour yet | Nature Nanotechnology
https://doi.org/10.1038/s41565-021-00901-8

Sustainable implementation of innovative technologies for water purification
22 March 2021
Sustainable implementation of innovative technologies for water purification | Nature Reviews Chemistry
https://doi.org/10.1038/s41570-021-00264-7

New definition of electronegativity fixes flaws left by Linus Pauling
14 April
New definition of electronegativity fixes flaws left by Linus Pauling | Research | Chemistry World
http://dx.doi.org/10.1038/s41467-021-22429-0

New ordering of elements could help find materials with promising properties
18 November 2020
New ordering of elements could help find materials with promising properties | Research | Chemistry World

Probing the gelation of egg whites with X-ray scattering
14 April
Probing the gelation of egg whites with X-ray scattering – Physics World

New Type of Battery Can Charge 10x Faster Than Lithium-Ion Models
10 April
New Type of Battery Can Charge 10x Faster Than Lithium-Ion Models (sciencealert.com)

3 mRNA vaccines researchers are working on (that aren't COVID)
14 April
3 mRNA vaccines researchers are working on (that aren't COVID) (theconversation.com)

3D printed proton-conductive membrane paves way for energy storage devices
15 April
3D printed proton-conductive membrane paves way for energy storage (innovationnewsnetwork.com)

Optimising oxygen evolution reaction to isolate hydrogen without using fossil fuels
12 April
Optimising oxygen evolution reaction to isolate hydrogen without using fossil fuels (innovationnewsnetwork.com)

Thermoelectric Material Discovery May Deliver New Forms of Electric Power in the Future
16 April
Thermoelectric Material Discovery May Deliver New Forms of Electric Power in the Future (scitechdaily.com)
DOI: 10.1016/j.joule.2021.03.012

Detecting protein and DNA/RNA structures in cryo-EM maps of intermediate resolution using deep learning
16 April
https://www.nature.com/articles/s41467-021-22577-3
https://doi.org/10.1038/s41467-021-22577-3

A Sponge to Soak Up Carbon Dioxide From the Air
18 April
A Sponge to Soak Up Carbon Dioxide From the Air (scitechdaily.com)

RNAi Pesticides Affect Only One Pest Species, Study Finds
16 April 2021

RNAi Pesticides Affect Only One Pest Species, Study Finds | Lab Manager

New Research Is a Step Towards Stabilizing a Lipid Nanoparticle

15 April
New Research Is a Step Towards Stabilizing a Lipid Nanoparticle | Technology Networks
https://doi.org/10.1038/s41467-021-22285-y

Green Chemistry and Biofuel: Mechanism of a Key Photoenzyme Decrypted

19 April
Green Chemistry and Biofuel: Mechanism of a Key Photoenzyme Decrypted (scitechdaily.com)
https://science.sciencemag.org/content/372/6538/eabd5687

Combating Challenging Separations With Advanced 2D Liquid Chromatography Technologies

6 April
Combating Challenging Separations With Advanced 2D Liquid Chromatography Technologies | Technology Networks

Two-Dimensional Liquid Chromatography: A State of the Art Tutorial

28 November 2016. *Anal. Chem.* 2017, 89, 1, 519–531. **Copyright © 2016 American Chemical Society**
https://pubs.acs.org/doi/10.1021/acs.analchem.6b03506

All-in-One Test for SARS-CoV-2 Detection and Surveillance Developed

21 April
All-in-One Test for SARS-CoV-2 Detection and Surveillance Developed | Technology Networks
https://www.cell.com/med/pdf/S2666-6340(21)00117-3.pdf?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS2666634021001173%3Fshowall%3Dtrue

Bill Gates' TerraPower is building next-generation nuclear power

8 April
Bill Gates' TerraPower is building next-generation nuclear power (cnbc.com)

Breakthrough Sets Stage for Biotech to Generate 1 Billion Vaccine Doses in Less Than a Month

22 April
Breakthrough Sets Stage for Biotech to Generate 1 Billion Vaccine Doses in Less Than a Month (scitechdaily.com)
DOI: 10.1038/s41467-021-22329-3

Plastics Can Be Broken Down in to Fuel, And We Just Found a Great Method For It

23 April
Plastics Can Be Broken Down in to Fuel, And We Just Found a Great Method For It (sciencealert.com)

Membrane Enables Complete Removal of Heavy Metals From Wastewater

22 April
Membrane Enables Complete Removal of Heavy Metals From Wastewater | Technology Networks
https://www.sciencedirect.com/science/article/abs/pii/S0045653521004938?via%3Dihub

Deformable microparticles for shuttling nanoparticles to the vascular wall

21 April
Deformable microparticles for shuttling nanoparticles to the vascular wall | Science Advances (sciencemag.org)
https://doi.org/10.1126/sciadv.abe0143

Researchers create long-sought zigzag-edged carbon nanobelts
22 April
Researchers create long-sought zigzag-edged carbon nanobelts (phys.org)

The next act for messenger RNA could be bigger than covid vaccines
5 February
The next act for messenger RNA could be bigger than covid vaccines | MIT Technology Review

Little Swirling Mysteries: Dynamics of Ultrasmall, Ultrafast Groups of Atoms Uncovered
25 April
Little Swirling Mysteries: Dynamics of Ultrasmall, Ultrafast Groups of Atoms Uncovered (scitechdaily.com)
https://doi.org/10.1038/s41586-021-03342-4

Polymer-Eating Enzymes Make "Biodegradable" Plastics Truly Compostable
22 April
https://scitechdaily.com/polymer-eating-enzymes-make-biodegradable-plastics-truly-compostable
https://doi.org/10.1038/s41586-021-03408-3

Copper Mining Bacteria: A More Efficient, Safer Alternative to Sourcing Copper
26 April
Copper Mining Bacteria: A More Efficient, Safer Alternative to Sourcing Copper (scitechdaily.com)
https://advances.sciencemag.org/content/7/17/eabd9210

Electrifying Cement With Nanocarbon Black: Cement That Conducts Electricity and Generates Heat
26 April
Electrifying Cement With Nanocarbon Black: Cement That Conducts Electricity and Generates Heat (scitechdaily.com)
https://doi.org/10.1103/PhysRevMaterials.4.125401

Improved desalination process also removes toxic metals to produce clean water
15 April
Improved desalination process also removes toxic metals to produce clean water | Berkeley News

Restoration and risk reduction of lead mining waste by phosphate-enriched biosolid amendments
26 April
Restoration and risk reduction of lead mining waste by phosphate-enriched biosolid amendments | Scientific Reports (nature.com)
https://doi.org/10.1038/s41598-021-88576-y

Scientists Argue for Combination of Organic Farming and Genetic Engineering
22 April
Scientists Argue for Combination of Organic Farming and Genetic Engineering | Technology Networks
https://www.cell.com/trends/plant-science/fulltext/S1360-1385(21)00071-6?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS1360138521000716%3Fshowall%3Dtrue

Time-Reversal Symmetry Breaking in a Superconductor
27 April
Time-Reversal Symmetry Breaking in a Superconductor (scitechdaily.com)

https://doi.org/10.1073/pnas.2007241118

More Compact and Efficient Vertical Turbines Could Be the Future for Wind Farms

26 April
More Compact and Efficient Vertical Turbines Could Be the Future for Wind Farms (scitechdaily.com)
https://doi.org/10.1016/j.renene.2021.03.001

Sandia Engineers are Revaluating Vertical Axis Wind Turbines

30 July 2012
Sandia Engineers are Reevaluating Vertical Axis Wind Turbines (scitechdaily.com)

Low-Cost, Highly Efficient Solar-Powered Desalination for Safe Drinking Water

17 April
Low-Cost, Highly Efficient Solar-Powered Desalination for Safe Drinking Water (scitechdaily.com)
DOI: 10.1063/5.0047390

Corrosion Prevention: Select The Optimum Materials

27 April
Corrosion Prevention: Select The Optimum Materials | Chemical Processing

Prehistoric amber: the answer to the antibiotic resistance crisis?

6 April
Baltic Amber vs Antibiotic Resistant Bacteria - BioTechniques

Microbiologists Have Found a Way to Use Bacteria to Remove Microplastics From the Environment

28 April
https://scitechdaily.com/microbiologists-have-found-a-way-to-use-bacteria-to-remove-microplastics-from-the-environment

New Nanoparticle Material Developed for Efficient Water Desalination

28 April
https://scitechdaily.com/new-nanoparticle-material-developed-for-efficient-water-desalination
https://doi.org/10.1021/acsami.0c20463

These cellular clocks help explain why elephants are bigger than mice

27 April
These cellular clocks help explain why elephants are bigger than mice (nature.com)
https://doi.org/10.1038/d41586-021-01086-9

One-Pot Borylation/Suzuki-Miyaura sp2-sp3 Cross Coupling

April (Poster you may have to complete an online form to download)
One-pot-borylationSuzuki–Miyaura-sp2–sp3-cross-coupling.pdf (hubspotusercontent40.net) and
https://www.research.manchester.ac.uk/portal/files/58272182/c7cc05037b.pdf
https://doi.org/10.1039/C7CC05037B
DOI:10.1039/c7cc05037b

Hydrocracking Our Way to Recycling Plastic Waste

28 April
Hydrocracking Our Way to Recycling Plastic Waste | Lab Manager

Highly reactive form of magnesium stabilized by bulky ligands

28 April

Highly reactive form of magnesium stabilized by bulky ligands (nature.com)
https://doi.org/10.1038/d41586-021-01014-x

The thickness of lead's neutron 'skin' has been precisely measured

27 April
The thickness of lead's neutron 'skin' has been precisely measured | Science News

Chemists Help Chocolatiers Bring Their "A" Game

28 April
Chemists Help Chocolatiers Bring Their "A" Game | Technology Networks
https://pubs.acs.org/doi/abs/10.1021/acs.jafc.1c00564

SARS-CoV-2 Makes Sacrifices To Escape Antibodies (South Africa B.1.351)

28 April
SARS-CoV-2 Makes Sacrifices To Escape Antibodies | Technology Networks
https://pubs.acs.org/doi/abs/10.1021/acs.jmedchem.1c00311

Smart Glass Has a Bright Future: Daylight Steering Provide Huge Energy Savings

29 April
Smart Glass Has a Bright Future: Daylight Steering Provide Huge Energy Savings (scitechdaily.com)
https://doi.org/10.1117/1.JOM.1.1.014502

Researchers Identify the Defect That Limits Solar-Cell Performance: Hydrogen in Hybrid Perovskites

29 April
Researchers Identify the Defect That Limits Solar-Cell Performance: Hydrogen in Hybrid Perovskites (scitechdaily.com)
https://doi.org/10.1038/s41563-021-00986-5

Oxygen Production From Three-Body Photodissociation of Water Revealed by Dalian Coherent Light Source

30 April
Oxygen Production From Three-Body Photodissociation of Water Revealed by Dalian Coherent Light Source (scitechdaily.com)
DOI: 10.1038/s41467-021-22824-7

A novel framework for engineering protein loops exploring length and compositional variation

28 April
A novel framework for engineering protein loops exploring length and compositional variation | Scientific Reports (nature.com)
https://www.nature.com/articles/s41598-021-88708-4

Uncovering the origins of amino acids in the early solar system

29 April
Uncovering the origins of amino acids in the early solar system (innovationnewsnetwork.com)

The climate solution actually adding millions of tons of CO2 into the atmosphere

29 April
New research shows that California's climate policy created up to 39 million carbon credits that aren't achieving real carbon savings. But companies can buy these forest offsets to justify polluting more anyway.
The climate solution adding millions of tons of CO2 into the atmosphere | MIT Technology Review

Phosphorus for Earth's earliest life may have been forged by lightning

16 March

Phosphorus for Earth's earliest life may have been forged by lightning | Science News

Lightning may be an important source of air-cleaning chemicals

29 April

Lightning may be an important source of air-cleaning chemicals | Science News

Scientists Discover Three Liquid Phases in Aerosol Particles

30 April

Scientists Discover Three Liquid Phases in Aerosol Particles (scitechdaily.com)
https://doi.org/10.1073/pnas.2102512118

Minister Harris announces €193 million investment in five world-leading SFI Research Centres

Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris TD February 1st announced an investment of €193 million in five Science Foundation Ireland Research Centres for six years.

The five centres will carry out research into smart medical devices, e-health, telecommunications networks, cybersecurity, smart cities, artificial intelligence, ethics and data privacy, as well as applied geosciences, energy security and marine resources.

Speaking today, **Minister Harris** said: "I am delighted to announce this significant Government investment in five SFI Research Centres, which reflects Ireland's position as a world leader in research and innovation.

"The investment will ensure that we are prepared for the changes and disruption that we are facing in addressing global societal and economic challenges.

"SFI Research Centres promote discovery and impact, as well as collaboration between academia, government and industry across the Island of Ireland and internationally.

"This support will further enhance the important work these Centres have already achieved, so they continue to play a pivotal role in the years ahead in protecting the wellbeing of the population and the economy.

"The five centres will also work to promote science, technology, engineering and maths (STEM) to the wider public through extensive Education and Public Engagement outreach. These initiatives include summer computer camps, developing secondary school education modules, and residency programmes for filmmakers, artists and teachers to forge collaborations between researchers and the community."

https://youtu.be/5DRgs1jKFDY

Prof Mark Ferguson, Director General Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland, said: "To maintain and build on Ireland's global standing in research, innovation, and discovery, it is crucial that we invest in excellent ideas and research with impact. SFI Research Centres support both basic and applied research, spanning a wide range of sectors at varying levels and stages, and as a country we have benefited from their considerable contributions in the recent Covid-19 pandemic.

"They have made transformational progress in just six years, with increased academic and industrial collaboration, extensive training of PhD students for future skills needs, winning competitive funding from the EU, producing excellent scientific results and driving vital public engagement. We look forward to further strengthening our ability to positively impact our society and economy through excellent scientific research, with continued support from the Government and industry in the years ahead."

This investment by Science Foundation Ireland will support approximately 1,060 graduate and Post-Doctoral students and Research Fellows employed by the Centres.

The investment is further backed by significant industry support from 200 industry partners committing over €91 million in cash and in-kind contributions.

The investment is set to benefit the whole country with 17 Higher Education Institutions across the country partnering in Centres, including Athlone Institute of Technology, Dublin City University, Dublin Institute for Advanced Studies, Dundalk Institute of Technology, Limerick Institute of Technology, Maynooth University, Munster Technological University, NUI Galway, Royal College of Surgeons in Ireland, Teagasc, Technological University of Dublin, Trinity College Dublin, Tyndall National Institute, University College Cork, University College Dublin, University of Limerick, and Waterford Institute of Technology.

The five SFI Research Centres receiving this second phase of funding are:

- ADAPT - ADAPT, the SFI Research Centre for AI-Driven Digital Content Technology, led by Trinity College Dublin
- CONNECT - the SFI Research Centre for Future Networks and Communications, led by Trinity College Dublin
- CÚRAM - the SFI Research Centre for Medical Devices led by NUI Galway
- iCRAG - the SFI Research Centre in Applied Geosciences led by University College Dublin
- Lero - the SFI Research Centre for Software, led by University of Limerick.

Other partners include the National Institute for Bioprocessing Research and Training (NIBRT), Geological Survey Ireland (GSI), Teagasc, Telecommunications Software and Systems Group (TSSG), Cork City Council, Cork County Council, Dublin City Council and Dun Laoghaire-Rathdown County Council.

Awards of funding to SFI Research Centres are made following rigorous international expert peer reviews.

Minister Harris announces 15 teams set to compete for SFI Future Innovator Prizes of €2 million

Competitions focus on sustainable solutions in the area of food waste and plastics.

15 February 2021: Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris, TD, today announced the 15 teams that have been shortlisted as part of the SFI Future Innovator Prize.

The two challenge-based prize programmes, with a prize fund of €2 million each, as part of the SFI Future Innovator Prize, are calling on the research teams to develop innovative solutions to food waste and plastics.

Five teams have been shortlisted under the SFI Food Challenge and 10 under the SFI Plastics Challenge. At the end of the 12-month programme two overall winners will be announced.

Congratulating the competing teams, **Minister Harris** said: "I am delighted to announce the fifteen teams who will go on to compete as part of the SFI Future Innovator Prize. The SFI Future Innovator Prize is a challenge-based prize funding programme that seeks to support Ireland's best and brightest, to develop novel, potentially disruptive, technologies to address significant societal challenges. On this occasion, it is about tackling food and plastic waste. I am really excited to see the outcome of their work and the response to these key national challenges."

The SFI Food Challenge will support the development of sustainable solutions to reduce food loss and waste across the full breadth of the food supply chain, addressing topics such as premature spoilage of fruit and vegetables; undernutrition and promoting healthy aging through optimisation of diet; the shelf-life salad leaves; valorising food waste into value added commodities and waste in the fishing industry.

The SFI Plastics Challenge will support the development of innovative STEM-led solutions that will enable the sustainable use of plastics in a circular economy, restore and preserve our oceans' health, and maximise how we use the earth's finite resources. The projects aim to address problems across a number of strategic challenge areas including removing plastics from coastal areas; reducing reliance on single use plastics in laboratories; upcycling plastic waste and utilising plastic waste for sustainable battery technologies.

Professor Mark Ferguson, Director General, SFI and Chief Scientific Adviser to the Government of Ireland, said: "I would like to congratulate the fifteen teams who have been shortlisted as part of the SFI Future Innovator Prize competition. We have seen a fantastic calibre of innovative thinking and truly novel approaches as part of the submissions, and I look forward to seeing the different solutions that develop in the areas of food waste and enabling the sustainable use of plastics, as the competition continues. I would like to commend each team on their hard work and dedication, and to wish them every success in the rest of the competition."

The SFI Future Innovator Prize, funded by the Department of Further and Higher Education, Innovation and Science through Science Foundation Ireland, is part of an overall government plan to cultivate challenge-based funding in Ireland.

#BelieveInScience

Three Park Place, Hatch Street Upper,
Dublin 2, Ireland
D02 FX65
+353 (0)1 607 3200
info@sfi.ie

E-Alert: March 2021

Science Foundation Ireland launches new 2025 strategy

An Taoiseach Micheál Martin TD, and Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris TD are today launching SFI's new strategy to 2025, **Shaping Our Future**. The new strategy has been developed to unlock the potential of Irish research to meet current challenges, seize future opportunities and support the priorities outlined in Ireland's recent Programme for Government: Our Shared Future.

SFI's new strategy has two core ambitions:

> **Delivering Today**: To deliver on our vision for Ireland we will develop more top talent, build on Ireland's excellent research base, and maximise the tangible benefits for our economy and society, addressing current challenges and supporting quality jobs and a competitive economy.
> **Preparing for Tomorrow**: As a small country, Ireland can best compete by developing a cohesive research ecosystem capable of taking first mover advantage in new and emergent fields. We will identify and develop the future skills required for Ireland's future economy and society. SFI's new strategy emphasises anticipating what's next and adapting our approach to lead in these new areas of discovery. To achieve this, SFI will engage and collaborate more widely and deeply with all stakeholders.

Read the full SFI Strategy 2025

Tel: +353 (0)1 6073200

Email: info@sfi.ie

www.sfi.ie

Contact Information:

GPE Scientific Ltd, Unit 5, Greaves Way Industrial Estate, Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4UB. UK.

Phone: +353(0)861305122

E-mail: info@gpescientific.co.uk

Website: http://www.gpescientific.ie

Company Information:

GPE Scientific Ltd was established in 1962 and is a leading distributor and manufacturer of laboratory equipment, glass blowing products and specialised glass components for the industrial, laboratory and research markets. There are many reasons to choose GPE Scientific above our competitors; we pride ourselves in stocking thousands of products from leading suppliers providing you with the best selection of laboratory equipment on the market. This includes being the exclusive distributors for Chemglass Life Sciences and Chemical Reactors, Norell NMR Tubes and Accessories and the portable Nanalysis NMReady Benchtop Spectrometer.

SFI Frontiers for the Future

SFI Frontiers for the Future Programme Awards

Science Foundation Ireland (SFI) is pleased to announce that the SFI Frontiers for the Future Programme (FFP) Awards rolling call will remain open for applications for the foreseeable future, subject to budget availability. The SFI Frontiers for the Future call document will be updated to reflect this.

New SFI's Frontiers for Partnership

In the coming weeks SFI will be launching a new FFP funding stream – SFI Frontiers for Partnership Awards. This call will be open to jointly prepared research proposals from the Technological University (TU) / Institutes of Technology (IoT) sector with partners in the University Sector or any other SFI Eligible Research Bodies. The aim of this programme is to build research capacity, expertise and reputation through funding excellent research in Ireland's Technological Universities and Institutes of Technology. This new programme will utilise the unique capabilities of the Technological Universities and the Institutes of Technology, in partnership with the Universities and other Research Bodies, to deliver excellent research which will ultimately transfer to a broader range of stakeholders.

Some high-level details are provided below. More information, including details on the deadline for applications will follow in the coming weeks.

-Each proposal must include one lead-applicant (based in a IoT/TU) and one co-applicant (based in a university or other SFI Eligible Research Body).
-Grant requests must be between €500,000 and €1,000,000 direct costs over a period of four or five years. It is expected that funds will be evenly distributed amongst the applicant research bodies.
-Eligibility criteria will generally be similar to the current criteria for the Frontiers for the Future Programme, with two important exceptions:
the current eligibility requirement that the PI must be in the final 24 months of a significant SFI grant to be eligible to apply will be removed for this stream of funding.
a signed contract of employment at the time of application will not be required.
-Applicants will be requested to provide written confirmation from their research body that they will be employed for the full duration of the grant, if successful.

SFI Frontiers for the Future Programme Projects

The SFI Frontiers for the Future Programme 2020 Projects call closed for applications in October 2020. Applications are currently under review, with final external review panels taking place in June 2021. Notification of outcome is expected to take place in July 2021. The Frontiers for the Future 2021 Projects call will be launching later this year.

Information related to the SFI Frontiers for the Future Programme is available at https://www.sfi.ie/funding/funding-calls/frontiers-for-the-future/

Please direct all queries to ffp@sfi.ie

For general notifications regarding grants, policies and updates please subscribe to our SFI Alerts **here**.

If you don't wish to receive any further emails like this please see the unsubscribe section below.

Tel: +353 (0) 1 6073200

Email: info@sfi.ie

www.sfi.ie

Taoiseach Honours Irish Diaspora Leaders with Prestigious SFI St Patrick's Day Science Medal

Nobel prize winner, Prof William C Campbell, and Analog Devices President and Chief Executive Officer, Mr Vincent T Roche, recognised for outstanding contributions to academia and industry

Dublin, Ireland - 16th March 2021: An Taoiseach, Micheál Martin TD, has today presented the prestigious Science Foundation Ireland (SFI) St Patrick's Day Science Medal to **Prof William C Campbell**, a recipient of the 2015 Nobel Prize in Physiology/Medicine, and to **Mr Vincent T Roche**, President and Chief Executive Officer of Analog Devices, Inc., during a celebratory virtual event to mark the occasion of St Patrick's Day and US-Ireland relations.

Now in its eighth year, the SFI St Patrick's Day Science Medal is awarded annually to US-based scientists, engineers or technology leaders with strong Irish connections, as chosen by an independent selection committee, to recognise their significant contributions to academia and industry and their roles in supporting and engaging with the research ecosystem in Ireland.

Watch Video: https://youtu.be/fK-ln8oBcw0

Congratulating the recipients at the virtual presentation event, **Taoiseach Micheál Martin TD**, said: "On behalf of the Government of Ireland and Science Foundation Ireland, I am delighted to present the SFI St. Patrick's Day Science Medal to both Professor Campbell and Mr Roche, whose contributions have made immense societal and economic impact and changed the lives of millions of people. We are deeply proud of their inspirational achievements and leadership. This prestigious prize highlights the enduring strength and profound connectivity of US-Ireland relations, which despite significant global challenges continue to grow from strength to strength. It is important that we both recognise our scientific heritage and look to the future. By placing research, development and innovation firmly at the heart of our economy, we can create new knowledge, better respond to societal needs and economic challenges, improve education, and increase the quality of our lives."

Watch Video: https://youtu.be/1R3YU1S7WAE

Recipient of the SFI St Patrick's Day Science Medal for Academia, Prof William C Campbell was born in Derry and raised in Ramelton, Co Donegal. He was educated at Campbell College Belfast and Trinity College Dublin, after which a Fulbright Travel Grant brought him to the University of Wisconsin, Madison, USA, where he undertook a PhD on liver fluke. Prof Campbell went on to work for the pharmaceutical company Merck at its Institute for Therapeutic Research until 1990. Prof Campbell is a Research Fellow Emeritus with Drew University, Madison, New Jersey in USA.

Speaking of the award, **Prof Campbell** said: "I am profoundly grateful and honoured to accept the 2021 SFI St. Patrick's Day Science Medal - an honour that is exceptional both in its rarity and in its conception. It recognizes scientific work that is carried out far beyond the recipient's homeland, and at the same time it celebrates the indissoluble ties that bind the distant worker to his or her native shore. I learned about parasitic diseases, first in Belfast, then in Dublin, and then in my adopted home in America. Through it all, my roots in Ireland were never forgotten. I have had the good fortune to work both in industry and in academia, and to be associated with colleagues who made my work far more valuable than anything I could have done alone. It is my hope that US-Ireland partnerships continue to prosper for the benefit of science, both now and in the future."

River blindness is an eye and skin disease caused by a parasite that ultimately leads to blindness, which is prevalent in Africa and in parts of Central and South America. Prof Campbell's work in the development of ivermectin, a medication used to treat parasite infestations, helped lower the incidence of river blindness and lymphatic filariasis and led to his joint Nobel Prize, shared with Japanese scientist, Prof Satoshi Ōmura. Prof Campbell's work provided the basis for the decision by Merck to distribute that cure free to millions of people in what became one of the first and foremost examples of a public/private partnership in international health. Ivermectin is currently being investigated as a treatment for coronavirus SARS-CoV-2.

Recipient of the SFI St Patrick's Day Science Medal for Industry, Mr Vincent T Roche is the President and Chief Executive Officer of Analog Devices, Inc. (ADI) and is considered a leader in the field of semiconductors. Originally from Wexford, Mr Roche earned a Bachelor's degree in Electrical Engineering from the then NIHE Limerick in 1982, before going on to join Analog Devices in the late 1980s. In May 2013, he became the third ever CEO to lead the company. In 2017, Mr Roche received an Honorary Doctorate in Engineering from the University of Limerick. Throughout his career, Mr Roche has been inspired and driven by an acute awareness of the profound impact semiconductor technology has across so many dimensions of our lives.

Watch Video: https://youtu.be/Ok7KAc3s7vA

Welcoming the award, **Mr Roche**, said: "I am deeply honoured to accept the SFI St Patrick's Day Science Medal for Industry. Ireland has been critical to ADI's R&D and operational success ever since we established our first site in Limerick in 1976, just over a decade after our company's founding. Many of ADI's cutting-edge technology innovations are the result of the rich collaboration between our U.S. and Irish operations, as well as our long-term relationship with Ireland's excellent academic institutions, research centres, and the larger business ecosystem. I am proud of our strong partnership with Ireland and I look forward to many more decades of joint growth and advancement."

Analog Devices is a world leader in high performance analog, mixed-signal, and digital signal processing (DSP) integrated circuits (ICs) for the industrial, automotive, communications, healthcare and consumer markets. Under Mr Roche, ADI has deepened and broadened its technology portfolio and approach to innovation to drive greater impact for humanity and the economy at large. His vision and leadership have helped make Analog Devices a critical strategic partner to thousands of leading companies around the world that are creating the future, earning Mr Roche a placement among the Forbes 100 Most Innovative Leaders in 2019. Analog Devices has long-established links with the Irish research community, in particular with the universities and research institutions in Cork (UCC and Tyndall, originally NMRC) and Limerick (UL and LIT). ADI invests directly in projects in the Irish research ecosystem and serves as a key partner in national strategic research programmes such as the SFI Research Centres, as well as Enterprise Ireland and IDA-funded centres.

Congratulating the recipients, **Prof Mark Ferguson, Director General, Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland**, said: "The SFI St Patrick's Day Science Medal recognises the global reach and influence of the Irish scientific and technology diaspora. I am delighted to congratulate both William and Vincent on the outstanding research, leadership and innovation they have achieved throughout their careers. The incredible achievements and diversity of our Irish research diaspora continue to advance Ireland's society and economy through excellent ground-breaking research and technology, generating new insights and creating new opportunities for both countries, academic communities and industry.

€13.5 million joint investment announced for US-Ireland R&D Programme

Dublin, Ireland, 17 March 2021: A joint investment of €13.5 million was today announced through a tripartite research and development partnership between the United States of America (USA), Republic of Ireland (RoI) and Northern Ireland (NI). The seven awards will support more than 60 research positions across 14 research institutions, for three to five years.

The US-Ireland Research and Development Partnership, launched in July 2006, is a unique initiative that aims to increase the level of collaborative R&D amongst researchers and industry professionals across the three jurisdictions. The programme involves multiple funding partners across the three jurisdictions, working together collaboratively to support the most excellent and impactful research. The funding agencies involved in the awards being announced today are Science Foundation Ireland (SFI) and the Health Research Board (HRB) in the Republic of Ireland; the National Science Foundation (NSF) and National Institutes of Health (NIH) in the USA, and the Health & Social Care R&D Division (HSC R&D) and the Department for the Economy (DfE) in Northern Ireland.

Welcoming the announcement, **Prof Mark Ferguson, Director General of Science Foundation Ireland and Chief Scientific Adviser to the Government of Ireland**, said: "The US-Ireland R&D Partnership Programme continues to support and encourage strong collaborative relationships between our countries. It recognises and highlights Ireland's significant scientific standing internationally and the societal and economic benefits that can be realised when we work beyond our borders. I wish all of the partners every success in this important collaboration."

The programme, which uses a 'single-proposal, single-review' approach, focuses on prioritised thematic areas, including sensors, nanoscale science and engineering, telecommunications, energy and sustainability, and health. The Irish components of research projects in the area of health are jointly co-funded by SFI with the Health Research Board (HRB).

Commenting on the awards, **HRB Chief Executive, Dr Mairéad O'Driscoll** said: "Health research makes a real difference to people's lives. We've seen how the recent pandemic has sparked huge public interest in both health and research. The HRB plays an essential role in advancing research, and is committed to supporting highly innovative international collaboration through the US-Ireland R&D Programme. I welcome the announcement of these new awards, which will generate health benefits in Ireland and internationally."

In congratulating the researchers on these awards, **Dr Janice Bailie, Assistant Director, Health and Social Care (HSC) Research and Development, Northern Ireland**, said: "More than ever, we can see the immense value of international research collaboration, as supported by the US Ireland R&D Programme. This bringing together of researchers from across Ireland and the US is strengthening knowledge transfer and improving health outcomes with global impact."

Trevor Cooper, Director of Higher Education in the Department for the Economy (Northern Ireland) said: "The US-Ireland R&D Partnership supports ground-breaking trans-Atlantic research which will help to further develop Northern Ireland's research and innovation capabilities, driving competition with the potential to deliver significant economic impact."

Under the programme, **Prof Simon Kelly based in University College Dublin** will partner with **Ulster University (NI)** and **Columbia University New York** and **Northwell-Hofstra School of Medicine (US)** to lead a neuroscience research project that seeks to identify the underlying neural mechanisms of decision-making in order to understand a core element of both normal and abnormal cognition.

Prof Rose-Anne Kenny based in **Trinity College Dublin (TCD)** will lead a research project that is focused on the areas of aging, epigenomics and behavioural and social sciences. Partnering with **Queen's University Belfast (NI)** and **University of South California (US)** they aim to identify new links between lifetime social and behavioural circumstances (e.g. low level of education and income, minority group membership, adverse childhood experiences, adult traumas and chronic stress), epigenetic clocks and subsequent physical health and cognitive function outcomes in people aged over 50 years.

In **University College Dublin**, **Prof Grace Morgan** will lead research in the area of molecular magnetoelectric materials, to investigate new ways to harness the manipulation of electron spins in transition metal complexes to maximise their potential for use in new magnetoelectric devices. This project is partnering with **Queen's University Belfast (NI)** and **Florida State University (US)**.

At the **Maynooth University Centre for Ocean Energy Research, Dr Oliver Mason in collaboration with Prof John Ringwood**, will partner with **Queen's University Belfast (NI)** and **Iowa State University (US)** to investigate new ways of improving the efficiency of arrays or farms of Wave Energy Converters (WECs). The work will focus on how the size and shape of individual WECs, and different control strategies, can be designed to optimise the performance of the array in harvesting energy from ocean waves.

Prof Frank McDermott, based at the iCRAG SFI Research Centre for Applied Geosciences led by **University College Dublin**, is partnering with **Queen's University Belfast (NI)** and the **NSF-funded Center for Bio-mediated and Bio-inspired Geotechnics (US)** to investigate the use of microbes and enzymes to enhance methods of bio-based strengthening which can be used to stabilise soil slopes in areas of high land-slide risk and bind problematic waste such as asbestos.

Prof Garry Duffy at the CÚRAM SFI Research Centre for Medical Devices led by **National University of Ireland Galway**, is partnering with **Queen's University Belfast (NI)** and the **Georgia Institute of Technology (US)** led **NSF Engineering Research Centre for Cell Manufacturing Technologies** to develop a Global Cell Manufacturing and Delivery partnership. The team aims to develop technologies to allow ambient transfer of complex cell-based therapies for chronic disease including heart disease and non-healing wounds, which could reduce the costs of cell products while maintaining their safety and potency. The partners will scale-up, model and test a hydrogel-based ambient transport system to make it clinical trial ready.

Prof Gerard O'Connor, also based at the CÚRAM SFI Research Centre for Medical Devices led by **National University of Ireland, Galway**, is working with **Queen's University Belfast (NI)** and **Boston University (US)** in a Cardiac Organoid Systems Partnership to create a functional engineered cardiac tissue with electromechanical properties that mimic native human myocardium on a

scalable laser-enabled manufacturing platform with the potential to transform the treatment of chronic heart disease.

For more information on the programme, click here. Full list of awards attached.

#BelieveInScience

Three Park Place, Hatch Street
Upper,
Dublin 2, Ireland
D02 FX65

+353 (0)1 607 3200
info@sfi.ie

eAlert: May 2021

SFI Research Infrastructure Programme

Change to Expression of Interest Deadline

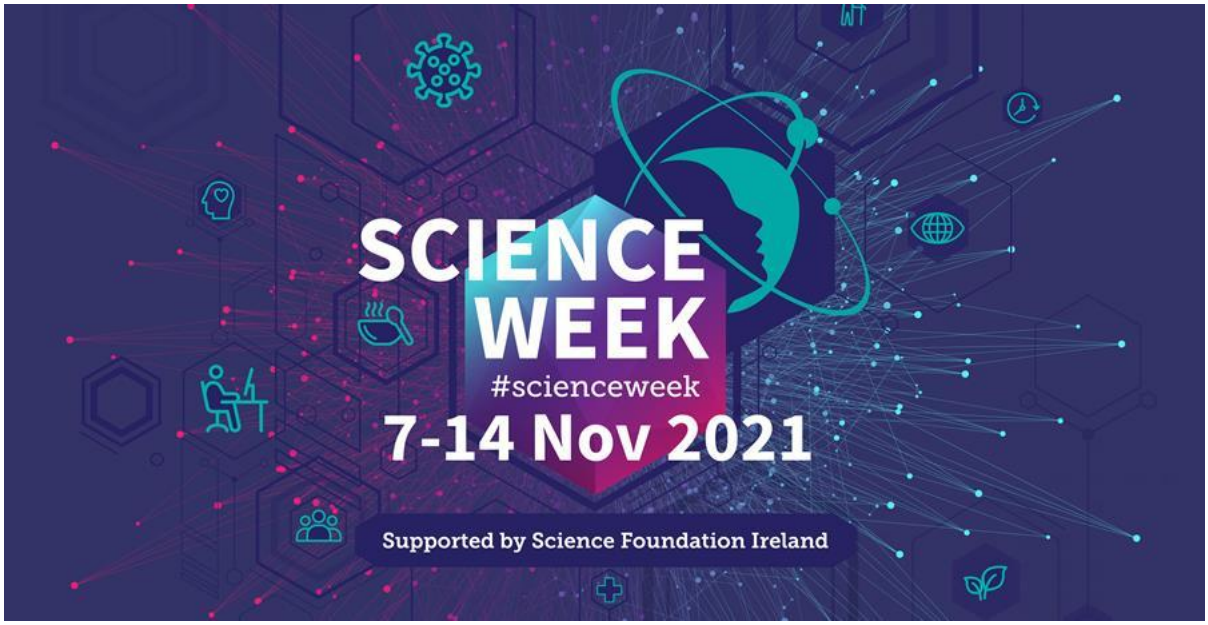
SFI would like to advise that the **Expression of Interest deadline** for the **SFI Research Infrastructure Programme 2021** has changed to **11th June 2021, 13:00 Dublin local time**. The Full proposal remains 2nd July 2021, 13:00 Dublin local time.

An information webinar about this call will be available on SFI's website from Thursday 20th May 2021. Details on how to access the webinar and further information on the programme call are available here:

SFI Research Infrastructure Programme

Contact us

Tel: +353 (0) 1 6073200 I Email: info@sfi.ie I Web: www.sfi.ie



April 2021

SFI Discover Programme Science Week Call 2021

Science Foundation Ireland is pleased to launch the **SFI Discover Programme Science Week** Call 2021. The purpose of this call is to provide support to festivals and events nationwide that encourage people, in particular those underrepresented in STEM, or those with less access to STEM, to engage in ways that are relevant and accessible during **Science Week 2021** and beyond.

Science Week Call 2021

A webinar on this call will be held on **April 16th** at 12pm. **Register interest here**.

Tel: +353 (0)1 6073200

Email: info@sfi.ie

www.sfi.ie

E-Alert: April 2021

SFI Industry RD&I Fellowship Programme

Science Foundation Ireland is pleased to launch a new programme, the SFI Industry RD&I Fellowship, which seeks to support academic partnerships with industry. Grants can be awarded to academic researchers wishing to spend time in industry to support industry-informed research and the exchange of knowledge and expertise between academia and industry. For further information on the SFI Industry RD&I Fellowship Programme please visit our website.

The deadline for submissions to the SFI Industry RD&I Fellowship Programme 2021 Call is 13:00 (local time Dublin, Ireland) on the **21st July 2021**.

A webinar will be held at 14:00 on **20th April 2021**. Please register here to attend.

The SFI Industry RD&I Fellowship LinkedIn group allows academic researchers and prospective industry partners to network and identify opportunities to apply. Join today!

SFI Industry RD&I Fellowship Programme

Tel: +353 (0)1 6073200

Email: info@sfi.ie

www.sfi.ie

SFI-IRC Pathway Programme

Supporting the development of research talent across all disciplines

30 April

The SFI-IRC Pathway Programme will support talented postdoctoral researchers from all research disciplines to develop their track record and transition to become independent research leaders.

The programme welcomes research proposals from any discipline within **Science, Technology, Engineering and Mathematics (STEM)** and **Arts, Humanities, and Social Sciences (AHSS)**. Applications of an interdisciplinary nature which draw together insights and approaches from one or more research disciplines will also be welcomed. The maximum funding request permitted under the SFI-IRC Pathway Programme is **€425,000 direct costs** over a period of four years which includes a contribution to the salary of the applicant, and the stipend and fees for a PhD student. Please refer to the Programme Call Document for further details.

Potential applicants, meeting the programmes eligibility criteria, wishing to apply to the SFI-IRC Pathway Programme 2021 call must first seek pre-approval from an eligible research body. Once SFI and the IRC have received a research body's approved candidate list in advance of the deadline (28th May 2021), nominated candidates will then be invited to submit a full proposal. SFI and the IRC recognises the continued need for equality, diversity and inclusivity across the research ecosystem, and are committed to addressing the gender imbalance within the higher education sector by increasing the number of grants held by female researchers. To this end, **each research body may nominate a maximum of 16 STEM-led and 8 AHSS-led applications. No more than eight of the 16 STEM-led, and four of the 8 AHSS-led, nominated applications may be from male candidates**. Upon submission to SFI and IRC all applications will be treated equally regardless of the gender of the applicant.

DEADLINE
Open
Research Body nomination: 28th May 2021; Full proposal submission: 25th June 2021
DURATION 48 months

More information at:

https://www.sfi.ie/funding/funding-calls/pathway

Minister Harris announces new SFI programme to support research in Technological Universities and Institutes of Technology

15 April 2021: Minister for Further and Higher Education, Research, Innovation and Science Simon Harris TD has today (Thursday) announced details of the Science Foundation Ireland Frontiers for Partnership Awards programme, which aims through an investment of €9 million to increase research capacity within Technological Universities (TUs) and Institutes of Technology (IoTs). The new programme is now open to research proposals that are led by TUs or IoTs, with partners from the University sector.

Speaking about the programme, **Minister Harris** said, "I'm delighted to announce this new initiative to increase geographical involvement and research engagement across the country, building on the unique strengths of both sectors. A key element of the programme is to increase research capacity in Technological Universities and Institutes of Technology by facilitating teaching replacement and increasing the number of PhD students."

New funding has been provided to support the research. With this funding and in line with SFI's new strategy, SFI has developed a new stream to support research capacity, building Ireland's Technological Universities and Institutes of Technology in partnership with their University counterparts.

The successful awards will be led by TU/IoT researchers and will support teaching buyout and the recruitment of PhD students. The budget for the programme is €700,000 in 2021 and there is a €9.1 million commitment over 5 years. The awards will be between €500,000 and €1,000,000 over 48 or 60 months. The objectives of the SFI Frontiers for Partnership Award programme are:

- To increase the research capacity of TU/IoTs through the facilitation of teaching replacement
- To increase the number of PhD students in the TU/IoT sector
- To increase the geographical range of SFI's funding portfolio

Full details of the programme, including an information webinar for potential applicants can be

SFI Industry RD&I Fellowship Programme

The SFI Industry RD&I Fellowship Programme 2021 seeks to support academia-industry interactions in order to address industry-informed challenges. Awards under this programme can be made to academic researchers (at faculty and postdoctoral level) wishing to spend time in industry worldwide through the temporary placement of academic researchers with an industry partner.

Funding

Fellowships can have a duration of between 1 and 12 months if full-time, and between 2 and 24 months if part-time. Grants awarded under this new programme will be subject to the General Block Exemption Regulation (GBER) under EU State aid guidelines. As such, the SFI funding rate will vary from 25% to a maximum of 80% of total project costs depending on the size of the industry partner company and the category of research being undertaken, with the industry partner contributing the remainder of the project costs. The maximum SFI contribution to the Fellowship costs is €100,000 direct costs. Please refer to the 2021 SFI Industry RD&I Fellowship Programme Call document for further details.

Finding a partner

A LinkedIn group called SFI Industry RD&I Fellowship Programme has been set up by SFI to facilitate networking between academic and industry researchers. Companies are encouraged to make their interest known to the academic community, and/or to advertise specific research opportunities, by posting on this 900+ members group's page. Academic researchers are encouraged to engage with relevant companies. Several companies have already published an advertisement and got a response – join the group today!

The SFI Researcher Database and the KTI Expert Database list potential academic research partners. Postdoctoral researchers do not appear in these databases – companies can identify the appropriate team leader from the database and contact them to discuss whether there are eligible researchers in their group (faculty and/or postdoctoral researchers). The Research Offices of the Irish academic and research institutions may also assist companies in identifying prospective academic partners.

Note: Prior to commencing your search for a partner, please refer to the 2021 SFI Industry RD&I Fellowship Programme Call document in order to understand the eligibility criteria associated with this programme. Academic and industry partners should jointly prepare an application. The academic researcher will submit the application to SFI via SESAME, SFI's grants and awards management system. additionally, industry partners will be required to provide SFI with the latest set of financial records and financial declarations.

For general queries, including eligibility queries, applicants are advised to contact the Research Office of the Research Body to whom they intend to submit their application. For additional information or clarification, contact irdif@sfi.ie.

More details at: https://www.sfi.ie/funding/funding-calls/sfi-industry-fellowship-programme

SFI Discover Programme
Open for
Engaging
discovery

E-Alert: May 2021

SFI Discover Programme Call 2021

The **SFI Discover Programme Call 2021** is now open!

SFI welcomes applications from across the sciences, arts, media, education, youth and/or community work sectors. Applicants are encouraged to submit proposals that create opportunities for broader participation and engagement of the public with STEM.

The SFI Discover Programme Call 2021 is running in collaboration with the Department of Education.

Further information on this Call is available here:

SFI Discover Programme

Tel: +353 (0)1 6073200

Email: info@sfi.ie

www.sfi.ie

SARS CoV-2 Virus Updates and Developments

South African coronavirus variant: All your questions answered
1 February 2021
South African coronavirus variant: All your questions answered | Live Science

Bayer to Manufacture CureVac's COVID-19 Vaccine
1 February
Bayer to Manufacture CureVac's COVID-19 Vaccine | Pharmaceutical Technology (pharmtech.com)

WHO team visits animal disease centre in Wuhan
2 February
WHO team visits animal disease centre in Wuhan (breakingnews.ie)

Russia's Sputnik V vaccine 92% effective in fighting COVID-19
2 February
Russia's Sputnik V vaccine 92% effective in fighting COVID-19 | Reuters and
Russia thumbs its nose at the world with new vaccine results
2 February
Russia thumbs its nose at the world with new vaccine results (pharmamanufacturing.com) and
Russia's Sputnik V vaccine has 92% efficacy in trial
2 February
Russia's Sputnik V vaccine has 92% efficacy in trial - BBC News

One-shot COVID-19 vaccine is effective against severe disease
29 January
How effective is Johnson & Johnson's one-shot COVID-19 vaccine? | Science News

Temperature, Humidity & Wind Predict Second Wave of COVID-19 Pandemic
2 February
Temperature, Humidity & Wind Predict Second Wave of COVID-19 Pandemic (scitechdaily.com)

Multiple COVID-19 Variants Are Developing Vaccine-Evading Mutations, Scientists Fear
2 February
Multiple COVID-19 Variants Are Developing Vaccine-Evading Mutations, Scientists Fear (sciencealert.com)

Researchers develop 10-minute COVID-19 diagnostic test that wage workers can afford
3 February
Researchers develop 10-minute COVID-19 diagnostic test that wage workers can afford | AGÊNCIA FAPESP

GSK and CureVac sign £132m deal to develop multi-variant Covid vaccine | World news | The Guardian
3 February
GSK and CureVac sign £132m deal to develop multi-variant Covid vaccine | World news | The Guardian

Fast, Cheap, Accessible COVID-19 Antibody Test Developed
2 February
Fast, Cheap, Accessible COVID-19 Antibody Test Developed | Technology Networks

Age groups that sustain resurging COVID-19 epidemics in the United States
2 February
Age groups that sustain resurging COVID-19 epidemics in the United States | Science (sciencemag.org)

Powerful Antiviral Treatment for COVID-19 Discovered That Could Change How Epidemics Are Managed
2 February
Powerful Antiviral Treatment for COVID-19 Discovered That Could Change How Epidemics Are Managed (scitechdaily.com)

The Sputnik V Vaccine and Russia's Race to Immunity (24 minute read)
1 February
The Sputnik V Vaccine and Russia's Race to Immunity | The New Yorker

EMA starts rolling review of Novavax COVID vaccine
3 January
EMA starts rolling review of Novavax COVID vaccine | RAPS

New Insight into Differences between SARS-CoV-2 and SARS-CoV
3 February
New Insight into Differences between SARS-CoV-2 and SARS-CoV | Lab Manager

UTEP Researchers Make Discoveries to Better Understand SARS-CoV-2 Virus
2 February
UTEP Researchers Make Discoveries to Better Understand SARS-CoV-2 Virus

How to redesign COVID vaccines so they protect against variants
29 January
How to redesign COVID vaccines so they protect against variants (nature.com)
https://doi.org/10.1038/d41586-021-00241-6

Novavax offers first evidence that COVID vaccines protect people against variants
29 January
Novavax offers first evidence that COVID vaccines protect people against variants (nature.com)

Single Pfizer vaccine dose is highly protective after 21 days, study finds
3 February
Single Pfizer vaccine dose is highly protective after 21 days, study finds (breakingnews.ie)

No More Needles for Diagnostic Tests?
26 January
No More Needles for Diagnostic Tests? | Technology Networks
https://www.nature.com/articles/s41551-020-00672-y

Scientists call for fully open sharing of coronavirus genome data
3 February
Scientists call for fully open sharing of coronavirus genome data (nature.com)
https://advances.sciencemag.org/content/7/2/eabc7323

If control measures are stopping flu in its tracks, why aren't they stopping coronavirus?
4 February

If control measures are stopping flu in its tracks, why aren't they stopping coronavirus? (theconversation.com)

Scientists Are Testing Mixing AstraZeneca's COVID-19 Vaccine With Pfizer's

4 February
Scientists Are Testing Mixing AstraZeneca's COVID-19 Vaccine With Pfizer's (sciencealert.com)

Retrained Generic Antibodies Can Recognize SARS-CoV-2

4 February
Retrained Generic Antibodies Can Recognize SARS-CoV-2 | Lab Manager and
Retrained generic antibodies can recognize SARS-CoV-2
2 February
Retrained generic antibodies can recognize SARS-CoV-2 | UIC Today

Oxford COVID-19 Vaccine Shows Protection of 76% in 3-Month Interval Between Doses

3 February
Oxford COVID-19 Vaccine Shows Protection of 76% in 3-Month Interval Between Doses | Technology Networks

First Images of SARS-CoV-2 Under the Helium Ion Microscope

4 February
First Images of SARS-CoV-2 Under the Helium Ion Microscope | Technology Networks

Small, Recurrent Deletions in SARS-CoV-2's Spike Protein May Drive Antibody Escape

5 February
Small, Recurrent Deletions in SARS-CoV-2's Spike Protein May Drive Antibody Escape (genengnews.com)

The sneaky way the coronavirus mutates to escape the immune system

5 February
The sneaky way the coronavirus mutates to escape the immune system | Live Science

Here's How Climate Change May Have Played a Role in The Emergence of COVID-19

5 February
Here's How Climate Change May Have Played a Role in The Emergence of COVID-19 (sciencealert.com)

Immune Boosting Nasal Spray: Protects Against COVID-19, Is Also Effective Against the Common Cold

5 February
Immune Boosting Nasal Spray: Protects Against COVID-19, Is Also Effective Against the Common Cold (scitechdaily.com)
https://doi.org/10.1183/13993003.01584-2020

How coronavirus variants may drive reinfection and shape vaccination efforts

5 February
What do coronavirus variants mean for reinfection and vaccines? | Science News

Coronavirus might become endemic – here's how

5 February
Coronavirus might become endemic – here's how (theconversation.com)

COVID vaccine weekly: developing boosters for new mutations

5 February
COVID vaccine weekly: developing boosters for new mutations (theconversation.com)

Not recommending AstraZeneca vaccine for the elderly risks the lives of the most vulnerable

Not recommending AstraZeneca vaccine for the elderly risks the lives of the most vulnerable (theconversation.com)

AstraZeneca vaccine: delaying the second dose increases protection, according to new data

8 February
Delaying The Second AstraZeneca Dose Actually Increases Protection, New Data Suggests (sciencealert.com)

COVID-19 diagnostics (Contains a video and podcast reviewing diagnostic tests, Commercial company)

February 2021
COVID-19 Diagnostics: In Focus - BioTechniques

The Evolution of SARS-CoV-2 in a Single Patient

8 February
The Evolution of SARS-CoV-2 in a Single Patient (genengnews.com)

Inhibition of SARS-CoV-2 (previously 2019-nCoV) infection by a highly potent pan-coronavirus fusion inhibitor targeting its spike protein that harbors a high capacity to mediate membrane fusion

30 march 2020
Inhibition of SARS-CoV-2 (previously 2019-nCoV) infection by a highly potent pan-coronavirus fusion inhibitor targeting its spike protein that harbors a high capacity to mediate membrane fusion | Cell Research (nature.com)
https://doi.org/10.1038/s41422-020-0305-x

Shifts in global bat diversity suggest a possible role of climate change in the emergence of SARS-CoV-1 and SARS-CoV-2

26 January
Shifts in global bat diversity suggest a possible role of climate change in the emergence of SARS-CoV-1 and SARS-CoV-2 - ScienceDirect
https://doi.org/10.1016/j.scitotenv.2021.145413

Rapid coronavirus tests: a guide for the perplexed

9 February
Rapid coronavirus tests: a guide for the perplexed (nature.com) And
FIND evaluation of SARS-CoV-2 antigen (Ag) detecting tests - FIND (finddx.org)
https://doi.org/10.1038/d41586-021-00332-4

Variant-proof vaccines — invest now for the next pandemic

8 February
Variant-proof vaccines — invest now for the next pandemic (nature.com)
https://doi.org/10.1038/d41586-021-00340-4

Two new variants of coronavirus found in England under investigation

9 February
Two new variants of coronavirus found in England under investigation (breakingnews.ie)

Cold sensitivity of the SARS-CoV-2 spike ectodomain

5 January

Cold sensitivity of the SARS-CoV-2 spike ectodomain | Nature Structural & Molecular Biology https://doi.org/10.1038/s41594-020-00547-5

China Scores a Public Relations Win After W.H.O. Mission to Wuhan

9 February
China Scores a Public Relations Win After W.H.O. Mission to Wuhan - The New York Times (nytimes.com)

Advanced Simulations Reveal How Air Conditioning Spreads COVID-19 Aerosols Through Restaurants

9 February
Advanced Simulations Reveal How Air Conditioning Spreads COVID-19 Aerosols Through Restaurants (scitechdaily.com)
DOI: 10.1063/5.0040188

COVID Detectives on the Hunt for Animal X

9 February
COVID Detectives on the Hunt for Animal X (scitechdaily.com)

Pangolin Coronavirus Could Jump to Humans – Similarities Found Between SARS-CoV-2 and a Pangolin Coronavirus

8 February
Pangolin Coronavirus Could Jump to Humans – Similarities Found Between SARS-CoV-2 and a Pangolin Coronavirus (scitechdaily.com)
https://doi.org/10.1038/s41467-021-21006-9

Using computer models to outsmart spike proteins in SARS-CoV-2

17 April 2020
Using computer models to outsmart spike proteins in SARS-CoV-2 - NMZ (nanomedzone.com)

Coronavirus (COVID-19) Update: FDA Authorizes Monoclonal Antibodies for Treatment of COVID-19

9 February
Coronavirus (COVID-19) Update: FDA Authorizes Monoclonal Antibodies for Treatment of COVID-19 | FDA

Climate change could have caused the COVID-19 outbreak

8 February
Climate change could have caused the COVID-19 outbreak (innovationnewsnetwork.com)

New Research Highlights Risk of New COVID Mutations Emerging During Chronic Infection

9 February
New Research Highlights Risk of New COVID Mutations Emerging During Chronic Infection (scitechdaily.com)

SARS-CoV-2 Infection Prevented and Treated in Human Lung Tissue Model

10 February
SARS-CoV-2 Infection Prevented and Treated in Human Lung Tissue Model (genengnews.com)
https://doi.org/10.1038/s41586-021-03312-w

All the coronavirus in the world could fit inside a Coke can, with plenty of room to spare (Just a bit of fun)

10 February

All the coronavirus in the world could fit inside a Coke can, with plenty of room to spare (theconversation.com)

Engineering Biomaterials for Better Vaccines

11 February

Engineering Biomaterials for Better Vaccines | Technology Networks

Bioinformatic Analysis Offers New Clues to How SARS-CoV-2 Infects Cells

10 February 2021

https://scitechdaily.com/bioinformatic-analysis-offers-new-clues-to-how-sars-cov-2-infects-cells and

Cytoplasmic short linear motifs in ACE2 and integrin β3 link SARS-CoV-2 host cell receptors to mediators of endocytosis and autophagy

Cytoplasmic short linear motifs in ACE2 and integrin β3 link SARS-CoV-2 host cell receptors to mediators of endocytosis and autophagy | Science Signaling (sciencemag.org)

DOI: 10.1126/scisignal.abf1117

'Major stones unturned': COVID origin search must continue after WHO report, say scientists

10 February

'Major stones unturned': COVID origin search must continue after WHO report, say scientists (nature.com)

https://doi.org/10.1038/d41586-021-00375-7

Adaptable biosensor rapidly detects COVID-19 virus and antibodies

11 February

Adaptable biosensor rapidly detects COVID-19 virus and antibodies – Physics World

Is there a limit to how much the coronavirus can mutate?

11 February

Is there a limit to how much the coronavirus can mutate? | Live Science

Scientists Think They've Figured Out What's Triggering Brain Fog in COVID-19 Patients

11 February

Scientists Think They've Figured Out What's Triggering Brain Fog in COVID-19 Patients (sciencealert.com)

WHO Says Oxford's Vaccine Is Safe and Likely to Be Efficacious in Older Adult

10 February

WHO Says Oxford's Vaccine Is Safe and Likely to Be Efficacious in Older Adults | Technology Networks

EMA to initiate rolling review of CureVac COVID vax

12 February

EMA to initiate rolling review of CureVac COVID vax (pharmamanufacturing.com)

New Research Reveals Bats & Pangolins in Southeast Asia Harbor COVID-19-Related Coronaviruses

12 February

New Research Reveals Bats & Pangolins in Southeast Asia Harbor COVID-19-Related Coronaviruses (scitechdaily.com)

Exhaled aerosol increases with COVID-19 infection, age, and obesity

23 January

Exhaled aerosol increases with COVID-19 infection, age, and obesity | PNAS

Making masks fit better can reduce coronavirus exposure by 96 percent

12 February
Making masks fit better can reduce coronavirus exposure by 96 percent | Science News

Some Coronaviruses Can Steal Their Host's Genes to Elude Their Immune System
13 February
Some Coronaviruses Can Steal Their Host's Genes to Elude Their Immune System (scitechdaily.com)

COVID vaccine weekly: why AstraZeneca vaccine received WHO backing even as South Africa paused rollout
12 February
COVID vaccine weekly: why AstraZeneca vaccine received WHO backing even as South Africa paused rollout (theconversation.com)

UK Coronavirus Variant May Be Up to 70% Deadlier, New Evidence Suggests
15 February
UK Coronavirus Variant May Be Up to 70% Deadlier, New Evidence Suggests (sciencealert.com)

Vaccines Versus the Mutants (Anthony King – Dublin based science journalist)
8 February
Vaccines Versus the Mutants | The Scientist Magazine® (the-scientist.com)

Are Climate-Driven Shifts in Bat Diversity to Blame for COVID-19?
12 February
Are Climate-Driven Shifts in Bat Diversity to Blame for COVID-19? | The Scientist Magazine® (the-scientist.com)

Down Syndrome, Genetics and COVID-19 Susceptibility
9 February
Down Syndrome, Genetics and COVID-19 Susceptibility | Technology Networks

The COVID-19 Coronavirus – SARS-CoV-2 – Might Hijack Cellular Processes
14 February
The COVID-19 Coronavirus – SARS-CoV-2 – Might Hijack Cellular Processes (scitechdaily.com)
https://stke.sciencemag.org/content/14/665/eabd0334
and 12 January 2021
Short linear motif candidates in the cell entry system used by SARS-CoV-2 and their potential therapeutic implications | Science Signaling (sciencemag.org)

How 'killer' T cells could boost COVID immunity in face of new variants
12 February
How 'killer' T cells could boost COVID immunity in face of new variants (nature.com)
https://doi.org/10.1038/d41586-021-00367-7

GAO: COVID-19 vaccine production falls short of January 2021 goal
15 February
GAO: COVID-19 vaccine production falls short of January 2021 goal | RAPS

Study finds 94% drop in symptomatic Covid cases with Pfizer vaccine
14 February
Study finds 94% drop in symptomatic Covid cases with Pfizer vaccine (irishtimes.com)

How the new coronavirus enters respiratory tissue, exploits immune defenses | Harvard Stem Cell Institute (HSCI)

29 April 2020
How the new coronavirus enters respiratory tissue, exploits immune defenses | Harvard Stem Cell Institute (HSCI)

Scientists Discover 7 New Coronavirus Variants in Locations Across The US

16 February
Scientists Discover 7 New Coronavirus Variants in Locations Across The US (sciencealert.com)

Just a Single Dose of COVID-19 Vaccine Provokes Strong Immune Response in Those Previously Infected

16 February
Just a Single Dose of COVID-19 Vaccine Provokes Strong Immune Response in Those Previously Infected (scitechdaily.com)
https://doi.org/10.2807/1560-7917.ES.2021.26.6.2100096

MIT Develops Machine-Learning Approach to Finding New Treatment Options for COVID-19

16 February
MIT Develops Machine-Learning Approach to Finding New Treatment Options for COVID-19 (scitechdaily.com)
https://doi.org/10.1038/s41467-021-21056-z

The coronavirus is here to stay — here's what that means

16 February
The coronavirus is here to stay — here's what that means (nature.com)

Who should get the Johnson & Johnson vaccine over the mRNA vaccines?

15 February
Who should get the Johnson & Johnson vaccine over the mRNA vaccines? | Live Science

COVID-19 vaccines are not comparable in terms of efficacy, according to specialists

17 February
COVID-19 vaccines are not comparable in terms of efficacy, according to specialists | AGÊNCIA FAPESP
A recording of the complete webinar is available at **www.youtube.com/watch?v=6bNLtyMSIxE**.

Markers of COVID-19 severity and therapeutic targets possibly unveiled in patients' blood plasma

17 February
Markers of COVID-19 severity and therapeutic targets possibly unveiled in patients' blood plasma | AGÊNCIA FAPESP

Blood Biomarker Test Rapidly Detects COVID-19 Severity

16 February
Blood Biomarker Test Rapidly Detects COVID-19 Severity | Technology Networks
https://www.medrxiv.org/content/10.1101/2020.11.04.20225557v1

Immune Features Identified That May Track With Lasting SARS-CoV-2 Protection

17 February
Immune Features Identified That May Track With Lasting SARS-CoV-2 Protection | Technology Networks
https://www.nature.com/articles/s41467-021-21336-8#article-info

Therapeutically Targeting Proteins Hijacked by SARS-CoV-2

17 February
Therapeutically Targeting Proteins Hijacked by SARS-CoV-2 | Technology Networks and

SARS-CoV-2 infection remodels the host protein thermal stability landscape | Molecular Systems Biology (embopress.org)
https://www.embopress.org/doi/full/10.15252/msb.202010188

Another Potentially Immunity-Evading SARS-CoV-2 Variant Detected
16 February
Another Potentially Immunity-Evading SARS-CoV-2 Variant Detected | The Scientist Magazine® (the-scientist.com)

Slower Covid Spread In Asia? A Protein May Be Key, Say Indian Scientists (Alpha-anti-trypsin (AAT)), (journal Infection, Genetics and Evolution)
10 February
Slower Covid Spread In Asia? A Protein May Be Key, Say Indian Scientists (ndtv.com)

Some antibodies can dampen antiviral defences in people with severe COVID
16 February
Some antibodies can dampen antiviral defences in people with severe COVID (nature.com)
https://doi.org/10.1038/d41586-021-00352-0

Coronavirus: preparing Europe for the increased threat of variants
17 February
Preparing Europe for the increased threat of variants (europa.eu)

U.K. Approves Study That Will Deliberately Infect Volunteers With Coronavirus
17 February
U.K. Approves Study That Will Infect Humans for Covid Trials - The New York Times (nytimes.com)

Why do antibodies fade after a COVID-19 infection, and will the same thing happen with vaccines?
17 February
Why do antibodies fade after a COVID-19 infection, and will the same thing happen with vaccines? (theconversation.com)

Where Are the Therapeutics to Combat COVID-19?
12 February
Where Are the Therapeutics to Combat COVID-19? | Pharmaceutical Executive (pharmexec.com)

Suitcase Lab Enables Rapid, Portable SARS-CoV-2 Testing
12 February
Suitcase Lab Enables Rapid, Portable SARS-CoV-2 Testing | Technology Networks
https://pubs.acs.org/doi/10.1021/acs.analchem.0c04779

The Impact of Emerging SARS-CoV-2 Variants on Diagnostic Testing
8 February
The Impact of Emerging SARS-CoV-2 Variants on Diagnostic Testing | Technology Networks

Vaccines versus the Mutants
8 February
Vaccines Versus the Mutants | The Scientist Magazine® (the-scientist.com)

What Pseudoviruses Bring to the Study of SARS-CoV-2
16 February
What Pseudoviruses Bring to the Study of SARS-CoV-2 | The Scientist Magazine® (the-scientist.com)

COVID-19 Genetic Mutation D614G Makes the Virus Up to 8x More Infectious

18 February

COVID-19 Genetic Mutation D614G Makes the Virus Up to 8x More Infectious (scitechdaily.com)

https://doi.org/10.7554/eLife.65365

Pfizer Vaccine Has Weaker Response Against South African COVID Variant, Study Hints

18 February

Pfizer Vaccine Has Weaker Response Against South African COVID Variant, Study Hints (sciencealert.com)

Study: Ozone Is Effective in Disinfecting Coronavirus

18 February

Study: Ozone Is Effective in Disinfecting Coronavirus | Lab Manager and

Pseudoviruses for the assessment of coronavirus disinfection by ozone

13 January

Pseudoviruses for the assessment of coronavirus disinfection by ozone | SpringerLink

https://doi.org/10.1007/s10311-020-01160-0

Intranasal Peptide Blocks SARS-CoV-2 Transmission in Ferrets

19 February

Intranasal Peptide Blocks SARS-CoV-2 Transmission in Ferrets (genengnews.com)

Luke O'Neill: Pfizer's vaccine can now be kept in a regular freezer | Newstalk

19 February

Luke O'Neill: Pfizer's vaccine can now be kept in a regular freezer | Newstalk

COVID-19 vaccine update: Pfizer may be the frontrunner, but Canada has hedged its bets

13 November 2020

COVID-19 vaccine update: Pfizer may be the frontrunner, but Canada has hedged its bets (theconversation.com)

Researchers looking for mRNA were ridiculed by colleagues. Luckily, that didn’t stop them.

18 February 2021

Researchers looking for mRNA were ridiculed by colleagues. Luckily, that didn’t stop them. - Macleans.ca

Pfizer set to double weekly production of coronavirus vaccine | BioPharma Dive

19 February

Pfizer set to double weekly production of coronavirus vaccine | BioPharma Dive

New coronavirus variants are emerging across the globe: Everything we know

16 February

New coronavirus variants are emerging across the globe: Everything we know - CNET

The U.K. approved the world’s first COVID-19 human challenge trial

18 February

The U.K. approved the world’s first COVID-19 human challenge trial | Science News

COG-UK: sequencing SARS-CoV-2 and detecting the novel variant B.1.1.7

18 February (Podcast)

COG-UK: sequencing SARS-CoV-2 and detecting the novel variant B.1.1.7 - BioTechniques

Thousands of COVID-19 'Long-Haulers' Are Still Suffering. Now, There Is Finally Hope

22 February

Thousands of COVID-19 'Long-Haulers' Are Still Suffering. Now, There Is Finally Hope (sciencealert.com)

COVID-19 Disease Severity May Be Driven by Antibody Responses

22 February

COVID-19 Disease Severity May Be Driven by Antibody Responses (genengnews.com)

SARS-CoV-2 with Genomic Deletions Escapes an Antibody

16 February

SARS-CoV-2 with Genomic Deletions Escapes an Antibody | The Scientist Magazine® (the-scientist.com)

First real-world UK data shows Pfizer-BioNTech vaccine provides high levels of protection from the first dose - GOV.UK

22 February

First real-world UK data shows Pfizer-BioNTech vaccine provides high levels of protection from the first dose - GOV.UK (www.gov.uk)

I was the Australian doctor on the WHO's COVID-19 mission to China. Here's what we found about the origins of the coronavirus

22 February

I was the Australian doctor on the WHO's COVID-19 mission to China. Here's what we found about the origins of the coronavirus (theconversation.com)

Can COVID vaccines stop transmission? Scientists race to find answers

19 February

Can COVID vaccines stop transmission? Scientists race to find answers (nature.com)
https://doi.org/10.1038/d41586-021-00450-z

Tricking COVID-19 With a Fake "Handshake" to Inactivate the Coronavirus

22 February

Tricking COVID-19 With a Fake "Handshake" to Inactivate the Coronavirus (scitechdaily.com)
https://doi.org/10.1021/acs.bioconjchem.0c00664

Doorknobs That Naturally Destroys Viruses: Biomaterials Could Mean Better Vaccines, Virus-Fighting Surfaces

22 February

Doorknobs That Naturally Destroys Viruses: Biomaterials Could Mean Better Vaccines, Virus-Fighting Surfaces (scitechdaily.com)
https://doi.org/10.1063/5.0029486

Russia Just Alerted the WHO to The World's First Case of H5N8 Avian Flu in Humans

22 February

Russia Just Alerted The WHO to The World's First Case of H5N8 Avian Flu in Humans (sciencealert.com)

Covid-19: Future targets for treatments rapidly identified with new computer simulations (video links and other links inside)

19 February

Covid-19: Future targets for treatments rapidly identified with new computer simulations (warwick.ac.uk)

Q&A: Why new data on vaccine effectiveness and intervals is relevant to Ireland

22 February
Q&A: Why new data on vaccine effectiveness and intervals is relevant to Ireland (irishtimes.com)

Ireland should review decision not to use AstraZeneca jab for over 65s, says diseases expert

23 February
Ireland should review decision not to use AstraZeneca jab for over 65s, says diseases expert (breakingnews.ie)

Coronavirus variants stymie success of monoclonal antibodies

23 February. (Anthony king Irish Science writer)
Coronavirus variants stymie success of monoclonal antibodies | Business | Chemistry World
http://dx.doi.org/10.1101/2021.01.25.428137 and
http://dx.doi.org/10.1126/science.abf4830

Tool Encoded in Coronaviruses Provides a Potential Drug Target for COVID-19

23 February
Tool Encoded in Coronaviruses Provides a Potential Drug Target for COVID-19 (scitechdaily.com)

Simply Talking While Infected Can Spread COVID-19 – Even While Wearing Masks

23 February
Simply Talking While Infected Can Spread COVID-19 – Even While Wearing Masks (scitechdaily.com)
DOI: 10.1063/5.0038380

Genetic Predisposition to Severe COVID-19 Discovered by Russian Researchers

22 February
Genetic Predisposition to Severe COVID-19 Discovered by Russian Researchers (scitechdaily.com)
DOI: 10.3389/fimmu.2021.641900

A Genetic Variant You May Have Inherited From Neanderthals Reduces the Risk of Severe COVID-19

20 February
A Genetic Variant You May Have Inherited From Neanderthals Reduces the Risk of Severe COVID-19 (scitechdaily.com)
https://doi.org/10.1073/pnas.2026309118

California's COVID-19 Variant Appears to Be More Contagious, And Possibly Deadlier

24 February
California's COVID-19 Variant Appears to Be More Contagious, And Possibly Deadlier (sciencealert.com)

Model Developed To Estimate False-Negative Rate for COVID-19 Tests

23 February
Model Developed To Estimate False-Negative Rate for COVID-19 Tests | Technology Networks
https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaa1382/6127024?searchresult=1

Covid-19: New 10-minute test is almost as accurate as a PCR

24 February
Covid-19: New 10-minute test is almost as accurate as a PCR (irishtimes.com)

Two New Rapid COVID-19 Diagnostic Tests Developed

24 February

Two New Rapid COVID-19 Diagnostic Tests Developed | Technology Networks

Great News! Pfizer Vaccine 94% Effective in Huge Real-World Study of 1.2 M People
24 February
Great News! Pfizer Vaccine 94% Effective in Huge Real-World Study of 1.2 M People (sciencealert.com)

Valneva Commences Manufacturing of its Inactivated, Adjuvanted COVID-19 Vaccine, Completes Phase 1/2 Study Recruitment
28 January
https://valneva.com/press-release/valneva-commences-manufacturing-of-its-inactivated-adjuvanted-covid-19-vaccine-completes-phase-1-2-study-recruitment

COVID-19 – VLA2001 Vaccine Candidate
https://valneva.com/research-development/covid-19-vla2001

€300m for Covid vaccines and medicines to be made in France
7 February
https://www.connexionfrance.com/French-news/France-pledges-300m-for-Covid-vaccine-and-health-projects-amid-Valneva-trials

African Green Monkey Kidney (Vero) Cells Provide an Alternative Host Cell System for Influenza A and B Viruses
5 march 1996
https://jvi.asm.org/content/jvi/70/8/5519.full.pdf

What are whole virus vaccines and how could they be used against COVID-19?
https://www.gavi.org/vaccineswork/what-are-whole-virus-vaccines-and-how-could-they-be-used-against-covid-19

The different types of COVID-19 vaccines
12 January 2021
https://www.who.int/news-room/feature-stories/detail/the-race-for-a-covid-19-vaccine-explained

First Scientific Study of Real-World COVID-19 Vaccine Effectiveness – Here Are the Results
25 February
First Scientific Study of Real-World COVID-19 Vaccine Effectiveness – Here Are the Results (scitechdaily.com)
https://www.nejm.org/doi/full/10.1056/NEJMoa2101765

Two-Thirds of COVID-19 Hospitalizations Are Due to These Four Conditions
25 February
Two-Thirds of COVID-19 Hospitalizations Are Due to These Four Conditions (scitechdaily.com)

Sugar-Coated Shield Helps the COVID-19 Virus Become Activated and Infectious
25 February
Sugar-Coated Shield Helps the COVID-19 Virus Become Activated and Infectious (scitechdaily.com)

SARS vs. COVID-19: Why Some Coronavirus Strains Are More Infectious Than Others
25 February
SARS vs. COVID-19: Why Some Coronavirus Strains Are More Infectious Than Others (scitechdaily.com)

SARS-CoV-2 with Genomic Deletions Escapes an Antibody

16 February
SARS-CoV-2 with Genomic Deletions Escapes an Antibody | The Scientist Magazine® (the-scientist.com)
doi:10.1126/science.abf6950, 2021.

Why COVID vaccines are so difficult to compare

23 February
Why COVID vaccines are so difficult to compare (nature.com)
https://doi.org/10.1038/d41586-021-00409-0

Coronavirus Reinfection Will Soon Become Our Reality

24 February
Is Coronavirus Reinfection Possible? - The Atlantic

Air purifiers could spread viruses in confined spaces

22 February
Air purifiers could spread viruses in confined spaces – Physics World

Huge News: US Officials Approve Pfizer Vaccine Storage at Normal Freezer Temperatures

26 February
Huge News: US Officials Approve Pfizer Vaccine Storage at Normal Freezer Temperatures (sciencealert.com)

Can COVID spread from frozen wildlife? Scientists probe pandemic origins

26 February
Can COVID spread from frozen wildlife? Scientists probe pandemic origins (nature.com)
https://doi.org/10.1038/d41586-021-00495-0

FDA "rapidly" finalizing EUA for J&J vaccine, following adcomm thumbs up

26 February
FDA "rapidly" finalizing EUA for J&J vaccine, following adcomm thumbs up | RAPS

Here Are 4 Key Things to Know About The Johnson & Johnson COVID-19 Vaccine

26 February
Here Are 4 Key Things to Know About The Johnson & Johnson COVID-19 Vaccine (sciencealert.com)

First Complete COVID-19 Coronavirus Model Shows Cooperation – "They Work Together"

26 February
First Complete COVID-19 Coronavirus Model Shows Cooperation – "They Work Together" (scitechdaily.com)
https://doi.org/10.1016/j.bpj.2020.10.048

Vitamin B6 May Calm COVID-19's Cytokine Storms and Unclog Blood Clots Linked to Lethality

26 February
Vitamin B6 May Calm COVID-19's Cytokine Storms and Unclog Blood Clots Linked to Lethality (scitechdaily.com)
https://doi.org/10.3389/fnut.2020.562051

MCMi news alert: FDA issues EUA for third COVID-19 vaccine (J&J Vaccine)

27 February
FDA Issues Emergency Use Authorization for Third COVID-19 Vaccine | FDA

Can a COVID-19 vaccine's second dose be delayed? It's complicated

26 February

Can a COVID-19 vaccine's second dose be delayed? It's complicated | Science News

Single dose of Pfizer vaccine 'can reduce asymptomatic infection by four-fold'

26 February

Single dose of Pfizer vaccine 'can reduce asymptomatic infection by four-fold' (irishexaminer.com)

Single Dose of Pfizer RNA Vaccine Acts As "Booster" in Those With Prior COVID-19 Infection

28 February

Single Dose of Pfizer RNA Vaccine Acts As "Booster" in Those With Prior COVID-19 Infection (scitechdaily.com)
https://doi.org/10.1016/S0140-6736(21)00501-8

New Data on COVID-19 Patients With Diabetes: 20% Die Within 28 Days of Hospital Admission

27 March

New Data on COVID-19 Patients With Diabetes: 20% Die Within 28 Days of Hospital Admission (scitechdaily.com)

How does the Johnson & Johnson vaccine compare to other coronavirus vaccines? 4 questions answered

28 February

How does the Johnson & Johnson vaccine compare to other coronavirus vaccines? 4 questions answered (theconversation.com)

Chip Simplifies COVID-19 Testing

26 February

Chip Simplifies COVID-19 Testing | Technology Networks
https://pubs.acs.org/doi/10.1021/acssensors.0c02561

Why Are Some Coronavirus Strains More Infectious Than Others?

25 February

Why Are Some Coronavirus Strains More Infectious Than Others? | Technology Networks

One dose of AstraZeneca vaccine protects older people

2 March

https://www.nytimes.com/live/2021/03/01/world/covid-19-coronavirus/one-astrazeneca-dose-substantially-reduced-the-risk-of-getting-sick-with-covid-19-for-the-elderly-a-new-study-shows
ffd7161c-b255-8e88-c2dc-88979fc2cc1b (khub.net) Link to Preprint

New coronavirus variant: here is what scientists know about B1525

1 March

New coronavirus variant: here is what scientists know about B1525 (theconversation.com)

COVID Found Mutating Inside a Baby Born With The Virus, in a World First

2 March

COVID Found Mutating Inside a Baby Born With The Virus, in a World First (sciencealert.com)

Asymptomatic COVID-19 Associated With a Balanced T-Cell Response

2 March

Asymptomatic COVID-19 Associated With a Balanced T-Cell Response | Technology Networks

https://rupress.org/jem/article/218/5/e20202617/211835/Highly-functional-virus-specific-cellular-immune?PR
doi: 10.1084/jem.20202617

Blood Tests Offer Early Indicator of Severe COVID-19

1 March
Blood Tests Offer Early Indicator of Severe COVID-19 | Technology Networks
https://ashpublications.org/bloodadvances/article/5/5/1164/475293/A-neutrophil-activation-signature-predicts?searchresult=1 and
LNP Delivers CRISPR Directly to Mouse Liver, Dramatically Cuts Cholesterol Levels for Months (genengnews.com)

First Test for All Known Human Coronaviruses, Including New COVID-19 Mutations

1 March
First Test for All Known Human Coronaviruses, Including New COVID-19 Mutations (scitechdaily.com)
https://doi.org/10.1038/s42003-021-01743-9

Sex Differences in Immune Responses to Viral Infection

1 March
Sex Differences in Immune Responses to Viral Infection | The Scientist Magazine® (the-scientist.com)

SARS-CoV-2 mutations in competition

2 February
Sars-CoV-2-Mutanten im Wettlauf (unibe.ch)
SARS-CoV-2 spike D614G change enhances replication and transmission | Nature
https://doi.org/10.1038/s41586-021-03361-1

Binding and Neutralization Antibody Titers After a Single Vaccine Dose in Health Care Workers Previously Infected With SARS-CoV-2

1 March
Binding and Neutralization Antibody Titers After a Single Vaccine Dose in Health Care Workers Previously Infected With SARS-CoV-2 | Vaccination | JAMA | JAMA Network
doi:10.1001/jama.2021.3341

Research Reveals How COVID-19 Can Kill Heart Muscle Cells, Interfere With Contraction

2 March
Research Reveals How COVID-19 Can Kill Heart Muscle Cells, Interfere With Contraction (scitechdaily.com)
https://doi.org/10.1016/j.jacbts.2021.01.002

Coronavirus: what happens when a person is simultaneously infected with two variants?

3 March
Coronavirus: what happens when a person is simultaneously infected with two variants? (theconversation.com)

Development of Spike Receptor-Binding Domain Nanoparticles as a Vaccine Candidate against SARS-CoV-2 Infection in Ferrets

2 March
Development of Spike Receptor-Binding Domain Nanoparticles as a Vaccine Candidate against SARS-CoV-2 Infection in Ferrets | mBio (asm.org)
https://doi.org/10.1128/mbio.00230-21

Team Discovers Drug Candidates That Can Stop SARS-CoV-2 Replication

4 March

Team Discovers Drug Candidates That Can Stop SARS-CoV-2 Replication | Technology Networks
https://onlinelibrary.wiley.com/doi/10.1002/anie.202016961

New Study Explores Association Between SARS-CoV-2 and Blood Group A

3 March

New Study Explores Association Between SARS-CoV-2 and Blood Group A | Technology Networks
https://doi.org/10.1182/bloodadvances.2020003259

How well does the AstraZeneca vaccine work? An expert reviews the current evidence

4 March

How well does the AstraZeneca vaccine work? An expert reviews the current evidence (theconversation.com)

Dangerous Origins: Solving a Genetic Mystery at the Heart of the COVID-19 Pandemic

5 March

Dangerous Origins: Solving a Genetic Mystery at the Heart of the COVID-19 Pandemic (scitechdaily.com)

New Low-Cost, Fast COVID-19 Coronavirus Test Developed – Doesn't Need Unpleasant Nasal Swab

5 March

https://scitechdaily.com/new-low-cost-fast-covid-19-coronavirus-test-developed-doesnt-need-unpleasant-nasal-swab
DOI: 10.1038/s41467-021-21627-0

What Do Vaccine Efficacy Numbers Actually Mean?

3 March

What Do Vaccine Efficacy Numbers Actually Mean? - The New York Times (nytimes.com)

How Dangerous Are New Mutations of the SARS-CoV-2 (COVID-19) Virus?

5 March

How Dangerous Are New Mutations of the SARS-CoV-2 (COVID-19) Virus? (scitechdaily.com)
https://doi.org/10.1038/s41586-021-03361-1

Single-dose Oxford–AstraZeneca COVID-19 vaccine followed by a 12-week booster - The Lancet

6 March

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00528-6/fulltext

Worrisome New Evidence That COVID-19 Vaccines Are Less Effective Against New Coronavirus Variants

6 March

Worrisome New Evidence That COVID-19 Vaccines Are Less Effective Against New Coronavirus Variants (scitechdaily.com)
https://doi.org/10.1038/s41591-021-01294-w

The Pfizer, Moderna, and Johnson & Johnson Vaccines, Compared - The Atlantic

7 March

The Pfizer, Moderna, and Johnson & Johnson Vaccines, Compared - The Atlantic

Backlash against Johnson & Johnson's COVID-19 vaccine is real and risky – here's how to make its rollout a success

5 March

Backlash against Johnson & Johnson's COVID-19 vaccine is real and risky – here's how to make its rollout a success (theconversation.com)

Easy-to-deliver mRNA treatment shows promise for stopping flu and Covid-19 viruses

3 February

Easy-to-deliver mRNA treatment shows promise for stopping flu and Covid-19 viruses (gatech.edu)

The COVID-19 Whack-a-Mole

4 March

The COVID-19 Whack-a-Mole | Technology Networks

Talking COVID-19 and Genetic Variants With Dr Jeffrey Barrett (video link)

2 March

Talking COVID-19 and Genetic Variants With Dr Jeffrey Barrett | Technology Networks

New Nasal Spray COVID Vaccine Uses Gene Transfer Technology

8 March

New Nasal Spray COVID Vaccine Uses Gene Transfer Technology (scitechdaily.com)

Coronavirus-Like Particles Could Ensure Reliability of Rapid COVID-19 Tests

8 March

Coronavirus-Like Particles Could Ensure Reliability of Rapid COVID-19 Tests (scitechdaily.com)
https://doi.org/10.1021/acs.biomac.0c01727

Innovative New mRNA Treatment Shows Promise for Stopping Both Flu and COVID-19 Viruses

7 March

Innovative New mRNA Treatment Shows Promise for Stopping Both Flu and COVID-19 Viruses (scitechdaily.com)
https://doi.org/10.1038/s41587-021-00822-w

Pregnancy and COVID: what the data say

9 March

Pregnancy and COVID: what the data say (nature.com)
https://doi.org/10.1038/d41586-021-00578-y

Chemical Engineering Professor Developing Indoor COVID-19 Detector

24 February

Chemical Engineering Professor Developing Indoor COVID-19 Detector | Texas Tech Today | TTU

COVID-19: An Analysis of Coronavirus Mutations in More Than 1,000 People

9 March

COVID-19: An Analysis of Coronavirus Mutations in More Than 1,000 People (scitechdaily.com)
https://science.sciencemag.org/content/early/2021/03/09/science.abg0821

Dire Coronavirus Prediction: Virus Evolving to Escape Current Vaccines, Treatments – "May Be Condemned to Chasing After the Evolving SARS-CoV-2 Continually"

8 March

Dire Coronavirus Prediction: Virus Evolving to Escape Current Vaccines, Treatments – "May Be Condemned to Chasing After the Evolving SARS-CoV-2 Continually" (scitechdaily.com)
https://doi.org/10.1038/s41586-021-03398-2
https://doi.org/10.1038/s41586-021-03398-2

AstraZeneca vaccine: careless talk has dented confidence and uptake in Europe

9 March

AstraZeneca vaccine: careless talk has dented confidence and uptake in Europe (theconversation.com)

Pollen can raise your risk of getting COVID-19, whether you have allergies or not

9 March

Pollen can raise your risk of getting COVID-19, whether you have allergies or not (theconversation.com)

Coronavirus (COVID-19) Update: FDA Issues Authorization for First Molecular Non-Prescription, At-Home Test

5 March

Coronavirus (COVID-19) Update: FDA Issues Authorization for First Molecular Non-Prescription, At-Home Test | FDA

COVID-19 Vaccine Combos Aim to Boost Immunity

9 March

COVID-19 Vaccine Combos Aim to Boost Immunity | The Scientist Magazine® (the-scientist.com)

Genetic Vaccine Platforms Demonstrate Their Potential

2 March

Genetic Vaccine Platforms Demonstrate Their Potential (biopharminternational.com)

Combating COVID-19: Generic Antibodies Can Be Retrained to Recognize SARS-CoV-2

10 March

Combating COVID-19: Generic Antibodies Can Be Retrained to Recognize SARS-CoV-2 (scitechdaily.com)

After a year of pain, here's how the COVID-19 pandemic could play out in 2021 and beyond

10 March

After a year of pain, here's how the COVID-19 pandemic could play out in 2021 and beyond (theconversation.com)

Inflammatory Protein Linked to Severe COVID-19 Identified

11 March

Inflammatory Protein Linked to Severe COVID-19 Identified | Technology Networks
https://doi.org/10.1126/sciimmunol.abg9873

Study Indicates That Humidity in Breath Makes Cotton Masks More Effective at Slowing the Spread of COVID-19

9 March

Study Indicates That Humidity in Breath Makes Cotton Masks More Effective at Slowing the Spread of COVID-19 | NIST
https://doi.org/10.1021/acsanm.0c03319

Leaked Documents Raise Concerns Over Integrity of mRNA Molecules in Some COVID-19 Vaccines

10 March

Leaked Documents Raise Concerns Over Integrity of mRNA Molecules in Some COVID-19 Vaccines (scitechdaily.com)

DOI: 10.1136/bmj.n627

Why It Takes 2 Shots to Make mRNA Vaccines Do Their COVID-19 Antibody-Creating Best

13 March

https://scitechdaily.com/why-it-takes-2-shots-to-make-mrna-vaccines-do-their-covid-19-antibody-creating-best

One Shot, Protected Forever: A General Flu Vaccine Using Microspheres (And It Could Be Adapted to Coronaviruses)

12 March

One Shot, Protected Forever: A General Flu Vaccine Using Microspheres (And It Could Be Adapted to Coronaviruses) (scitechdaily.com)

The UK variant is likely deadlier, more infectious and becoming dominant. But the vaccines still work well against it

12 March

The UK variant is likely deadlier, more infectious and becoming dominant. But the vaccines still work well against it (theconversation.com)

NTU Singapore scientists design compound that targets enzyme linked to autoimmune disorders and severe COVID-19

10 March

Detail News (ntu.edu.sg)

Covid-19: Evidence does not suggest AstraZeneca jab linked to clots, MHRA says

15 March

Covid-19: Evidence does not suggest AstraZeneca jab linked to clots, MHRA says - BBC News

SARS-CoV-2 Jumped From Bats to Humans Without Much Change

16 March

SARS-CoV-2 Jumped From Bats to Humans Without Much Change | Technology Networks
https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3001115

Novavax Announces COVID-19 Vaccine Has High Efficacy Against SARS-CoV-2 and Variant Strains

15 March

Novavax Announces COVID-19 Vaccine Has High Efficacy Against SARS-CoV-2 and Variant Strains | Technology Networks

What is Going on With the AstraZeneca/Oxford Vaccine?

16 March

What is Going on With the AstraZeneca/Oxford Vaccine? | In the Pipeline (sciencemag.org)

Dismantling the anti-vaxx industry

15 March

Dismantling the anti-vaxx industry | Nature Medicine

https://doi.org/10.1038/s41591-021-01260-6

COVID-19 vaccines are probably less effective at preventing transmission than symptoms – here's why

16 March
COVID-19 vaccines are probably less effective at preventing transmission than symptoms – here's why (theconversation.com)

The AstraZeneca COVID-19 Vaccine And Risk of Blood Clots: What You Need to Know

17 March
The AstraZeneca COVID-19 Vaccine And Risk of Blood Clots: What You Need to Know (sciencealert.com)

Study suggests the Brazilian variant emerged in November, is more transmissible and can cause reinfection

17 March
Study suggests the Brazilian variant emerged in November, is more transmissible and can cause reinfection | AGÊNCIA FAPESP

Antibodies against SARS-CoV-2 induced by prior infection are six times less effective against P.1 variant

17 March
Antibodies against SARS-CoV-2 induced by prior infection are six times less effective against P.1 variant | AGÊNCIA FAPESP

Aspirin Is "Huge Win" for Those Looking to Reduce Risk From Some of the Most Devastating Effects of COVID-19

17 March
https://scitechdaily.com/aspirin-is-huge-win-for-those-looking-to-reduce-risk-from-some-of-the-most-devastating-effects-of-covid-19
https://doi.org/10.1213/ANE.0000000000005292

WHO calls for further studies, data on origin of SARS-CoV-2 virus, reiterates that all hypotheses remain open. (Update and replaced earlier report)

30 March
https://www.who.int/news/item/30-03-2021-who-calls-for-further-studies-data-on-origin-of-sars-cov-2-virus-reiterates-that-all-hypotheses-remain-open

We still don't know for sure where the coronavirus came from. Here's why

18 March
Why we still don't know for sure where the coronavirus came from | Science News

Coronavirus is evolving but so are our antibodies

17 March
Coronavirus is evolving but so are our antibodies (theconversation.com)

Long COVID Symptoms Are Vanishing For Some Vaccinated Patients, And We Don't Know Why

18 March
Long COVID Symptoms Are Vanishing For Some Vaccinated Patients, And We Don't Know Why (sciencealert.com)

Certain Mouthwashes Might Stop COVID-19 Virus Transmission
17 March
Certain Mouthwashes Might Stop COVID-19 Virus Transmission | Lab Manager

Innovators target vaccines for variants and shortages in global South
17 March
Innovators target vaccines for variants and shortages in global South (nature.com)
https://doi.org/10.1038/d41587-021-00001-x

AstraZeneca Vaccine Was Just Declared Safe by The EMA. Here's What That Means
18 March
AstraZeneca Vaccine Was Just Declared Safe by The EMA. Here's What That Means (sciencealert.com)

Sturdier Spike Protein Explains Faster Spread of COVID-19 Variants
18 March
Sturdier Spike Protein Explains Faster Spread of COVID-19 Variants | Lab Manager and
SARS-CoV-2 D614G Mutation Stabilizes Spike Protein, May Explain Faster Spread
19 March
SARS-CoV-2 D614G Mutation Stabilizes Spike Protein, May Explain Faster Spread (genengnews.com)
And
Structural impact on SARS-CoV-2 spike protein by D614G substitution
16 March
Structural impact on SARS-CoV-2 spike protein by D614G substitution | Science (sciencemag.org)

Researchers Have Identified a Potential New Target for Anti-COVID-19 Therapies
19 March
Researchers Have Identified a Potential New Target for Anti-COVID-19 Therapies (scitechdaily.com)
https://doi.org/10.1038/s41564-021-00884-1

Novel Coronavirus Circulated Undetected for Months Before First COVID-19 Cases Discovered in Wuhan, China
20 March
Novel Coronavirus Circulated Undetected for Months Before First COVID-19 Cases Discovered in Wuhan, China (scitechdaily.com)
https://science.sciencemag.org/content/early/2021/03/17/science.abf8003

AstraZeneca vaccine: how to fix supply issues
19 March
AstraZeneca vaccine: how to fix supply issues (theconversation.com)

Serum Institute chief sounds alarm over vaccine raw materials shortage
16 March
Serum Institute chief sounds alarm over vaccine raw materials shortage | The National (thenationalnews.com)

How effective is the first shot of the Pfizer or Moderna vaccine?
19 March
How effective is the first shot of the Pfizer or Moderna vaccine? (theconversation.com)

Heart Problems in Pets Could Be Linked to COVID Variant. Here's What You Must Know

22 March
Heart Problems in Pets Could Be Linked to COVID Variant. Here's What You Must Know (sciencealert.com)

Vaccination by Inhalation – Boosts Immune Responses to Respiratory Infections and Lung Cancer

21 March
Vaccination by Inhalation – Boosts Immune Responses to Respiratory Infections and Lung Cancer (scitechdaily.com)
https://immunology.sciencemag.org/content/6/57/eabd8003

A New Nanotechnology-Based COVID-19 Vaccine Candidate

3 March
A New Nanotechnology-Based COVID-19 Vaccine Candidate | Technology Networks
https://mbio.asm.org/content/12/2/e00230-21

New Study Predicts SARS-CoV-2 Evolving To Escape Current Vaccines

8 March
New Study Predicts SARS-CoV-2 Evolving To Escape Current Vaccines | Technology Networks
https://www.nature.com/articles/s41586-021-03398-2

Anti-SARS-CoV-2 Drug Candidate Enters Phase 1 Trial in the US

19 March
Anti-SARS-CoV-2 Drug Candidate Enters Phase 1 Trial in the US | Technology Networks
https://doi.org/10.1126/science.abb4489

Ancient Mystery Solved on How Cells Tell Apart RNA and DNA

20 March
Ancient Mystery Solved on How Cells Tell Apart RNA and DNA (genengnews.com) and

The mechanism of the nucleo-sugar selection by multi-subunit RNA polymerases

4 February
Ancient Mystery Solved on How Cells Tell Apart RNA and DNA (genengnews.com)
https://doi.org/10.1038/s41467-021-21005-w

Rare COVID reactions might hold key to variant-proof vaccines

19 March
Rare COVID reactions might hold key to variant-proof vaccines (nature.com)
https://doi.org/10.1038/d41586-021-00722-8

Pandemic whistle blower: we need a non-political way to track viruses

19 March
Pandemic whistleblower: we need a non-political way to track viruses (nature.com)
https://doi.org/10.1038/d41586-021-00760-2

COVID-19 Vaccine in The Form of a Pill Is Set to Enter First Clinical Trials

23 March
COVID-19 Vaccine in The Form of a Pill Is Set to Enter First Clinical Trials (sciencealert.com)

Here’s what makes 4 promising COVID-19 vaccines unique — and potentially useful

23 March
Here’s what makes 4 promising COVID-19 vaccines unique | Science News

Sex Differences in Immune Responses to Viral Infection

1 March

Sex Differences in Immune Responses to Viral Infection | The Scientist Magazine® (the-scientist.com)

AstraZeneca's COVID-19 Shot Completely Prevented Severe Disease

22 March

AstraZeneca's COVID-19 Shot Completely Prevented Severe Disease | The Scientist Magazine® (the-scientist.com)

Why manufacturing Covid vaccines at scale is hard

23 March (Anthony King Dublin based science journalist –Open Access)

Why manufacturing Covid vaccines at scale is hard | Business | Chemistry World

Supercomputer Analysis Reveals Why UK, South Africa Coronavirus Variants Are More Contagious, Deadly

23 March (Contains interesting molecular dynamic video model of spike bound to ACE2)

Supercomputer Analysis Reveals Why UK, South Africa Coronavirus Variants Are More Contagious, Deadly (scitechdaily.com)

https://doi.org/10.3897/rio.7.e62936

Is the AstraZeneca COVID-19 Vaccine Safe and Effective? Here Are the Results From a Large Clinical Trial

22 March

Is the AstraZeneca COVID-19 Vaccine Safe and Effective? Here Are the Results From a Large Clinical Trial (scitechdaily.com)

https://clinicaltrials.gov/ct2/show/NCT04516746?term=azd1222&draw=2&rank=2 (clinical trial link)

People gave up on flu pandemic measures a century ago when they tired of them – and paid a price

23 March

People gave up on flu pandemic measures a century ago when they tired of them – and paid a price (theconversation.com)

"An Unforced Error": US Expert Group Issues "Unprecedented" Statement on AstraZeneca Vaccine Trials

23 March

"An Unforced Error": US Expert Group Issues "Unprecedented" Statement on AstraZeneca Vaccine Trials | Technology Networks

Protein May Play a Role in COVID-19 Clinical Variability

24 March

Protein May Play a Role in COVID-19 Clinical Variability | Technology Networks

https://www.cell.com/cell-reports-medicine/fulltext/S2666-3791(21)00037-9?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS2666379121000379%3Fshowall%3Dtrue

doi:10.1016/j.xcrm.2021.100221

Unexpected Binding Between SARS-CoV-2 and Antiviral Drug

24 March

Unexpected Binding Between SARS-CoV-2 and Antiviral Drug | Technology Networks

https://doi.org/10.1021/acs.jmedchem.1c00058

https://bjsm.bmj.com/content/early/2021/02/09/bjsports-2020-103274

COVID-19 Survivors' Increased Risk of Blood Clots May Stem from Prolonged Immune Response

24 March

COVID-19 Survivors' Increased Risk of Blood Clots May Stem from Prolonged Immune Response (genengnews.com)

What scientists do and don't know about the Oxford–AstraZeneca COVID vaccine

24 March

What scientists do and don't know about the Oxford–AstraZeneca COVID vaccine (nature.com)
https://doi.org/10.1038/d41586-021-00785-7

COVID-19 recovery: science isn't enough to save us

23 March

COVID-19 recovery: science isn't enough to save us (nature.com)
https://doi.org/10.1038/d41586-021-00731-7

Unexpected Binding Between SARS-CoV-2 and Antiviral Drug

24 March

Unexpected Binding Between SARS-CoV-2 and Antiviral Drug | Technology Networks
https://doi.org/10.1021/acs.jmedchem.1c00058

"Silencing" nsp14 Protein To Weaken SARS-CoV-2

25 March

"Silencing" nsp14 Protein To Weaken SARS-CoV-2 | Technology Networks
https://doi.org/10.1111/febs.15815

SARS-CoV-2 Under Surveillance

4 March

SARS-CoV-2 Under Surveillance (genengnews.com)

The Coronavirus Variants Don't Seem to Be Highly Variable So Far

24 March

The Coronavirus Variants Don't Seem to Be Highly Variable So Far - Scientific American

Rare COVID reactions might hold key to variant-proof vaccines

19 March

Rare COVID reactions might hold key to variant-proof vaccines (nature.com)
https://doi.org/10.1038/d41586-021-00722-8

Flu Shot Associated With Fewer, Less Severe COVID Cases – Why Is Still Unclear

25 March

Flu Shot Associated With Fewer, Less Severe COVID Cases – Why Is Still Unclear (scitechdaily.com)
https://doi.org/10.1016/j.ajic.2021.02.012

Post-acute COVID-19 Syndrome: Columbia Physicians Review What's Known About "Long-Haulers"

25 March

Post-acute COVID-19 Syndrome: Columbia Physicians Review What's Known About "Long-Haulers" (scitechdaily.com)

Hormone Drugs May Disarm COVID-19 Spike Protein and Stop Disease Progression

22 March
Hormone Drugs May Disarm COVID-19 Spike Protein and Stop Disease Progression - Penn Medicine

Pfizer Vaccine Induces Immune Structures Key to Lasting Immunity

25 March
Pfizer Vaccine Induces Immune Structures Key to Lasting Immunity | The Scientist Magazine® (the-scientist.com)
doi:10.21203/rs.3.rs-310773/v1, 2021.

Scientists Find Evidence That Novel Coronavirus Infects Cells in the Mouth – Saliva May Play Role in COVID Transmission

26 March
Scientists Find Evidence That Novel Coronavirus Infects Cells in the Mouth – Saliva May Play Role in COVID Transmission (scitechdaily.com)
https://doi.org/10.1038/s41591-021-01296-8

Here's what makes 4 promising COVID-19 vaccines unique — and potentially useful

23 March
Here's what makes 4 promising COVID-19 vaccines unique | Science News

Cheating the Coronavirus: New Drug Candidate Against COVID-19

28 March
Cheating the Coronavirus: New Drug Candidate Against COVID-19 (scitechdaily.com)
https://doi.org/10.1039/D0CC08387A

AstraZeneca Vaccine Fails To Protect Against The South African Variant, Says Study

17 March
AstraZeneca Vaccine Fails To Protect Against The South African Variant, Says Study (forbes.com) and

Efficacy of the ChAdOx1 nCoV-19 Covid-19 Vaccine against the B.1.351 Variant

16 March
Efficacy of the ChAdOx1 nCoV-19 Covid-19 Vaccine against the B.1.351 Variant | NEJM
https://doi.org/10.1038/s41467-021-21620-7

New Hope For A Covid-19 Vaccine That Protects Against All Variants

11 March
New Hope For A Covid-19 Vaccine That Protects Against All Variants (forbes.com) and

SARS-CoV-2 vaccination induces neutralizing antibodies against pandemic and pre-emergent SARS-related coronaviruses in monkeys

17 February
SARS-CoV-2 vaccination induces neutralizing antibodies against pandemic and pre-emergent SARS-related coronaviruses in monkeys | bioRxiv
doi: https://doi.org/10.1101/2021.02.17.431492 and

Mosaic nanoparticles elicit cross-reactive immune responses to zoonotic coronaviruses in mice

12 February
Mosaic nanoparticles elicit cross-reactive immune responses to zoonotic coronaviruses in mice | Science (sciencemag.org)
DOI: 10.1126/science.abf6840

Variant Strains, Reinfection, And The Diminishing Possibility Of Achieving Full Herd Immunity In The US

26 March
Variant Strains, Reinfection, And The Diminishing Possibility Of Achieving Full Herd Immunity In The US (forbes.com)

Low-Dose Aspirin Use for Heart Disease May Reduce Likelihood of COVID-19 Infection

28 March
Low-Dose Aspirin Use for Heart Disease May Reduce Likelihood of COVID-19 Infection (scitechdaily.com)
https://doi.org/10.1111/febs.15784

Cells from human foetuses are important for developing vaccines – but they're not an ingredient

26 March
Cells from human foetuses are important for developing vaccines – but they're not an ingredient (theconversation.com)

Coronavirus is evolving but so are our antibodies

17 March
Coronavirus is evolving but so are our antibodies (theconversation.com) and

Evolution of antibody immunity to SARS-CoV-2

18 January
Evolution of antibody immunity to SARS-CoV-2 | Nature
https://doi.org/10.1038/s41586-021-03207-w and

Development of potency, breadth and resilience to viral escape mutations in SARS-CoV-2 neutralizing antibodies

8 March
Development of potency, breadth and resilience to viral escape mutations in SARS-CoV-2 neutralizing antibodies (biorxiv.org)
https://doi.org/10.1101/2021.03.07.434227

COVID vaccines focus on the spike protein – but here's another target

10 December 2020
COVID vaccines focus on the spike protein – but here's another target (theconversation.com)

Glycans are crucial in COVID-19 infection

24 March
Glycans are crucial in COVID-19 infection | RIKEN

GSK steps in to manufacture 60 million Novavax vaccine doses in Britain

29 March
GSK steps in to manufacture 60 million Novavax vaccine doses in Britain (pharmamanufacturing.com)

Molecule attacks coronavirus in a novel way

26 March
Molecule attacks coronavirus in a novel way — Universität Bonn (uni-bonn.de) and

A SARS-CoV-2 Spike Binding DNA Aptamer that Inhibits Pseudovirus Infection by an RBD-Independent Mechanism

23 March
A SARS-CoV-2 Spike Binding DNA Aptamer that Inhibits Pseudovirus Infection by an RBD-Independent Mechanism** - Schmitz - - Angewandte Chemie International Edition - Wiley Online Library
https://doi.org/10.1002/anie.202100316

WHO Officials Have Ruled on The Likely Source of COVID-19 in a New Report

30 March

WHO Officials Have Ruled on The Likely Source of COVID-19 in a New Report (sciencealert.com)

AstraZeneca's COVID-19 vaccine holds up in an updated analysis of trial data

25 March

AstraZeneca's COVID-19 vaccine holds up in updated data analysis | Science News

New $2 Test Can Accurately Detect COVID-19 Antibodies in a Drop of Blood in Less Than an Hour

29 March

New $2 Test Can Accurately Detect COVID-19 Antibodies in a Drop of Blood in Less Than an Hour (scitechdaily.com)

https://doi.org/10.1038/s41467-021-22102-6

Here's What COVID-19 Vaccine Side Effects to Expect Based on Your Age, Sex, And Dose

31 March

Here's What COVID-19 Vaccine Side Effects to Expect Based on Your Age, Sex, And Dose (sciencealert.com)

High-fiber diet may play a role in controlling the inflammation associated with COVID-19

31 March

High-fiber diet may play a role in controlling the inflammation associated with COVID-19 | AGÊNCIA FAPESP

https://www.tandfonline.com/doi/full/10.1080/19490976.2021.1874740

Protein Fingerprinting Enables Ultrafast COVID-19 Diagnosis

26 March

Protein Fingerprinting Enables Ultrafast COVID-19 Diagnosis | Technology Networks

https://doi.org/10.1038/s41587-021-00860-4

CRISPR-Based Test Can Detect SARS-CoV-2 Variants

30 March

CRISPR-Based Test Can Detect SARS-CoV-2 Variants | Technology Networks

https://www.nature.com/articles/s41467-021-21996-6

Molecular Landscapes by David S. Goodsell

SARS-CoV-2 Fusion, 2020

Computational biologist David Goodsell has captured the molecular details of the coronavirus, such as the virus fusing to a cell membrane and releasing RNA into a cell (above), in elaborate water colour paintings. Well worth having a look at this interactive presentation.

PDB-101: Goodsell Gallery: SARS-CoV-2 Fusion (rcsb.org)

Moderna and Pfizer COVID-19 vaccines may block infection as well as disease

30 March

Moderna, Pfizer COVID-19 vaccines may reduce coronavirus transmission | Science News

WHO report into COVID pandemic origins zeroes in on animal markets, not labs

30 March

WHO report into COVID pandemic origins zeroes in on animal markets, not labs (nature.com)

https://doi.org/10.1038/d41586-021-00865-8

China accused of withholding data from WHO coronavirus origins investigation in Wuhan – CNN

31 March
China accused of withholding data from WHO coronavirus origins investigation in Wuhan - CNN

AstraZeneca vaccine deemed safe by EMA, again

31 March
AstraZeneca vaccine deemed safe by EMA, again | RAPS

What scientists do and don't know about the Oxford–AstraZeneca COVID vaccine

24 March
What scientists do and don't know about the Oxford–AstraZeneca COVID vaccine (nature.com)
https://doi.org/10.1038/d41586-021-00785-7

Pfizer says its COVID-19 vaccine has 100 percent efficacy in young people

1 April
Pfizer says its COVID-19 vaccine has 100 percent efficacy in young people | Science News

Moderna and Pfizer COVID-19 vaccines may block infection as well as disease

30 March
Moderna, Pfizer COVID-19 vaccines may reduce coronavirus transmission | Science News

After the WHO report: what's next in the search for COVID's origins

1 April
After the WHO report: what's next in the search for COVID's origins (nature.com)
https://doi.org/10.1038/d41586-021-00877-4

Scientists Need to Admit What They Got Wrong About Covid

1 April
Scientists Need to Admit What They Got Wrong About Covid | WIRED
Article by C. Brandon Ogbunu (@big_data_kane), a computational biologist, is an assistant professor at Yale University and an Ideas contributor at WIRED.

CDC Real-World Research: Protective Benefits of mRNA COVID-19 Vaccines Confirmed

1 April
CDC Real-World Research: Protective Benefits of mRNA COVID-19 Vaccines Confirmed (scitechdaily.com)

Why It Takes 2 Shots to Make mRNA Vaccines Do Their COVID-19 Antibody-Creating Best

13 March
Why It Takes 2 Shots to Make mRNA Vaccines Do Their COVID-19 Antibody-Creating Best (scitechdaily.com)

Vaccinated? Here's How Your Life May Change After Getting the COVID-19 Vaccine

1 April
Vaccinated? Here's How Your Life May Change After Getting the COVID-19 Vaccine (scitechdaily.com)

Germany to restrict AstraZeneca use in under-60s amid blood clots fear

31 March

Germany to restrict AstraZeneca use in under-60s amid blood clots fear (breakingnews.ie)

What causes COVID-19 vaccine side effects?

1 April
What causes COVID-19 vaccine side effects? | Live Science

Why manufacturing Covid vaccines at scale is hard

23 March by Anthony King, Dublin based science journalist
Why manufacturing Covid vaccines at scale is hard | Business | Chemistry World

Pfizer's COVID-19 vaccine effective after 6 months and works against problem variant

1 April
Pfizer's COVID-19 vaccine effective after 6 months and works against problem variant | Live Science

Highly Contagious Coronavirus Variant Spread Across the Globe – Undetected for Months – Before Its Discovery

1 April
Highly Contagious Coronavirus Variant Spread Across the Globe – Undetected for Months – Before Its Discovery (scitechdaily.com)
https://doi.org/10.3201/eid2705.210050

NIRVANA: Fast, Portable Test Can Diagnose COVID-19 and Track Variants

1 April
NIRVANA: Fast, Portable Test Can Diagnose COVID-19 and Track Variants (scitechdaily.com)
https://doi.org/10.1016/j.medj.2021.03.015

In Severe COVID-19, Cytokine "Hurricane" in Lung Attracts Damaging Inflammatory Cells

2 April
In Severe COVID-19, Cytokine "Hurricane" in Lung Attracts Damaging Inflammatory Cells (scitechdaily.com)
https://doi.org/10.1016/j.immuni.2021.03.005

Pfizer Vaccine Induces Immune Structures Key to Lasting Immunity

25 March
Pfizer Vaccine Induces Immune Structures Key to Lasting Immunity | The Scientist Magazine® (the-scientist.com)

New Decoy Protein Treatment Fools Coronavirus, Rendering It Impotent

3 April
New Decoy Protein Treatment Fools Coronavirus, Rendering It Impotent (scitechdaily.com)

If COVID Spread to North American Bats, It Could Be Disastrous – Here Is the Current Risk Assessment

4 April
If COVID Spread to North American Bats, It Could Be Disastrous – Here Is the Current Risk Assessment (scitechdaily.com)
https://doi.org/10.1111/csp2.410

4 takeaways from the WHO's report on the origins of the coronavirus

1 April
4 takeaways from the WHO's report on the origins of the coronavirus | Science News

Pfizer says its COVID-19 vaccine has 100 percent efficacy in young people

31 March

Pfizer says its COVID-19 vaccine has 100 percent efficacy in young people | Science News

Moderna and Pfizer COVID-19 vaccines may block infection as well as disease

30 March

Moderna, Pfizer COVID-19 vaccines may reduce coronavirus transmission | Science News

A Deep Dive Into the SARS-CoV-2 N Protein

6 April

A Deep Dive Into the SARS-CoV-2 N Protein | Technology Networks

https://www.sciencedirect.com/science/article/pii/S0006349521002538 and

https://www.cell.com/biophysj/pdf/S0006-3495(21)00253-8.pdf

Multivalent binding of the partially disordered SARS-CoV-2 nucleocapsid phosphoprotein dimer to RNA (sciencedirectassets.com)

25 March

https://doi.org/10.1016/j.bpj.2021.03.023

Deep dive into key COVID-19 protein is a step toward new drugs, vaccines

4 April

Deep dive into key COVID-19 protein is a step toward new drugs, vaccines | Oregon State University

Nine Potential New COVID-19 Treatments

6 April

Nine Potential New COVID-19 Treatments | Technology Networks

https://doi.org/10.1016/j.celrep.2021.108959 and

Penn Study Uncovers Possible COVID-19 Drugs — Including Several That Are Already FDA-Approved

2 April

Penn Study Uncovers Possible COVID-19 Drugs — Including Several That Are Already FDA-Approved - Penn Medicine

Why is it so hard to investigate the rare side effects of COVID vaccines?

1 April

Why is it so hard to investigate the rare side effects of COVID vaccines? (nature.com)

https://doi.org/10.1038/d41586-021-00880-9

AstraZeneca vaccine linked to rare blood clots, says EMA official – POLITICO

6 April

AstraZeneca vaccine linked to rare blood clots, says EMA official – POLITICO

Experiments Show Sunlight Destroys COVID Virus 8 Times Faster Than Scientists Thought

5 April

Experiments Show Sunlight Destroys COVID Virus 8 Times Faster Than Scientists Thought (scitechdaily.com)

https://doi.org/10.1093/infdis/jiab070

New COVID variants have changed the game, and vaccines will not be enough. We need global ‘maximum suppression’

5 April

New COVID variants have changed the game, and vaccines will not be enough. We need global 'maximum suppression' (theconversation.com)

Dynamic Model of SARS-CoV-2 Spike Protein Reveals Potential New Vaccine Targets

6 April
Dynamic Model of SARS-CoV-2 Spike Protein Reveals Potential New Vaccine Targets | Lab Manager
See detailed paper:

Computational epitope map of SARS-CoV-2 spike protein

1 April
Computational epitope map of SARS-CoV-2 spike protein (plos.org)
https://doi.org/10.1371/journal.pcbi.1008790

Novel coronavirus can remain active for more than 14 days in patients with mild symptoms

7 April
Novel coronavirus can remain active for more than 14 days in patients with mild symptoms | AGÊNCIA FAPESP

A Salute to China's COVID Heroes | MedPage Today

6 April
A Salute to China's COVID Heroes | MedPage Today

Here's Why You Can Expect More Severe Vaccine Side Effects if You're Young or a Woman

7 April
Here's Why You Can Expect More Severe Vaccine Side Effects if You're Young or a Woman (sciencealert.com)

Stanford University researchers determined the code from spare drops in discarded vials of the COVID-19 vaccine and published it on GitHub.

6 April (The editor spent many hours searching unsuccessfully for this code sequence to compare with the previously published (ICN Issue 1) Pfizer/BioNTec sequence and nor it has been made available.
Scientists Reverse Engineer mRNA Sequence of Moderna Vaccine | The Scientist Magazine® (the-scientist.com)
and

Assemblies-of-putative-SARS-CoV2-spike-encoding-mRNA-sequences-for-vaccines-BNT-162b2-and-mRNA-1273

1 April
Assemblies-of-putative-SARS-CoV2-spike-encoding-mRNA-sequences-for-vaccines-BNT-162b2-and-mRNA-1273/Assemblies of putative SARS-CoV2-spike-encoding mRNA sequences for vaccines BNT-162b2 and mRNA-1273.docx.pdf at main · NAalytics/Assemblies-of-putative-SARS-CoV2-spike-encoding-mRNA-sequences-for-vaccines-BNT-162b2-and-mRNA-1273 · GitHub

Administration of a Second Dose of the Moderna COVID-19 Vaccine After an Immediate Hypersensitivity Reaction With the First Dose: Two Case Reports

6 April
Administration of a Second Dose of the Moderna COVID-19 Vaccine After an Immediate Hypersensitivity Reaction With the First Dose: Two Case Reports | Annals of Internal Medicine (acpjournals.org)
https://doi.org/10.7326/L21-0104

mRNA Covid-19 Vaccines Are Fast to Make, but Hard to Scale

3 March (Good illustrations)
mRNA Covid-19 Vaccines Are Fast to Make, but Hard to Scale - WSJ

Oxford Pauses Dosing in Trial of AstraZeneca Covid-19 Vaccine in Children, Teenagers

6 April
Oxford Pauses Dosing in Trial of AstraZeneca Covid-19 Vaccine in Children, Teenagers - WSJ

Researchers Are Hatching a Low-Cost Coronavirus Vaccine

5 April (This prospect is really promising)
Researchers Are Hatching a Low-Cost Covid-19 Vaccine - The New York Times (nytimes.com)

In rare instances, AstraZeneca's Covid-19 vaccine linked to blood clots, regulators say

7 April
AstraZeneca's Covid-19 vaccine linked to blood clots in rare cases (statnews.com)

New Insights on Cause of Severe Reactions Following Pfizer/BioNTech mRNA COVID-19 Vaccination

6 April
New Insights on Cause of Severe Reactions Following Pfizer/BioNTech mRNA COVID-19 Vaccination (scitechdaily.com)
DOI: 10.1111/cea.13874

COVID-19: men create more antibodies after asymptomatic infections and keep them for longer – new research

7 April
COVID-19: men create more antibodies after asymptomatic infections and keep them for longer – new research (theconversation.com)

How to Spot Blood Clot Symptoms, And What to Do About It

8 April
How to Spot Blood Clot Symptoms, And What to Do About It (sciencealert.com)

First Images of Cells Exposed to COVID-19 Vaccine

8 April
First Images of Cells Exposed to COVID-19 Vaccine | Technology Networks and

Native-like SARS-CoV-2 Spike Glycoprotein Expressed by ChAdOx1 nCoV-19/AZD1222 Vaccine

2 April
Native-like SARS-CoV-2 Spike Glycoprotein Expressed by ChAdOx1 nCoV-19/AZD1222 Vaccine | ACS Central Science

Phase 1 Study of Novel Oral Antiviral Against SARS-CoV-2 Initiated

8 April
Phase 1 Study of Novel Oral Antiviral Against SARS-CoV-2 Initiated | Technology Networks and

PFIZER INITIATES PHASE 1 STUDY OF NOVEL ORAL ANTIVIRAL THERAPEUTIC AGENT AGAINST SARS-COV-2

23 March
Pfizer Initiates Phase 1 Study of Novel Oral Antiviral Therapeutic Agent Against SARS-CoV-2 | pfpfizeruscom

What is thrombocytopenia, the rare blood condition possibly linked to the AstraZeneca vaccine?

8 April
What is thrombocytopenia, the rare blood condition possibly linked to the AstraZeneca vaccine? (theconversation.com)

How could a COVID vaccine cause blood clots? Scientists race to investigate

9 April
How could a COVID vaccine cause blood clots? Scientists race to investigate (nature.com)
https://doi.org/10.1038/d41586-021-00940-0

News - Communicating the potential benefits and harms of the Astra-Zeneca COVID-19 vaccine

April
Winton Centre Cambridge

Coronapod: How to define rare COVID vaccine side effects

1 April
Coronapod: How to define rare COVID vaccine side effects (nature.com)

New Achilles Heel of Coronavirus? Aptamer Molecule Attacks Coronavirus in a Novel Way

9 April
New Achilles Heel of Coronavirus? Aptamer Molecule Attacks Coronavirus in a Novel Way (scitechdaily.com)
https://doi.org/10.1002/anie.202100316

What is mRNA? The messenger molecule that's been in every living cell for billions of years is the key ingredient in some COVID-19 vaccines

9 April (a simple explanation with graphics)
What is mRNA? The messenger molecule that's been in every living cell for billions of years is the key ingredient in some COVID-19 vaccines (theconversation.com)

It's Much More Likely the Coronavirus Came from Wildlife, Not a Lab - Scientific American

2 April
It's Much More Likely the Coronavirus Came from Wildlife, Not a Lab - Scientific American

Corona Inhibitors: X-ray Screening Identifies Promising Drugs for Treatment of COVID-19

10 April
Corona Inhibitors: X-ray Screening Identifies Promising Drugs for Treatment of COVID-19 (scitechdaily.com)
https://science.sciencemag.org/content/early/2021/03/31/science.abf7945

How big are the blood-clot risks of the AstraZeneca jab? | Coronavirus | The Guardian

11 April
How big are the blood-clot risks of the AstraZeneca jab? | Coronavirus | The Guardian

Official admits China’s Covid vaccines’ effectiveness low

11 April
Official admits China’s Covid vaccines’ effectiveness low (irishexaminer.com)

Blood clot risks: comparing the AstraZeneca vaccine and the contraceptive pill

9 April
Blood clot risks: comparing the AstraZeneca vaccine and the contraceptive pill (theconversation.com)

One COVID-19 Strain May 'Break Through' Pfizer Vaccine, Early Results Show
12 April
One COVID-19 Strain May 'Break Through' Pfizer Vaccine, Early Results Show (sciencealert.com)

Repurposing Drugs To Manage COVID-19 Progression
9 April
Repurposing Drugs To Manage COVID-19 Progression | Technology Networks
https://doi.org/10.1038/s41591-021-01310-z

How Well Do COVID-19 Vaccines Actually Work Over the Longer Term?
11 April
How Well Do COVID-19 Vaccines Actually Work Over the Longer Term? (scitechdaily.com)

Children Less Infectious Than Adults With COVID-19 – Daycare & In-Person School May Be Relatively Safe
12 April
Children Less Infectious Than Adults With COVID-19 – Daycare & In-Person School May Be Relatively Safe (scitechdaily.com)
https://doi.org/10.1503/cmaj.210263

Newly Discovered Virus-Cell Interaction May Explain COVID-19's High Infection Rate
11 April
Newly Discovered Virus-Cell Interaction May Explain COVID-19's High Infection Rate (scitechdaily.com)
https://doi.org/10.1016/j.bpj.2021.02.007 and

Biomechanical characterization of SARS-CoV-2 spike RBD and human ACE2 protein-protein interaction
17 February
Biomechanical characterization of SARS-CoV-2 spike RBD and human ACE2 protein-protein interaction: Biophysical Journal (cell.com)

Scientists Discover Sugar Molecules in SARS-CoV-2 Coronavirus Spike Protein Play Active Role in Infection
23 September 2020
Scientists Discover Sugar Molecules in SARS-CoV-2 Coronavirus Spike Protein Play Active Role in Infection (scitechdaily.com)
https://doi.org/10.1021/acscentsci.0c01056 and

Beyond Shielding: The Roles of Glycans in the SARS-CoV-2 Spike Protein
23 September 2020
Beyond Shielding: The Roles of Glycans in the SARS-CoV-2 Spike Protein | ACS Central Science
https://doi.org/10.1021/acscentsci.0c01056

AstraZeneca's COVID-19 vaccine is tied to uncommon blood clots in rare cases
7 April
AstraZeneca COVID-19 vaccine tied to uncommon blood clots, experts say | Science News

Good News, The B117 Strain Is Not Linked to Greater Severity of COVID-19
13 April
Good News, The B117 Strain Is Not Linked to Greater Severity of COVID-19 (sciencealert.com)

Track the Progress of Vaccine Testing and Approvals
COVID-19 Vaccine Frontrunners

7 April
COVID-19 Vaccine Frontrunners | The Scientist Magazine® (the-scientist.com)

FDA, CDC Urge Pause in J&J COVID-19 Vaccination, Citing “Rare” Blood Clots

13 April
FDA, CDC Urge Pause in J&J COVID-19 Vaccination, Citing "Rare" Blood Clots (genengnews.com)

Kati Kariko Helped Shield the World From the Coronavirus

8 April
profile of biochemist Katalin Kariko

COVID-19 Causes “Unexpected” Cellular Response in the Lungs, Surprising Scientists

12 April
COVID-19 Causes “Unexpected” Cellular Response in the Lungs, Surprising Scientists (scitechdaily.com)
https://immunology.sciencemag.org/content/6/58/eabg0833
https://doi.org/10.1021/acs.chemrev.0c00158

What is capillary leak syndrome and is it linked to the AstraZeneca vaccine?

14 April
What is capillary leak syndrome and is it linked to the AstraZeneca vaccine? (theconversation.com)

Is it the adenovirus vaccine technology, used by AstraZeneca and Johnson & Johnson, causing blood clots? There’s no evidence yet

14 April
Is it the adenovirus vaccine technology, used by AstraZeneca and Johnson & Johnson, causing blood clots? There's no evidence yet (theconversation.com)

Sputnik V vaccine is no match for a fast-spreading variant

14 April (Ignore the NASA report at the start of this article)
Sputnik V, a host of coronavirus mutations and a rocket stack (nature.com)
https://doi.org/10.1038/d41586-021-00962-8
Qualitatively distinct modes of Sputnik V vaccine-neutralization escape by SARS-CoV-2 Spike variants | medRxiv

Air traveller yields a new variant bristling with mutations

14 April
https://doi.org/f48g

How could a COVID vaccine cause blood clots? Scientists race to investigate

9 April
How could a COVID vaccine cause blood clots? Scientists race to investigate (nature.com)
https://doi.org/10.1038/d41586-021-00940-0

The race for antiviral drugs to beat COVID — and the next pandemic

14 April
The race for antiviral drugs to beat COVID — and the next pandemic (nature.com)
https://doi.org/10.1038/d41586-021-00958-4

SARS-CoV-2 infectivity by viral load, S gene variants and demographic factors and the utility of lateral flow devices to prevent transmission

5 April
SARS-CoV-2 infectivity by viral load, S gene variants and demographic factors and the utility of lateral flow devices to prevent transmission | medRxiv
doi: https://doi.org/10.1101/2021.03.31.21254687

Antibody Persistence through 6 Months after the Second Dose of mRNA-1273 Vaccine for Covid-19

6 April
Antibody Persistence through 6 Months after the Second Dose of mRNA-1273 Vaccine for Covid-19 | NEJM
DOI: 10.1056/NEJMc2103916

Asthma Drug Reduces Recovery Time in Non-Hospitalized Patients With COVID-19 | Technology Networks

14 April
Asthma Drug Reduces Recovery Time in Non-Hospitalized Patients With COVID-19 | Technology Networks
https://doi.org/10.1101/2021.04.10.21254672

Researchers Use Genetics To Identify Potential Drugs for Early Treatment of COVID-19

14 April
Researchers Use Genetics To Identify Potential Drugs for Early Treatment of COVID-19 (scitechdaily.com)
https://doi.org/10.1038/s41591-021-01310-z

Q&A: What now for AstraZeneca and Johnson & Johnson vaccines?

13 April
Q&A: What now for AstraZeneca and Johnson & Johnson vaccines? (irishtimes.com)

Denmark to ditch AstraZeneca jab entirely, delaying vaccine rollout

14 April
Denmark to ditch AstraZeneca jab entirely, delaying vaccine rollout (breakingnews.ie)

Q&A: Covid vaccine side effects – What are they, who gets them and why?

14 April
Q&A: Covid vaccine side effects – What are they, who gets them and why? (irishtimes.com)

A coronavirus epidemic may have hit East Asia about 25,000 years ago

14 April
Modern East Asian DNA hints at an ancient coronavirus outbreak | Science News

The P.1 coronavirus variant is twice as transmissible as earlier strains

14 April
Coronavirus variant P.1 is twice as transmissible as earlier strains | Science News

Denmark To Suspend Rollout of AstraZeneca COVID-19 Vaccine

14 April (More detail than news report above)
Denmark To Suspend Rollout of AstraZeneca COVID-19 Vaccine | Technology Networks

The FDA Calls for Pausing the Use of the Johnson & Johnson COVID-19 Vaccine

14 April
The FDA Calls for Pausing the Use of the Johnson & Johnson COVID-19 Vaccine | Technology Networks

Intestinal Organoids Show How SARS-CoV-2 Affects the Gut

14 April
Intestinal Organoids Show How SARS-CoV-2 Affects the Gut | Technology Networks
http://doi.org/10.1016/j.stemcr.2021.02.019

Fragment Screen Points to New SARS-CoV-2 Inhibitors
15 April
Fragment Screen Points to New SARS-CoV-2 Inhibitors | Technology Networks
https://advances.sciencemag.org/content/7/16/eabf8711

Tackling the Spread of SARS-CoV-2 Variants
6 April
Tackling the Spread of SARS-CoV-2 Variants | Technology Networks

South African variant more resistant to vaccine, BGU finds
22 March
South African variant more resistant to vaccine, BGU finds - The Jerusalem Post (jpost.com)

Probiotic Yogurt-Based Drugs Could Help Treat COVID-19
13 April
Probiotic Yogurt-Based Drugs Could Help Treat COVID-19 | Lab Manager and

Cross-kingdom inhibition of bacterial virulence and communication by probiotic yeast metabolites
24 March
Cross-kingdom inhibition of bacterial virulence and communication by probiotic yeast metabolites | Microbiome | Full Text (biomedcentral.com)
https://doi.org/10.1186/s40168-021-01027-8

Unique U.S. Army Developed COVID-19 Vaccine Begins Phase 1 Clinical Trial
14 April
Unique U.S. Army Developed COVID-19 Vaccine Begins Phase 1 Clinical Trial (scitechdaily.com)
https://clinicaltrials.gov/ct2/show/NCT04784767 and

Ferritin nanoparticle-based SARS-CoV-2 RBD vaccine induces a persistent antibody response and long-term memory in mice
12 February
https://www.nature.com/articles/s41423-021-00643-6
https://doi.org/10.1038/s41423-021-00643-6

Comparing vaccines: efficacy, safety and side effects - Healthy Debate
11 March
Comparing vaccines: efficacy, safety and side effects - Healthy Debate

Using Genetics to ID Potential Drugs for COVID-19 Treatment
14 April and

Actionable druggable genome-wide Mendelian randomization identifies repurposing opportunities for COVID-19
9 April
Actionable druggable genome-wide Mendelian randomization identifies repurposing opportunities for COVID-19 | Nature Medicine
https://doi.org/10.1038/s41591-021-01310-z

How UK doctor linked rare blood-clotting to AstraZeneca Covid jab | Vaccines and immunisation | The Guardian
13 April
How UK doctor linked rare blood-clotting to AstraZeneca Covid jab | Vaccines and immunisation | The Guardian

COVID vaccine weekly: safety concerns and reactions in the west dent confidence worldwide

15 April

COVID vaccine weekly: safety concerns and reactions in the west dent confidence worldwide (theconversation.com)

How Taiwan beat COVID-19 – new study reveals clues to its success

15 April

COVID vaccine weekly: safety concerns and reactions in the west dent confidence worldwide (theconversation.com)

Only 0.008% of Vaccinated People in The US Have Caught COVID-19, New Data Reveal

16 April

Only 0.008% of Vaccinated People in The US Have Caught COVID-19, New Data Reveal (sciencealert.com)

An In-Depth Look at SARS-CoV-2 Evolution

16 April

An In-Depth Look at SARS-CoV-2 Evolution | Technology Networks
https://www.microbiologyresearch.org/content/journal/jgv/10.1099/jgv.0.001584

COVID-19: Therapeutics, Preventives and Industry Perspectives

9 April

COVID-19: Therapeutics, Preventives and Industry Perspectives | Technology Networks

COVID-19: Scientists Identify Human Genes That Fight SARS-CoV-2 Infection

16 April

COVID-19: Scientists Identify Human Genes That Fight SARS-CoV-2 Infection (scitechdaily.com)
https://doi.org/10.1016/j.molcel.2021.04.008

Scientists in Japan Discover Key to Coronavirus Transmission: Triangular-Shaped Spikes

16 April

Scientists in Japan Discover Key to Coronavirus Transmission: Triangular-Shaped Spikes
https://doi.org/10.1063/5.0048626

Blood clots as prevalent with Pfizer and Moderna vaccine as with AstraZeneca's: study – MarketWatch

15 April

Blood clots as prevalent with Pfizer and Moderna vaccine as with AstraZeneca's: study - MarketWatch and Pdf: OSF | COVID-CVT-paper.pdf

Doctors home in on cause of blood clots linked with Covid-19 vaccines – CNN

18 April

Doctors home in on cause of blood clots linked with Covid-19 vaccines - CNN

Pfizer and Moderna DECLINED joining Johnson & Johnson study of vaccine blood clot risks

16 April

Pfizer and Moderna DECLINED joining Johnson & Johnson study of vaccine blood clot risks | Daily Mail Online

J&J asked Pfizer, Moderna to help study blood clots but they declined: WSJ

16 April
J&J asked Pfizer, Moderna to help study blood clots but they declined: WSJ (cnbc.com)

Why would a COVID vaccine cause rare blood clots? Researchers have found clues | PBS News Hour

14 April
Why would a COVID vaccine cause rare blood clots? Researchers have found clues | PBS NewsHour

Does the AstraZeneca COVID-19 vaccine really cause blood clots? | Gavi, the Vaccine Alliance

16 March
Does the AstraZeneca COVID-19 vaccine really cause blood clots? | Gavi, the Vaccine Alliance

EXPERT REACTION: Brain blood clots may be more likely after COVID-19 infection than following vaccines – Scimex

16 April
EXPERT REACTION: Brain blood clots may be more likely after COVID-19 infection than following vaccines - Scimex

Australia reports first blood clot death 'likely' linked to AstraZeneca vaccine | Reuters

16 April
Australia reports first blood clot death 'likely' linked to AstraZeneca vaccine | Reuters

What causes the rare blood clots linked with some covid-19 vaccines? | New Scientist

13 April
What causes the rare blood clots linked with some covid-19 vaccines? | New Scientist

Expert reaction to preprint looking at incidence of rare cerebral venous thrombosis (CVT) following COVID-19 infection compared to incidence after vaccination or influenza | Science Media Centre

15 April (Preprint)
expert reaction to preprint looking at incidence of rare cerebral venous thrombosis (CVT) following COVID-19 infection compared to incidence after vaccination or influenza | Science Media Centre

New Findings on COVID-19 Evolution Using Novel Technology Could Inform Treatment and Vaccine-Development Efforts

17 April
New Findings on COVID-19 Evolution Using Novel Technology Could Inform Treatment and Vaccine-Development Efforts (scitechdaily.com)
https://doi.org/10.1371/journal.ppat.1009431
https://doi.org/10.1371/journal.ppat.1009453

Oxford-AstraZeneca (Vaxzevria) COVID-19 vaccine: Known side effects

12 April 2020
Oxford-AstraZeneca (Vaxzevria) COVID-19 vaccine: Known side effects (medicalnewstoday.com)

Investigators Link COVID-19 and Risk of Blood Clot Formation

18 April
Investigators Link COVID-19 and Risk of Blood Clot Formation (scitechdaily.com)
https://doi.org/10.7554/eLife.64909

COVID-19 Patients Can Be Categorized Into Three Groups – Here Are the 3 Phenotypes

17 April

COVID-19 Patients Can Be Categorized Into Three Groups – Here Are the 3 Phenotypes (scitechdaily.com)
https://doi.org/10.1371/journal.pone.0248956

Oxford–AstraZeneca COVID-19 Vaccine: Regulators Give Update on Links to Rare Clotting Disorders

8 April

Oxford–AstraZeneca COVID-19 Vaccine: Regulators Give Update on Links to Rare Clotting Disorders | Technology Networks

Sunlight and COVID-19 Mortality: Is There a Link?

16 April

Sunlight and COVID-19 Mortality: Is There a Link? | Technology Networks
https://onlinelibrary.wiley.com/doi/10.1111/bjd.20093

UK Government-Funded COVID-19 Vaccine Phase I/II Trials Report Positive Data

16 April

UK Government-Funded COVID-19 Vaccine Phase I/II Trials Report Positive Data | Technology Networks

Experimental Drug MK-4482 for COVID-19 Is Effective in Hamster Study

19 April

Experimental Drug MK-4482 for COVID-19 Is Effective in Hamster Study | Technology Networks
https://www.nature.com/articles/s41467-021-22580-8#article-info

COVID vaccines and blood clots: five key questions

16 April

COVID vaccines and blood clots: five key questions (nature.com)
https://doi.org/10.1038/d41586-021-00998-w

People with rare blood clots after a COVID-19 jab share an uncommon immune response

16 April

People with post-COVID-19 vaccine clots share a rare immune response | Science News

Brave Volunteers Are Being Deliberately Reinfected With COVID-19 For Science

20 April

Brave Volunteers Are Being Deliberately Reinfected With COVID-19 For Science (sciencealert.com)

Fewer COVID-19 Infections Detected in Women Who Take Certain Vitamins, Study Claims

20 April

Fewer COVID-19 Infections Detected in Women Who Take Certain Vitamins, Study Claims (sciencealert.com)

New COVID-19 Vaccine May Offer Broad Protection Against Existing and Future Coronavirus Strains at a Cost of $1

19 April

New COVID-19 Vaccine May Offer Broad Protection Against Existing and Future Coronavirus Strains at a Cost of $1 (scitechdaily.com)
https://doi.org/10.1073/pnas.2025622118

Multivitamins, Omega-3, Probiotics, Vitamin D May Lessen Risk of COVID-19

19 April
Multivitamins, Omega-3, Probiotics, Vitamin D May Lessen Risk of COVID-19 (scitechdaily.com)
DOI: 10.1136/bmjnph-2021-000250

Long COVID's long R&D agenda

20 April
Long COVID's long R&D agenda (nature.com)
https://doi.org/10.1038/d41573-021-00069-9

The Blood-Clot Problem Is Multiplying

16 April
The Vaccine-Related Blood Clot Mystery Must Be Solved - The Atlantic

We Need to Talk About the AstraZeneca Vaccine

30 March
The AstraZeneca Vaccine Blood-Clot Issue Won't Go Away - The Atlantic

New Side Effect From mRNA COVID Vaccines?

15 April
New Side Effect From mRNA COVID Vaccines? | MedPage Today

EMA: J&J vaccine possibly linked to rare clots; benefit outweighs risk | RAPS

20 April
EMA: J&J vaccine possibly linked to rare clots; benefit outweighs risk | RAPS

Johnson & Johnson COVID-19 Vaccine Roll-out to Resume in Europe Following European Medicines Agency (EMA) Review

20 April
Johnson & Johnson COVID-19 Vaccine Roll-out to Resume in Europe Following European Medicines Agency (EMA) ReviewEMA Confirms Overall Benefit-Risk Profile Remains Positive | Johnson & Johnson (jnj.com)

EU Officials Now Say Blood Clots Really Are 'Very Rare' J&J Vaccine Side Effect

21 April
EU Officials Now Say Blood Clots Really Are 'Very Rare' J&J Vaccine Side Effect (sciencealert.com)

Q+A: Indian coronavirus variant – what is it and what effect will it have?

20 April
Q+A: Indian coronavirus variant – what is it and what effect will it have? (theconversation.com)

Russian COVID vaccine: why more and more countries are turning to Sputnik V

20 April
Russian COVID vaccine: why more and more countries are turning to Sputnik V (theconversation.com)

Luke O'Neill: Limiting Johnson & Johnson like AstraZeneca would be a 'tragedy' | Newstalk

20 April
https://www.newstalk.com/news/luke-oneill-limiting-johnson-johnson-like-astrazeneca-would-be-a-tragedy-1182972

Coronavirus Does Not Infect the Brain, but Still Inflicts Significant Neurological Damage

21 April

Coronavirus Does Not Infect the Brain, but Still Inflicts Significant Neurological Damage (scitechdaily.com)
https://doi.org/10.1093/brain/awab148

Simple Oral Hygiene – Such As Using Mouthwash – Could Help Reduce COVID-19 Severity

20 April

Simple Oral Hygiene – Such As Using Mouthwash – Could Help Reduce COVID-19 Severity (scitechdaily.com)

Scientists Find Evidence That Novel Coronavirus Infects Cells in the Mouth – Saliva May Play Role in COVID Transmission

26 March

Scientists Find Evidence That Novel Coronavirus Infects Cells in the Mouth – Saliva May Play Role in COVID Transmission (scitechdaily.com)
https://doi.org/10.1038/s41591-021-01296-8

COVID-19 vaccine efficacy and effectiveness—the elephant (not) in the room

20 April

COVID-19 vaccine efficacy and effectiveness—the elephant (not) in the room - The Lancet Microbe

Not recommending AstraZeneca vaccine for the elderly risks the lives of the most vulnerable

5 February

Not recommending AstraZeneca vaccine for the elderly risks the lives of the most vulnerable (theconversation.com)

Germany to give different second vaccine to AstraZeneca recipients under 60

14 April

Germany to give different second vaccine to AstraZeneca recipients under 60 (france24.com)

ONE YEAR OF SARS-COV-2 EVOLUTION

15 April

One year of SARS-CoV-2 evolution | Microbiology Society

Coronapod: could COVID vaccines cause blood clots? Here's what the science says

16 April

Coronapod: could COVID vaccines cause blood clots? Here's what the science says (nature.com)

Two Cases of COVID-19 'Vaccine Breakthrough' Infection Confirmed in The US

22 April

Two Cases of COVID-19 'Vaccine Breakthrough' Infection Confirmed in The US (sciencealert.com)

SARS-CoV-2 Induces Polyfunctional Antibodies That Kill Infected Cells

22 April

SARS-CoV-2 Induces Polyfunctional Antibodies That Kill Infected Cells (genengnews.com)

National vaccine panel puts off briefing where AstraZeneca advice update was expected (Canada)

20 April

https://www.ctvnews.ca/health/coronavirus/national-vaccine-panel-puts-off-briefing-where-astrazeneca-advice-update-was-expected-1.5394544

Luke O'Neill on Johnson & Johnson vaccine: 'If you're offered it, take it' | Newstalk
22 April
Luke O'Neill on Johnson & Johnson vaccine: 'If you're offered it, take it' | Newstalk

Why calculating the risk of the AstraZeneca vaccine is so difficult – a doctor explains
22 April
Why calculating the risk of the AstraZeneca vaccine is so difficult – a doctor explains (theconversation.com)

Environmental sequencing for COVID-19 (with links)
April
Environmental sequencing for COVID-19 - BioTechniques

EU to shortly sign world's largest vaccine deal with Pfizer
23 April
EU to shortly sign world's largest vaccine deal with Pfizer | Reuters

AstraZeneca vaccine Ireland: Unusual brain clots reported in several Irish people who got AstraZeneca vaccine - Independent.ie
23 April
AstraZeneca vaccine Ireland: Unusual brain clots reported in several Irish people who got AstraZeneca vaccine - Independent.ie

EMA: AstraZeneca's COVID-19 vaccine: benefits and risks in context
23 April
https://www.ema.europa.eu/en/news/astrazenecas-covid-19-vaccine-benefits-risks-context

FDA and CDC Lift Recommended Pause on Johnson & Johnson (Janssen) COVID-19 Vaccine Use Following Thorough Safety Review
23 April
https://www.fda.gov/news-events/press-announcements/fda-and-cdc-lift-recommended-pause-johnson-johnson-janssen-covid-19-vaccine-use-following-thorough

CDC Panel Recommends Unpausing Johnson & Johnson COVID Vaccine in The US
24 April
CDC Panel Recommends Unpausing Johnson & Johnson COVID Vaccine in The US (sciencealert.com)

New Biochemical Clues in Cell Receptors Help Explain How Coronavirus May Hijack Human Cells
23 April
https://scitechdaily.com/new-biochemical-clues-in-cell-receptors-help-explain-how-coronavirus-may-hijack-human-cells
https://stke.sciencemag.org/content/14/665/eabd0334

Here's what we know about B.1.1.7, the U.S.'s dominant coronavirus strain
19 April
What we know about B.1.1.7, the U.S.'s dominant coronavirus strain | Science News

COVID Leaves This in Your Body Even If You're Asymptomatic, New Study Says

24 April
COVID Leaves This in Your Body Even If You're Asymptomatic, New Study Says (bestlifeonline.com)

UPDATED Comparing COVID-19 Vaccines: Timelines, Types and Prices

23 April
https://www.biospace.com/article/comparing-covid-19-vaccines-pfizer-biontech-moderna-astrazeneca-oxford-j-and-j-russia-s-sputnik-v

Covid vaccines may work better than thought against variants, say researchers

19 March
https://www.pulsetoday.co.uk/news/clinical-areas/immunology-and-vaccines/covid-vaccines-may-work-better-than-thought-against-variants-say-researchers
BUT

Efficacy of the ChAdOx1 nCoV-19 Covid-19 Vaccine against the B.1.351 Variant

16 March
https://www.nejm.org/doi/full/10.1056/NEJMoa2102214

Kingston Mills: Mistake to insist 60-69 year olds take AstraZeneca vaccine

23 April
https://www.bing.com/news/search?q=Kingston+Mills%3a+Mistake+to+insist+60-69+year+olds+take+AstraZeneca+vaccine&qpvt=Kingston+Mills%3a+Mistake+to+insist+60-69+year+olds+take+AstraZeneca+vaccine&FORM=EWRE

Ireland's four Covid-19 vaccines: Supply, efficacy and side effects

26 April
https://www.irishtimes.com/life-and-style/health-family/ireland-s-four-covid-19-vaccines-supply-efficacy-and-side-effects-1.4545731

UK, South African, Brazilian: A Virologist Explains Each COVID Variant

26 April
UK, South African, Brazilian: A Virologist Explains Each COVID Variant (scitechdaily.com)

Native-like SARS-CoV-2 spike glycoprotein expressed by ChAdOx1 nCoV-19/AZD1222 vaccine

19 January 2021
https://www.biorxiv.org/content/10.1101/2021.01.15.426463v1.full

FDA and CDC OK resuming J&J COVID-19 shots paused over rare clot concerns

23 April
CDC panel voted to resume J&J COVID-19 shots paused for clot concerns | Science News

COVID-19 Silences the Immune Response in Infected Cells in the Gut

27 April
COVID-19 Silences the Immune Response in Infected Cells in the Gut (scitechdaily.com)
DOI: 10.15252/msb.202110232

A Rare Neurological Condition Has Been Linked to COVID-19 in 21 Countries

28 April
A Rare Neurological Condition Has Been Linked to COVID-19 in 21 Countries (sciencealert.com)

Effect of COVID-19 Antiviral Remdesivir Multiplied 10-Fold by Hepatitis C Drugs

27 April
Effect of COVID-19 Antiviral Remdesivir Multiplied 10-Fold by Hepatitis C Drugs (genengnews.com)

"Nanotraps" Designed To Catch and Clear Coronavirus

28 April
"Nanotraps" Designed To Catch and Clear Coronavirus | Technology Networks
https://doi.org/10.1016/j.matt.2021.04.005

Confusion about vaccine guidelines could prolong pandemic

28 April
Confusion about vaccine guidelines could prolong pandemic | Cornell Chronicle and

Beyond the First Dose — Covid-19 Vaccine Follow-through and Continued Protective Measures

28 April
Beyond the First Dose — Covid-19 Vaccine Follow-through and Continued Protective Measures | NEJM
DOI: 10.1056/NEJMp2104527

Why variants are most likely to blame for India's COVID surge

28 April. (Calculation shows how much greater the death rate is if the virus is more transmissible compared to a more deadly virus)
Why variants are most likely to blame for India's COVID surge (theconversation.com)

Preprints: how draft academic papers have become essential in the fight against COVID

28 April
Preprints: how draft academic papers have become essential in the fight against COVID (theconversation.com)

All-in-One Test for SARS-CoV-2 Detection and Surveillance Developed

21 April
All-in-One Test for SARS-CoV-2 Detection and Surveillance Developed | Technology Networks
https://www.cell.com/med/pdf/S2666-6340(21)00117-3.pdf?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS2666634021001173%3Fshowall%3Dtrue

SARS-CoV-2 Spike Protein Alone May Cause COVID-19 Lung Damage – Even Without the Presence of Intact Virus

30 April
SARS-CoV-2 Spike Protein Alone May Cause COVID-19 Lung Damage – Even Without the Presence of Intact Virus (scitechdaily.com)

Can Cuba beat COVID with its homegrown vaccines?

29 April
Can Cuba beat COVID with its homegrown vaccines? (nature.com)
https://doi.org/10.1101/2021.02.08.430146

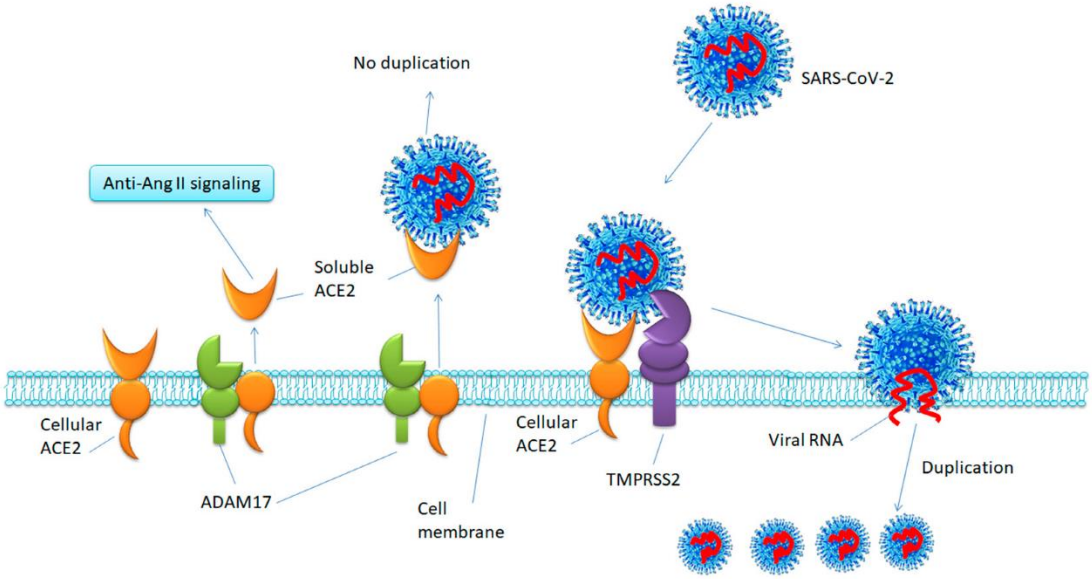
Researchers Say Benefits of AstraZeneca COVID-19 Vaccine Outweigh Its Risks

30 April
Researchers Say Benefits of AstraZeneca COVID-19 Vaccine Outweigh Its Risks (scitechdaily.com)
https://doi.org/10.1063/5.0050887

Addenda

Addendum 1

Angiotensin-converting enzyme 2 (ACE2)



See: Fig 1. ACE2: The key Molecule for Understanding the Pathophysiology of Severe and Critical Conditions of COVID-19: Demon or Angel?
Viruses | Free Full-Text | ACE2: The key Molecule for Understanding the Pathophysiology of Severe and Critical Conditions of COVID-19: Demon or Angel? | HTML (mdpi.com)

The COVID-19 Coronavirus – SARS-CoV-2 – Might Hijack Cellular Processes

14 February
The COVID-19 Coronavirus – SARS-CoV-2 – Might Hijack Cellular Processes (scitechdaily.com)
https://stke.sciencemag.org/content/14/665/eabd0334
and 12 January 2021
Short linear motif candidates in the cell entry system used by SARS-CoV-2 and their potential therapeutic implications | Science Signaling (sciencemag.org)

ACE2: Evidence of role as entry receptor for SARS-CoV-2 and implications in comorbidities (Section 2.1 etc)

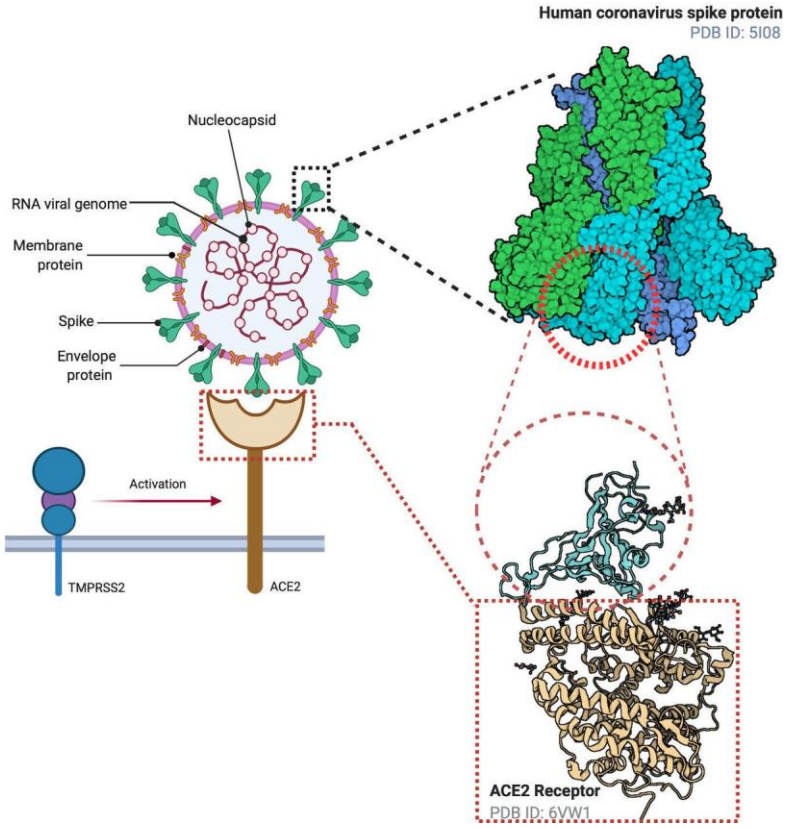
9 November 2020
ACE2: Evidence of role as entry receptor for SARS-CoV-2 and implications in comorbidities | eLife (elifesciences.org)

Body Localization of ACE-2: On the Trail of the Keyhole of SARS-CoV-2

3 December 2020 (See section "Lungs")
Frontiers | Body Localization of ACE-2: On the Trail of the Keyhole of SARS-CoV-2 | Medicine (frontiersin.org)
https://doi.org/10.3389/fmed.2020.594495

Role of angiotensin-converting enzyme 2 (ACE2) in COVID-19

13 July 2020
Role of angiotensin-converting enzyme 2 (ACE2) in COVID-19 | Critical Care | Full Text (biomedcentral.com)
https://doi.org/10.1186/s13054-020-03120-0



See: Fig 3. Molecules in pathogenesis: angiotensin converting enzyme 2 (ACE2)
https://jcp.bmj.com/content/early/2020/12/08/jclinpath-2020-206954

Gene expression and in situ protein profiling of candidate SARS-CoV-2 receptors in human airway epithelial cells and lung tissue

July 2020
Gene expression and in situ protein profiling of candidate SARS-CoV-2 receptors in human airway epithelial cells and lung tissue | European Respiratory Society (ersjournals.com)
DOI: 10.1183/13993003.01123-2020

Airways Expression of SARS-CoV-2 Receptor, ACE2, and TMPRSS2 Is Lower in Children Than Adults and Increases with Smoking and COPD

18 September 2020o
Airways Expression of SARS-CoV-2 Receptor, ACE2, and TMPRSS2 Is Lower in Children Than Adults and Increases with Smoking and COPD (cell.com)
https://doi.org/10.1016/j.omtm.2020.05.013

Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis

June 2004 (refers to SARS not SARS VoV-19)
Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis - PubMed (nih.gov) (Abstract)
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7167720 (full paper)
https://doi.org/10.1002/path.1570

What is the ACE2 receptor, how is it connected to coronavirus and why might it be key to treating COVID-19? The experts explain (Aimed at scientific minded public - excellent)

14 may 2020

What is the ACE2 receptor, how is it connected to coronavirus and why might it be key to treating COVID-19? The experts explain (theconversation.com)

Receptors for SARS-CoV-2 Present in Wide Variety of Human Cells

29 April 2020
Receptors for SARS-CoV-2 Present in Wide Variety of Human Cells | The Scientist Magazine® (the-scientist.com)

High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa

24 February 2020
High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucosa | International Journal of Oral Science (nature.com)
https://doi.org/10.1038/s41368-020-0074-x

Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis

June 2004 (related to original SARS)
(PDF) Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis (researchgate.net)
https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.1002%2Fpath.1570

The human Protein Atlas: ACE2 a little difficult to follow)

Tissue expression of ACE2 - Summary - The Human Protein Atlas

Heterogeneous expression of the SARS-Coronavirus-2 receptor ACE2 in the human respiratory tract

22 September 2020
Heterogeneous expression of the SARS-Coronavirus-2 receptor ACE2 in the human respiratory tract - EBioMedicine (thelancet.com)
https://doi.org/10.1016/j.ebiom.2020.102976
https://doi.org/10.3390/v12121471

Cell entry mechanisms of SARS-CoV-2

26 May 2020
Cell entry mechanisms of SARS-CoV-2 | PNAS
https://doi.org/10.1073/pnas.2003138117

Integrins: An Overview of Structural and Functional Aspects

https://www.ncbi.nlm.nih.gov/books/NBK6259

What is integrin?

https://www.mechanobio.info/what-is-mechanosignaling/what-is-the-extracellular-matrix-and-the-basal-lamina/what-is-integrin

Integrin ligands at a glance

2006
https://jcs.biologists.org/content/119/19/3901

A potential role for integrins in host cell entry by SARS-CoV-2

1 March 2020
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7114098

SARS-COV-2 and infectivity: Possible increase in infectivity associated to integrin motif expression
4 April 2020
https://onlinelibrary.wiley.com/doi/10.1002/jmv.25831

SARS-CoV-2 attachment to host cells is possibly mediated via RGD-integrin interaction in a calcium-dependent manner and suggests pulmonary EDTA chelation therapy as a novel treatment for COVID 19
January 2021
https://www.sciencedirect.com/science/article/pii/S017129852030543X

An evolutionary RGD motif in the spike protein of SARS-CoV-2 may serve as a potential high risk factor for virus infection?
27 February 2020
An Evolutionary RGD Motif in the Spike Protein of SARS-CoV-2 may Serve as a Potential High Risk Factor for Virus Infection? [v1] | Preprints

Integrin b3 and ACE2 linked by short linear motifs enabling endocytosis and autophagy of SARS-CoV-2
12 October 2020
https://www.news-medical.net/news/20201012/Integrin-b3-and-ACE2-linked-by-short-linear-motifs-enabling-endocytosis-and-autophagy-of-SARS-CoV-2.aspx

The Integrin Binding Peptide, ATN-161, as a Novel Therapy for SARS-CoV-2 Infection
6 January 2021
https://www.jacc.org/doi/10.1016/j.jacbts.2020.10.003

A Multi-Targeting Approach to Fight SARS-CoV-2 Attachment
3 August 2020
https://www.frontiersin.org/articles/10.3389/fmolb.2020.00186/full
https://doi.org/10.3389/fmolb.2020.00186

Integrins Control Vesicular Trafficking; New Tricks for Old Dogs
2 October 2020
https://doi.org/10.1016/j.tibs.2020.09.001

Not only ACE2—the quest for additional host cell mediators of SARS-CoV-2 infection: Neuropilin-1 (NRP1) as a novel SARS-CoV-2 host cell entry mediator implicated in COVID-19
18 January 2021
https://www.nature.com/articles/s41392-020-00460-9

Neuropilin-1 is a host factor for SARS-CoV-2 infection
13 November 2020
https://science.sciencemag.org/content/370/6518/861#:~:text=Another%20host%20factor%20for%20SARS%2DCoV%2D2&text=Cantuti%2DCastelvetri%20et%20al.,in%20endothelial%20and%20epithelial%20cells.
DOI: 10.1126/science.abd3072

Interaction of SARS-CoV-2 and Other Coronavirus With ACE (Angiotensin-Converting Enzyme)-2 as Their Main Receptor
27 August 2020
Interaction of SARS-CoV-2 and Other Coronavirus With ACE (Angiotensin-Converting Enzyme)-2 as Their Main Receptor | Hypertension (ahajournals.org)
https://doi.org/10.1161/HYPERTENSIONAHA.120.15256

Severe respiratory SARS-CoV2 infection: Does ACE2 receptor matter?
2020
Severe respiratory SARS-CoV2 infection: Does ACE2 receptor matter? (resmedjournal.com)

Bioinformatic characterization of angiotensin-converting enzyme 2, the entry receptor for SARS-CoV-2
28 October 2020
Bioinformatic characterization of angiotensin-converting enzyme 2, the entry receptor for SARS-CoV-2 (plos.org)
https://doi.org/10.1371/journal.pone.0240647

The modelling of COVID19 pathways sheds light on mechanisms, opportunities and on controversial interpretations of medical treatments. v2
No date? Text indicates 2020
2003.11614.pdf (arxiv.org)

ACE2 Receptor Expression and Severe Acute Respiratory Syndrome Coronavirus Infection Depend on Differentiation of Human Airway Epithelia
September 2005
ACE2 Receptor Expression and Severe Acute Respiratory Syndrome Coronavirus Infection Depend on Differentiation of Human Airway Epithelia | Journal of Virology (asm.org)
https://doi.org/10.1128/JVI.79.23.14614-14621.2005

Scientists figure out how new coronavirus breaks into human cells
11 March 2020 (Lay explanation)
Scientists figure out how new coronavirus breaks into human cells | Live Science

Angiotensin-converting enzyme 2 expression in COPD and IPF fibroblasts: the forgotten cell in COVID-19
28 January 2021
Angiotensin-converting enzyme 2 expression in COPD and IPF fibroblasts: the forgotten cell in COVID-19 | American Journal of Physiology-Lung Cellular and Molecular Physiology
https://doi.org/10.1152/ajplung.00455.2020

https://hsci.harvard.edu/news/how-new-coronavirus-enters-respiratory-tissue-exploits-immune-defenses
24 April 2020
How the new coronavirus enters respiratory tissue, exploits immune defenses | Harvard Stem Cell Institute (HSCI)

How does coronavirus kill? Clinicians trace a ferocious rampage through the body, from brain to toes | Science | AAAS
17 April 2020
How does coronavirus kill? Clinicians trace a ferocious rampage through the body, from brain to toes | Science | AAAS

Not just the lungs: Covid-19 attacks like no other 'respiratory' virus – STAT

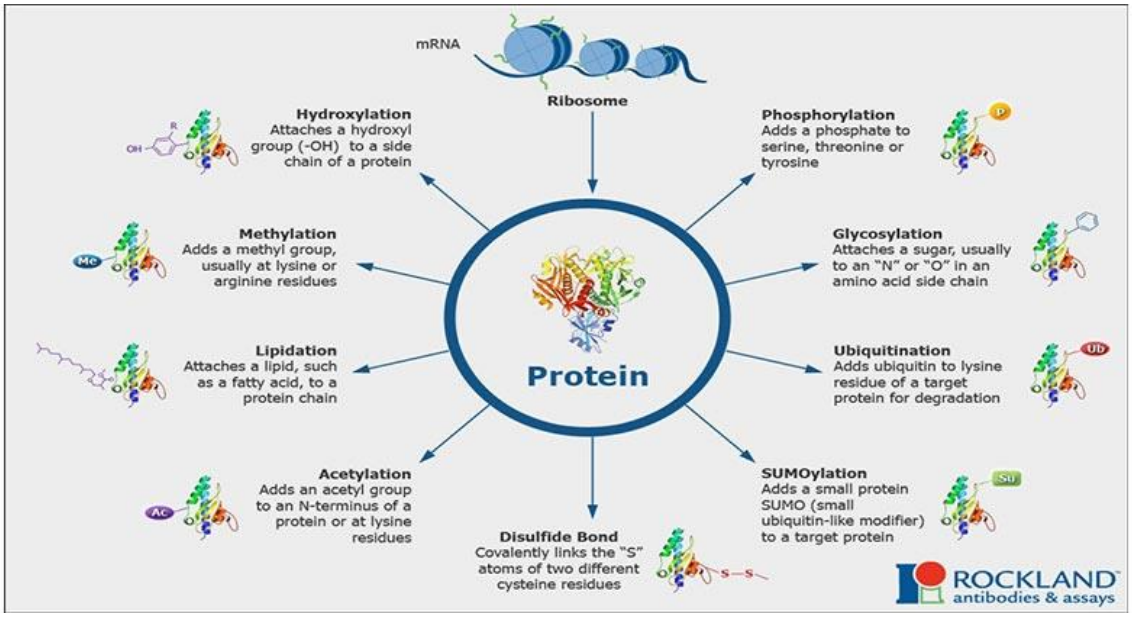
24 June 2020
Not just the lungs: Covid-19 attacks like no other 'respiratory' virus - STAT (statnews.com)

Assessing ACE2 expression patterns in lung tissues in the pathogenesis of COVID-19
13 April 2020
Assessing ACE2 expression patterns in lung tissues in the pathogenesis of COVID-19 (nih.gov)
https://dx.doi.org/10.1016%2Fj.jaut.2020.102463

SARS‐CoV‐2 receptor ACE2 and TMPRSS2 are primarily expressed in bronchial transient secretory cells | The EMBO Journal
14 April 2020
SARS-CoV-2 receptor ACE2 and TMPRSS2 are primarily expressed in bronchial transient secretory cells | The EMBO Journal (embopress.org)
https://doi.org/10.15252/embj.20105114

Addendum 2

Post translation etc



https://microbenotes.com/post-translational-modification

An Introduction to Post-Translational Modifications

4 December 2020

An Introduction to Post-Translational Modifications | Technology Networks

Amino Acids – the Building Blocks of Proteins

26 September 2019

Essential Amino Acids: Chart, Abbreviations and Structure | Technology Networks

Machine Learning Technique Reveals the Many Conformations of a Protein

8 February 2021

Machine Learning Technique Reveals the Many Conformations of a Protein | Technology Networks

Probing the Molecules of Life

26 January 2021

Probing the Molecules of Life | Technology Networks

Proteomics: Principles, Techniques and Applications

9 December 2020

https://www.technologynetworks.com/proteomics/articles/proteomics-principles-techniques-and-applications-343804

COVID-19 vaccines: The new technology that made them possible

11 December 2020

COVID-19 vaccines: The new technology that made them possible | Live Science

Here are the most promising coronavirus vaccine candidates out there

25 November 2020 (interesting aspect of Sputnik V is that 2 adenoviruses are used for more efficacy)

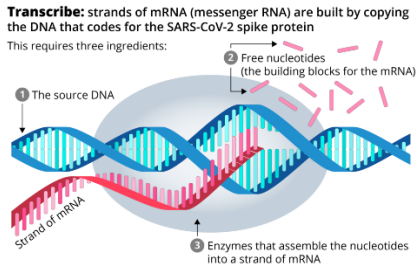
Here are the most promising coronavirus vaccine candidates out there | Live Science

CRISPR vs COVID-19: how can gene editing help beat a virus?

2 November 2020
CRISPR vs COVID-19: how can gene editing help beat a virus? | BioTechniques (future-science.com)
https://doi.org/10.2144/btn-2020-0145

Addendum 3

Vaccine Manufacture & Scale Up



mRNA Manufacture

GreenLight BIOSCIENCES™

Moderna: mRNA Vaccine Production and Facility Design
21 January
https://cellculturedish.com/mrna-vaccine-production-and-facility-design

How are COVID-19 vaccines made? An expert explains
18 February
How are COVID-19 vaccines made? An expert explains (theconversation.com)

Teaming up for Vaccines
30 April 2020
https://www.thechemicalengineer.com/features/teaming-up-for-vaccines

How to make a messenger RNA vaccine: Inside the RNA manufacturing process Messenger RNA Manufacturing Overview
9 November 2020
https://www.greenlightbiosciences.com/blog/how-to-make-a-messenger-rna-vaccine

An Update on Self-Amplifying mRNA Vaccine Development
28 January 2021
https://www.mdpi.com/2076-393X/9/2/97/htm

mRNA and the future of vaccine manufacturing
10 February 2021
https://www.path.org/articles/mrna-and-future-vaccine-manufacturing

The Sleeping Giants of Vaccine Production Awaken
3 February 2021
https://www.genengnews.com/insights/the-sleeping-giants-of-vaccine-production-awaken

Meeting Fill/Finish Challenges for COVID-19 Vaccines
1 February 2021
Meeting Fill/Finish Challenges for COVID-19 Vaccines | BioPharm International

Getting better at scaling up biopharmaceutical processes
1 November 2020
Getting better at scaling up biopharmaceutical processes (biopharminternational.com)

Meeting Fill/Finish Challenges for COVID-19 Vaccines | BioPharm International
1 February 2021

Meeting Fill/Finish Challenges for COVID-19 Vaccines | BioPharm International

Vaccination and vaccines for COVID-19
19 February 2021
Vaccination and vaccines for COVID-19 | Book | Chemistry World

How Pfizer Makes Its Covid-19 Vaccine
28 April
How Pfizer Makes Its Covid-19 Vaccine - The New York Times (nytimes.com)

Amplifying RNA Vaccine Development
18 June 2020
https://www.nejm.org/doi/full/10.1056/NEJMcibr2009737
DOI: 10.1056/NEJMcibr2009737

GMP Manufacturing of Messenger RNA Therapeutics and Vaccines: Case Study of a SA SARS CoV-2 Vaccine
22 Sept 2020
https://www.youtube.com/watch?v=W7AyHrVAo1A

Developing mRNA-vaccine technologies
1 November 2012
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3597572/#__sec2title
Impact of mRNA chemistry and manufacturing process on innate immune activation
24 June 2020
https://advances.sciencemag.org/content/6/26/eaaz6893.full

High Throughput Production of mRNA (Moderna)
11 July 2019
https://www.youtube.com/watch?v=cxu2cD5FBcg

mRNA Manufacturing
4 December 2019
https://www.youtube.com/watch?v=8j33dGRZ_S4

Non-Viral Delivery of self-amplifying mRNA Vaccines
31 March 2020
https://www.precisionnanosystems.com/resources-and-community/resource-center/webinars-videos/detail/non-viral-delivery-of-self-amplifying-mrna-vaccines

Making a vaccine
8 December 2020
https://www.youtube.com/watch?v=-92HQA0GcI8&feature=emb_rel_end

mRNA as a Transformative Technology for Vaccine Development to Control Infectious Diseases
1 February 2019
https://www.researchgate.net/publication/331007460_mRNA_as_a_Transformative_Technology_for_Vaccine_Development_to_Control_Infectious_Diseases

Complementary DNA

https://en.wikipedia.org/wiki/Complementary_DNA#:~:text=In%20genetics%2C%20complementary%20DNA%20(cDNA,clone%20eukaryotic%20genes%20in%20prokaryotes.

Plasmid

https://en.wikipedia.org/wiki/Plasmid

Overview: DNA cloning

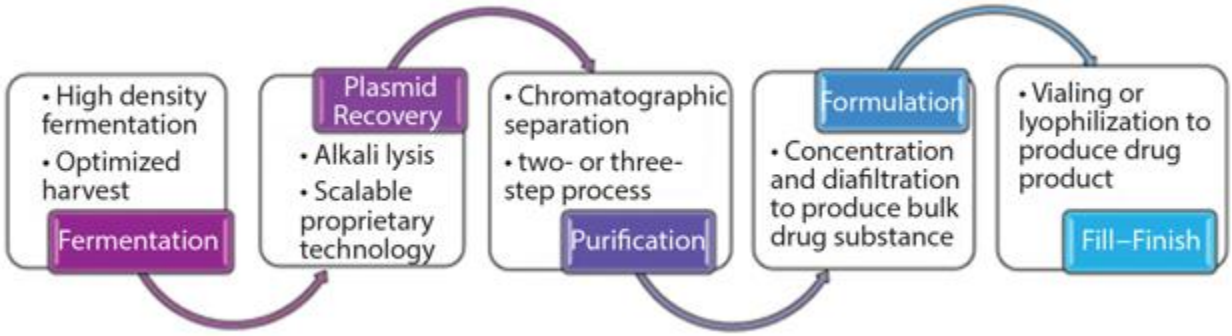
https://www.khanacademy.org/science/ap-biology/gene-expression-and-regulation/biotechnology/a/overview-dna-cloning and

Overview: DNA Cloning

https://www.khanacademy.org/science/biology/biotech-dna-technology/dna-cloning-tutorial/a/overview-dna-cloning?modal=1

Addendum 4

Production of DNA Plasmid for Cell Free RNA Vaccines Templates



The promise of mRNA vaccines: a biotech and industrial perspective | npj Vaccines
4 February 2020
The promise of mRNA vaccines: a biotech and industrial perspective | npj Vaccines (nature.com)

Cell-Free Synthesis: An Industry Roadmap - BioProcess InternationalBioProcess International
22 September 2020
Cell-Free Synthesis: An Industry Roadmap - BioProcess InternationalBioProcess International (bioprocessintl.com)

Synthetic Biology Goes Cell-Free | BMC Biology | Full Text
8 August 2019
Synthetic Biology Goes Cell-Free | BMC Biology | Full Text (biomedcentral.com)

Types of Plasmids: Definition, Structure, Function, Vector/Isolation
https://www.microscopemaster.com/plasmids.html

Plasmid DNA- Structure, Function, Isolation And Applications
8 November 2019
https://geneticeducation.co.in/plasmid-dna-structure-function-isolation-and-applications

Manufacturing Plasmid DNA: Ensuring Adequate Supplies for Gene and Cell Therapies
17 October 2016

Deconstructing cell-free extract preparation for in vitro activation of transcriptional genetic circuitry
8 September 2018
411785v1.full (1).pdf(Review)- Adobe Document Cloud
https://doi.org/10.1101/411785

Exploring the Potential of Cell-Free Protein Synthesis for Extending the Abilities of Biological Systems
11 October 2019
Frontiers | Exploring the Potential of Cell-Free Protein Synthesis for Extending the Abilities of Biological Systems | Bioengineering and Biotechnology (frontiersin.org)

Protein Expression Guide I An Introduction to Protein Expression Methods
Commercial publication with excellent graphics
Protein Expression Guide I An Introduction to Protein Expression Methods | Promega

Cell-free protein synthesis for proteomics
20 October 2003
https://documentcloud.adobe.com/link/review?uri=urn:aaid:scds:US:fa828c97-bd1a-4b3f-b543-e5c544e52d3a#pageNum=1

Manufacturing of Plasmids for Gene Therapies
NHS presentation
https://atmpmanufacture.org/wp-content/uploads/2018/01/amc-oct-2017-paul-lloyd-evans-nhsbt.pdf

Small-scale GMP production of plasmid DNA using a simplified and fully disposable production method
June 2019
https://www.sciencedirect.com/science/article/pii/S2590155919300046

Plasmid DNA Production for Cell and Gene Therapy
Commercial publication
https://cellculturedish.com/expert-plasmid-dna-production-cell-gene-therapy

DNA plasmid production in different host strains of Escherichia coli
1 April 2009
https://academic.oup.com/jimb/article/36/4/521/5993847

Engineering Escherichia coli to increase plasmid DNA production in high cell-density cultivations in batch mode
19 September 2012
https://microbialcellfactories.biomedcentral.com/articles/10.1186/1475-2859-11-132

The Pivotal Role of Plasmid DNA
6 December 2019
https://www.pharmasalmanac.com/articles/the-pivotal-role-of-plasmid-dna

How Long Does it Take to Manufacture Plasmid under GMP?
Commercial publication
https://vgxii.com/wp-content/uploads/2018/11/VGXI_How_Long_Does_It_Take1.pdf

Bacterial DNA – the role of plasmids
Publication by Science Learning Hub
https://www.sciencelearn.org.nz/resources/1900-bacterial-dna-the-role-of-plasmids

Plasmids 101: What is a plasmid?
2 April 2020
https://blog.addgene.org/plasmids-101-what-is-a-plasmid

Plasmid & Types
Definition
https://biologydictionary.net/plasmid

The Future of Cell-Free Protein Synthesis | NEB
Commercial publication
The Future of Cell-Free Protein Synthesis | NEB

Cell-Free Protein Expression | Thermo Fisher Scientific – IE
Commercial publication
Cell-Free Protein Expression | Thermo Fisher Scientific - IE

The Evolution of Cell Free Biomanufacturing
8 June 2020
The Evolution of Cell Free Biomanufacturing
https://doi.org/10.3390/pr8060675

The Development of Cell-Free Protein Expression Systems and Their Application in the Research on Antibiotics Targeting Ribosome (Open access peer-reviewed chapter)
20 January 2012
The Development of Cell-Free Protein Expression Systems and Their Application in the Research on Antibiotics Targeting Ribosome | IntechOpen

mRNA as a Transformative Technology for Vaccine Development to Control Infectious Diseases
2 January 2019
mRNA as a Transformative Technology for Vaccine Development to Control Infectious Diseases - ScienceDirect

Comparison of new vaccine approaches – COVID-19
26 June 2020
Comparison of new vaccine approaches – COVID-19 - (europeanpharmaceuticalreview.com)

Automated Cell-Free Multiprotein Synthesis Facilitates the Identification of a Secretory, Oligopeptide Elicitor-Like, Immunoreactive Protein of the Oomycete Pythium insidiosum
12 May 2020
mSystems-2020-Sae-Chew-e00196-20.full (2).pdf(Review)- Adobe Document Cloud
https://doi.org/10.1128/mSystems.00196-20

Cell-Free and Happy: In Vitro Translation And Transcription/Translation Systems
21 June 1999
Cell-Free And Happy: In Vitro Translation And Transcription/Translation Systems | The Scientist Magazine® (the-scientist.com)
Page not found: Cell Press (Moved use DOI)

Portable, On-Demand Biomolecular Manufacturing: Cell
22 September 2016
https://www.cell.com/fulltext/S0092-8674(16)31246-6
https://doi.org/10.1016/j.cell.2016.09.013

ALiCE®Cell-Free Protein Synthesis System Protocol
Commercial publication
ALiCE®Cell-Free Protein Synthesis System Protocol | Sigma-Aldrich

New COVID Vaccines Need Absurd Amounts of Material and Labour

4 January 2021
New COVID Vaccines Need Absurd Amounts of Material and Labor - Scientific American

In Vitro Transcription and the Use of Modified Nucleotides - Promega Connections
26 June 2020
In Vitro Transcription and the Use of Modified Nucleotides - Promega Connections

DNA cloning and recombinant DNA (video) | Khan Academy
Video from Khan Academy course
DNA cloning and recombinant DNA (video) | Khan Academy

Plasmids extra

Overview: DNA cloning (article) | Khan Academy
https://www.khanacademy.org/science/ap-biology/gene-expression-and-regulation/biotechnology/a/overview-dna-cloning

The time and cost required to make a plasmid
11 September 2018
https://blog.addgene.org/the-time-and-cost-required-to-make-a-plasmid

Scalable Technology to Produce Pharmaceutical Grade Plasmid DNA for Gene Therapy | IntechOpen (Contains ads)
1 November 2010
https://www.intechopen.com/books/gene-therapy-developments-and-future-perspectives/scalable-technology-to-produce-pharmaceutical-grade-plasmid-dna-for-gene-therapy
DOI: 10.5772/19087

Industrial Manufacturing of Plasmid DNA
15 February 2008
Industrial Manufacturing of Plasmid DNA (genengnews.com)

How to add foreign DNA to bacteria — Science Learning Hub
How to add foreign DNA to bacteria — Science Learning Hub

Plasmid DNA- Structure, Function, Isolation And Applications
8 November 2019
Plasmid DNA- Structure, Function, Isolation And Applications (geneticeducation.co.in)

Engineering a minimal cloning vector from a pUC18 plasmid backbone with an extended multiple cloning site | BioTechniques
20 May 2019
Engineering a minimal cloning vector from a pUC18 plasmid backbone with an extended multiple cloning site | BioTechniques (future-science.com)

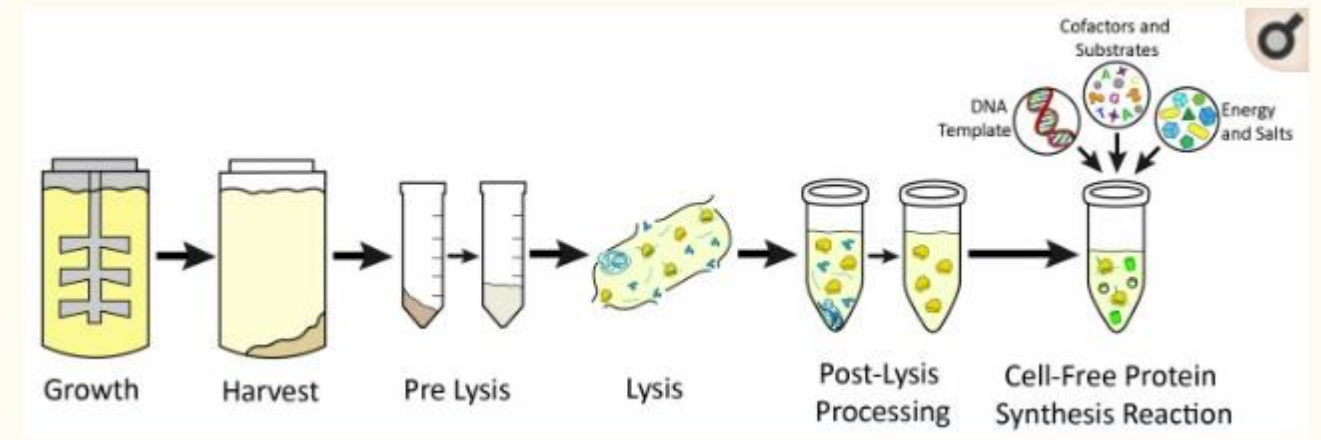
E. coli strain engineering for the production of advanced biopharmaceutical products
4 July 2018
https://academic.oup.com/femsle/article/365/15/fny162/5049002
https://doi.org/10.1093/femsle/fny162

10: Plasmids

3 January 2021
https://bio.libretexts.org/Bookshelves/Cell_and_Molecular_Biology/Book%3A_Investigations_in_Molecular_Cell_Biology_(O'Connor)/10%3A_Plasmids

Addendum 5

Cell Free Protein Production



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6481089 See

A User's Guide to Cell-Free Protein Synthesis

2 March 2019
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6481089

Toward a Roadmap for Cell-Free Synthesis in Bioprocessing

22 September 2020
https://bioprocessintl.com/upstream-processing/expression-platforms/toward-a-roadmap-for-cell-free-synthesis-in-bioprocessing

Exploring the Potential of Cell-Free Protein Synthesis for Extending the Abilities of Biological Systems

11 October 2019
https://www.frontiersin.org/articles/10.3389/fbioe.2019.00248/full
https://doi.org/10.3389/fbioe.2019.00248

Synthetic Biology Goes Cell-Free

8 August 2019
https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-019-0685-x
https://doi.org/10.1186/s12915-019-0685-x

Cell-Free Protein Synthesis: A Promising Option for Future Drug Development

20 March 2020
https://link.springer.com/article/10.1007/s40259-020-00417-y
https://doi.org/10.1007/s40259-020-00417-y

Cell free protein synthesis: a viable option for stratified medicines manufacturing?

November 2017
https://www.sciencedirect.com/science/article/pii/S221133981730045X
https://doi.org/10.1016/j.coche.2017.10.003

An Introduction to Cell-Free Protein Expression

16 July 2020 (Commercial video)
https://www.the-scientist.com/sponsored-videos/an-introduction-to-cell-free-protein-expression-67743

Cell-free protein expression
(Commercial article)
https://cube-biotech.com/cell-free-protein-expression

An Introduction to Protein Expression
Commercial presentation
https://worldwide.promega.com/resources/guides/protein-analysis/protein-expression-methods

Orders of protein structure
https://www.khanacademy.org/science/biology/macromolecules/proteins-and-amino-acids/a/orders-of-protein-structure

Four levels of protein structure
Khan Academy Video
https://www.khanacademy.org/test-prep/mcat/biomolecules/amino-acids-and-proteins1/v/four-levels-of-protein-structure#:~:text=The%20four%20levels%20of%20protein,By%20Tracy%20Kovach.

Learn About the 4 Types of Protein Structure (better graphics)
https://www.thoughtco.com/protein-structure-373563

Large Molecules Problem Set (alternative models)
http://www.biology.arizona.edu/biochemistry/problem_sets/large_molecules/03t.html

FOUR LEVELS OF PROTEIN STRUCTURE (embedded video more recent)
https://uta.pressbooks.pub/cellphysiology/chapter/chapter-2

Cell-free protein synthesis: advances on production process for biopharmaceuticals and immunobiological products
20 January
Cell-free protein synthesis: advances on production process for biopharmaceuticals and immunobiological products | BioTechniques (future-science.com)
https://doi.org/10.2144/btn-2020-0155

Addendum 6

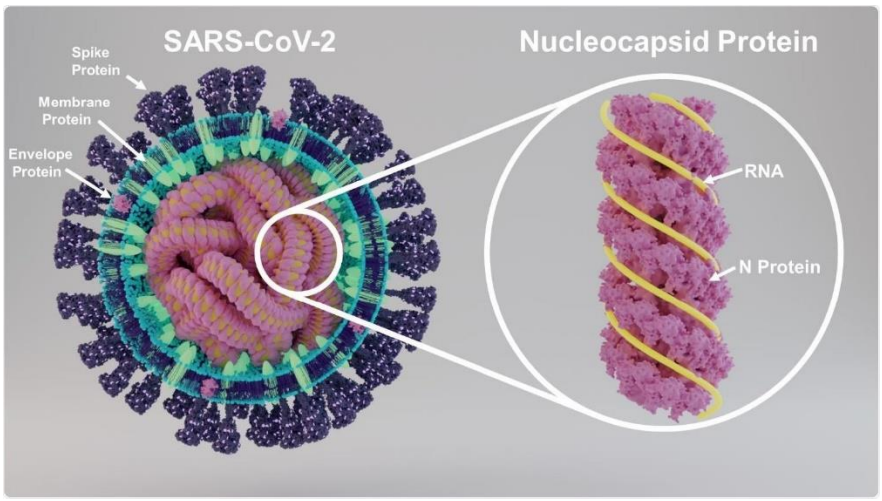
SARS-CoV-2 Neucleocapsid (N) protein

Nucleocapsid Protein (N-Protein)

The nucleocapsid protein (N-protein) is a structural protein that binds to the coronavirus RNA genome, thus creating a shell (or capsid) around the enclosed nucleic acid. The N-protein also 1) interacts with the viral membrane protein during viral assembly, 2) assists in RNA synthesis and folding, 3) plays a role in virus budding, and 4) affects host cell responses, including cell cycle and translation.

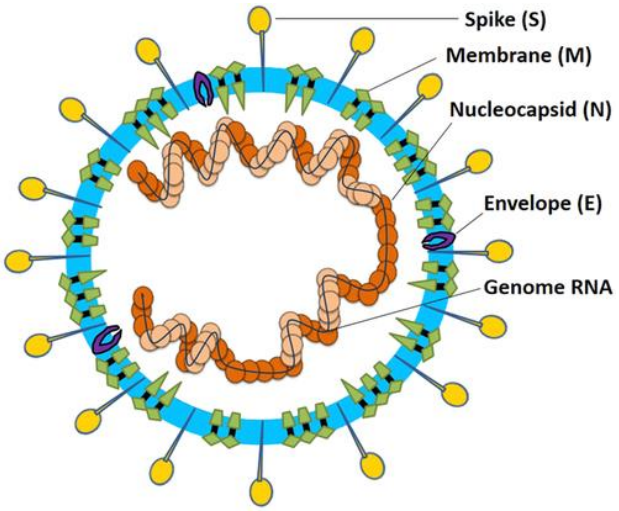
SARS-CoV-2 Neucleocapside (N) protein is heavily glycosylated

30 August 2020
https://www.news-medical.net/news/20200830/SARS-CoV-2-Neucleocapside-(N)-protein-is-heavily-glycosylated.aspx



Coronavirus infections and immune responses ??

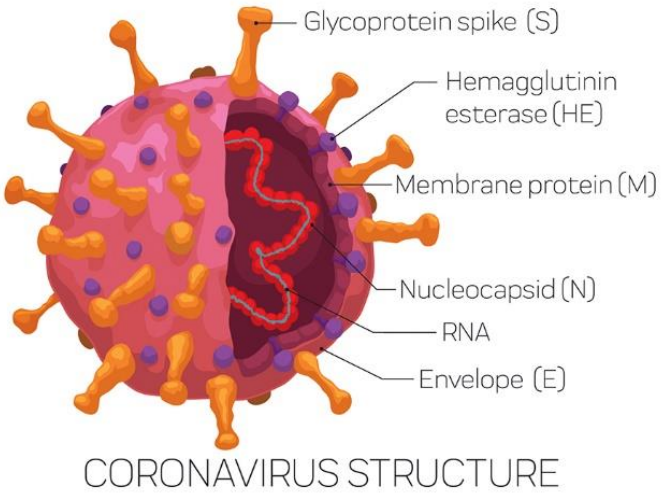
25 January 2020
https://onlinelibrary.wiley.com/doi/10.1002/jmv.25685



COVID-19 vaccines focus on the spike protein, but there's another target

20 December 2020

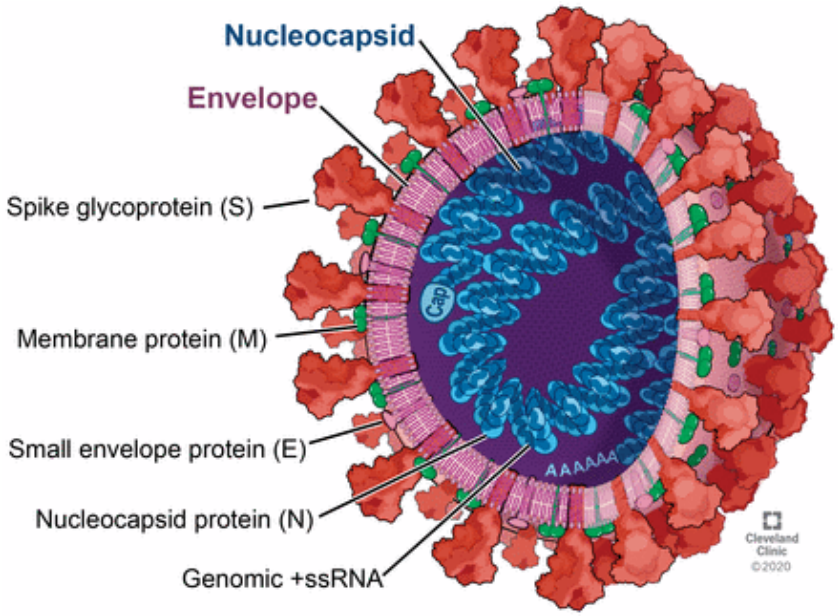
https://www.asbmb.org/asbmb-today/science/122020/covid-19-vaccines-focus-on-the-spike-protein-but-t

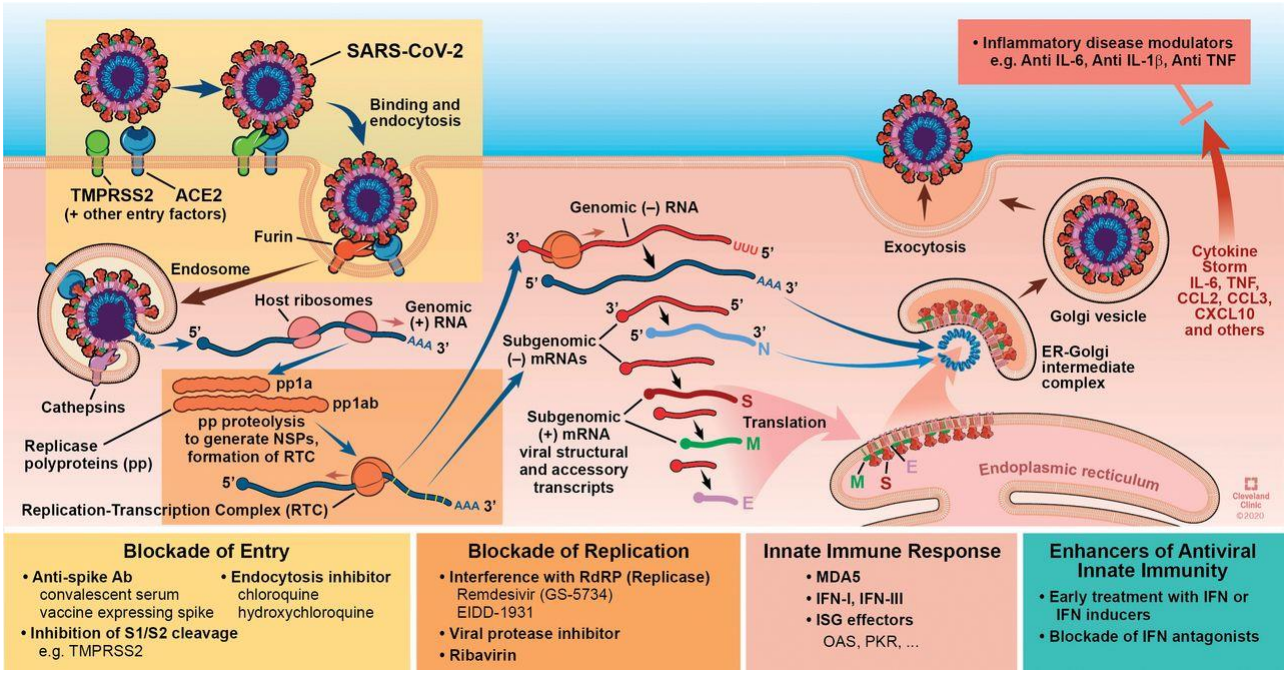


COVID-19: Coronavirus replication, pathogenesis, and therapeutic strategies

1 June 2020

https://www.ccjm.org/content/87/6/321

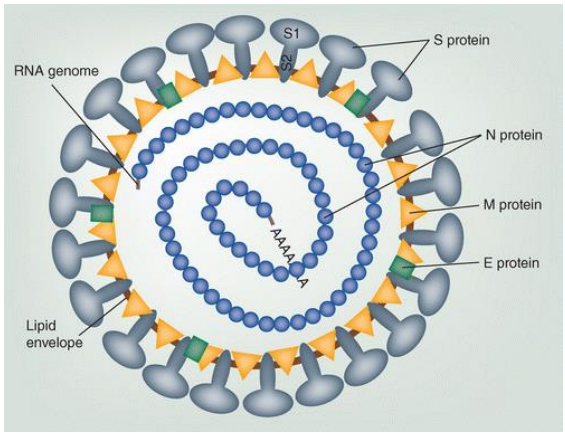




Membrane binding proteins of coronaviruses

28 April 2019

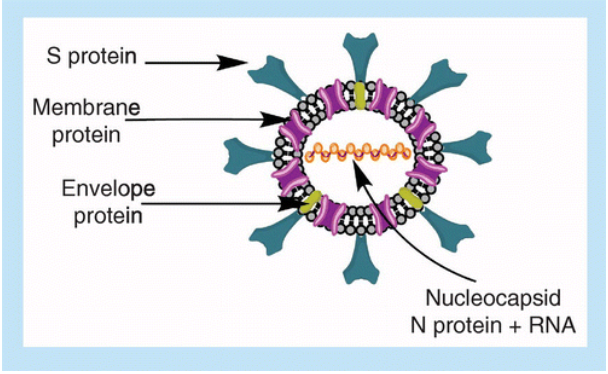
https://www.futuremedicine.com/doi/full/10.2217/fvl-2018-0144



Tackling SARS-CoV-2: proposed targets and repurposed drugs

22 June 2020

https://www.future-science.com/doi/10.4155/fmc-2020-0147



Research related to COVID-19

https://medicine.umich.edu/dept/ebs/research-related-covid-19

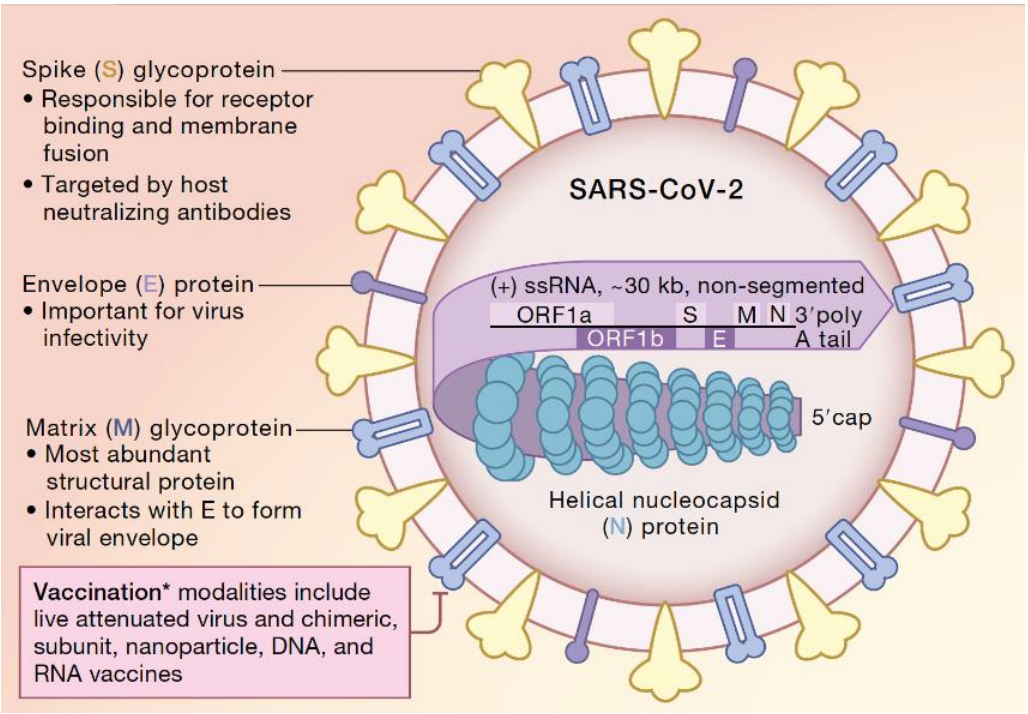


Image source: https://doi.org/10.1016/j.cell.2020.04.013

https://www.cell.com/cell/pdf/S0092-8674(20)30475-X.pdf?_returnURL=https%3A%2F%2Flinkinghub.elsevier.com%2Fretrieve%2Fpii%2FS009286742030475X%3Fshowall%3Dtrue

A Visual Guide to the SARS-CoV-2 Coronavirus

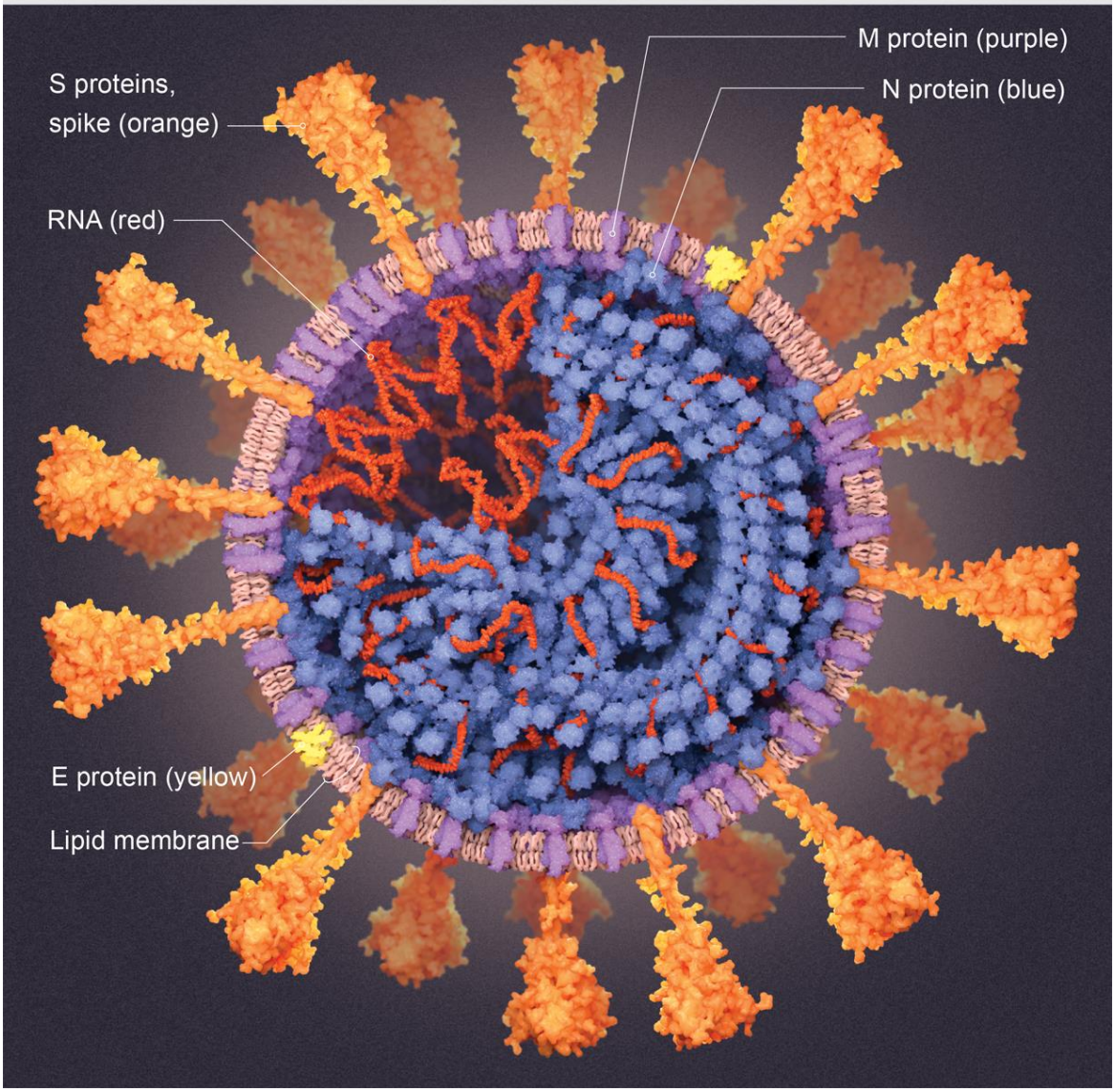
1 July 2020

https://www.scientificamerican.com/article/a-visual-guide-to-the-sars-cov-2-coronavirus

See below

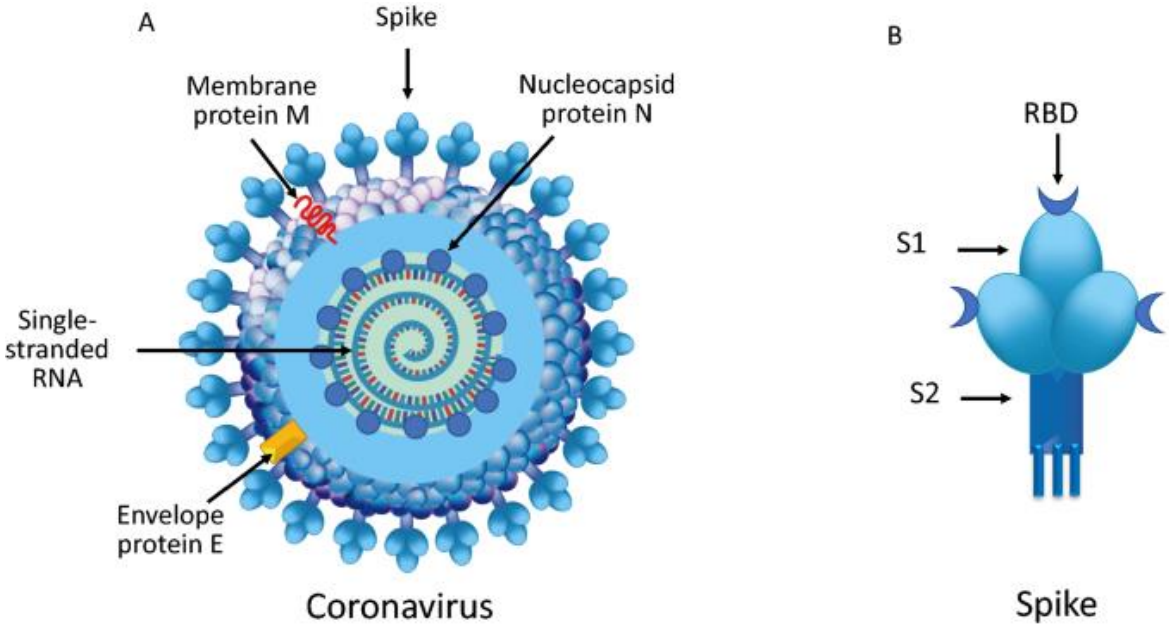
Gene Machine

A SARS-CoV-2 virus particle wafting into a person's nose or mouth is about 100 nanometers in diameter—visible only with an electron microscope. It is a near sphere of protein (cross section shown) inside a fatty membrane that protects a twisting strand of RNA—a molecule that holds the virus's genetic code. Proteins called "S" form spikes that extend from the surface and grab onto a human cell, hundreds of times larger, so the particle, or virion, can slip inside; the crown, or corona, appearance gives the virus its name. Structural proteins—N, M and E—move inside the cell, where they help new virions form.



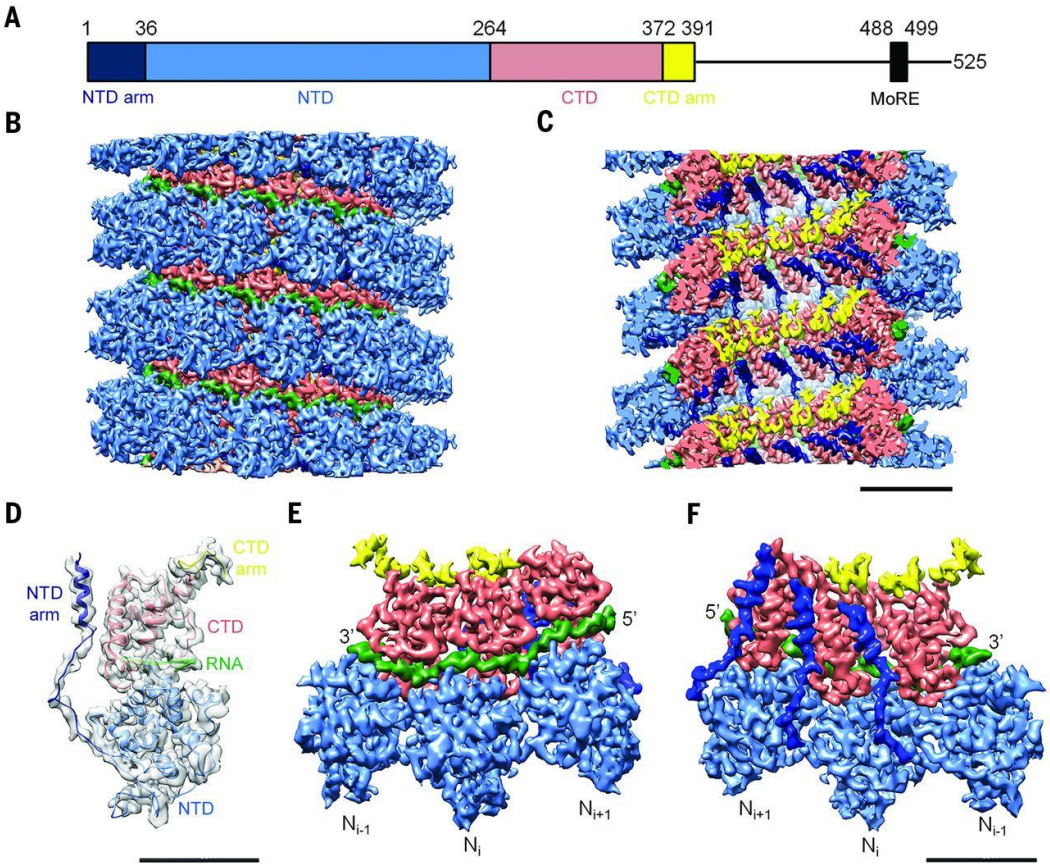
Differences and similarities between SARS-CoV and SARS-CoV-2: spike receptor-binding domain recognition and host cell infection with support of cellular serine proteases

31 July 2020



Near-atomic cryo-EM structure of the helical measles virus nucleocapsid ?????

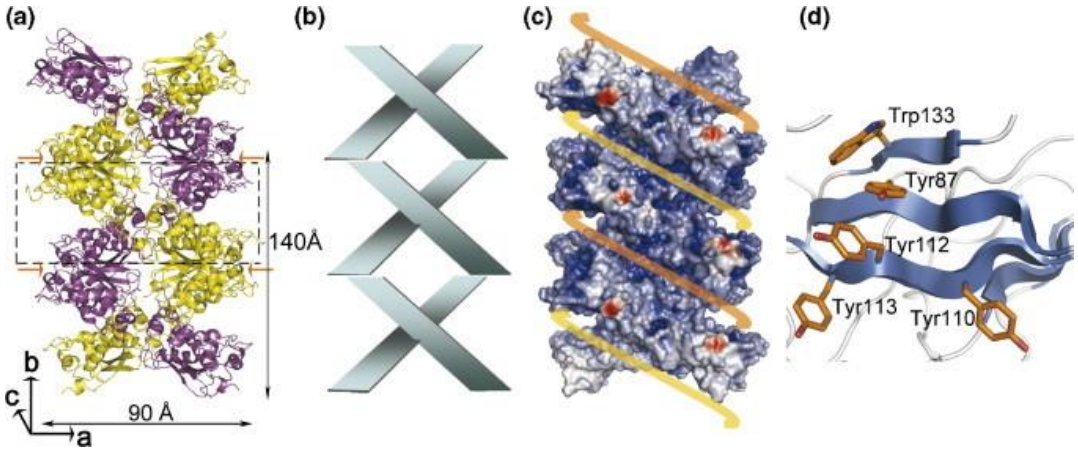
8 May 2015



Structure of the SARS Coronavirus Nucleocapsid Protein RNA-binding Dimerization Domain Suggests a Mechanism for Helical Packaging of Viral RNA

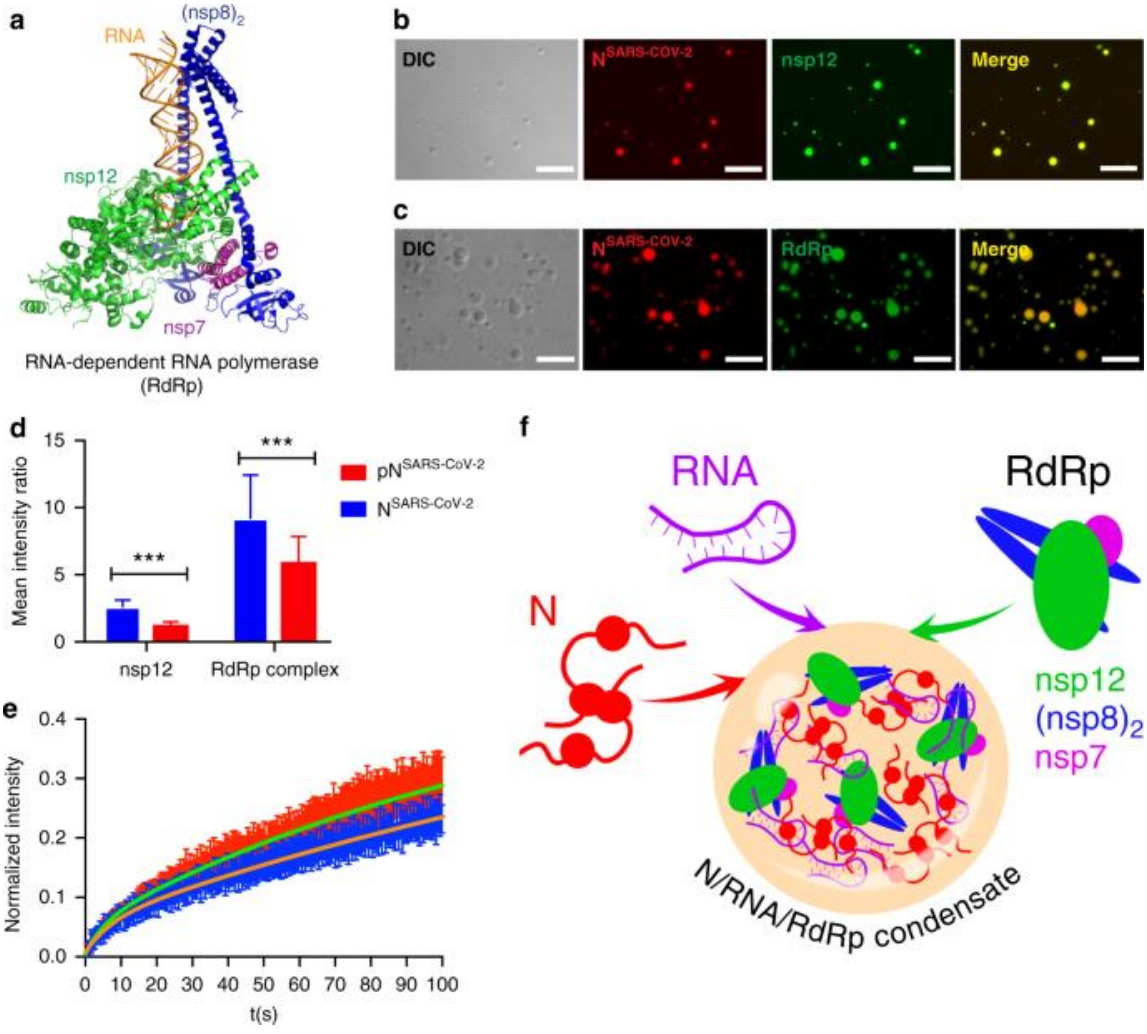
5 March 2007

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7094638/



Nucleocapsid protein of SARS-CoV-2 phase separates into RNA-rich polymerase-containing condensates

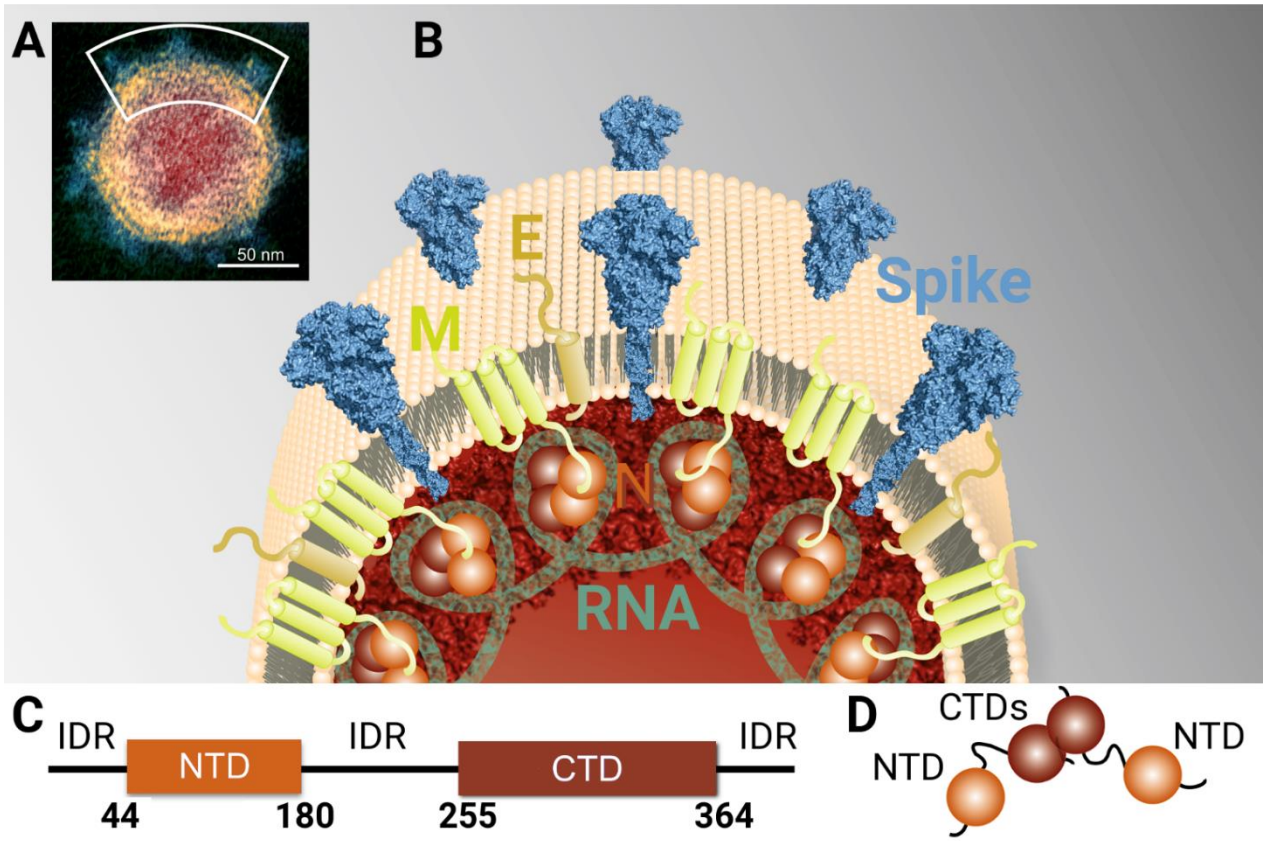
27 November 2020



Structural basis of RNA recognition by the SARS-CoV-2 nucleocapsid phosphoprotein

2 December 2020

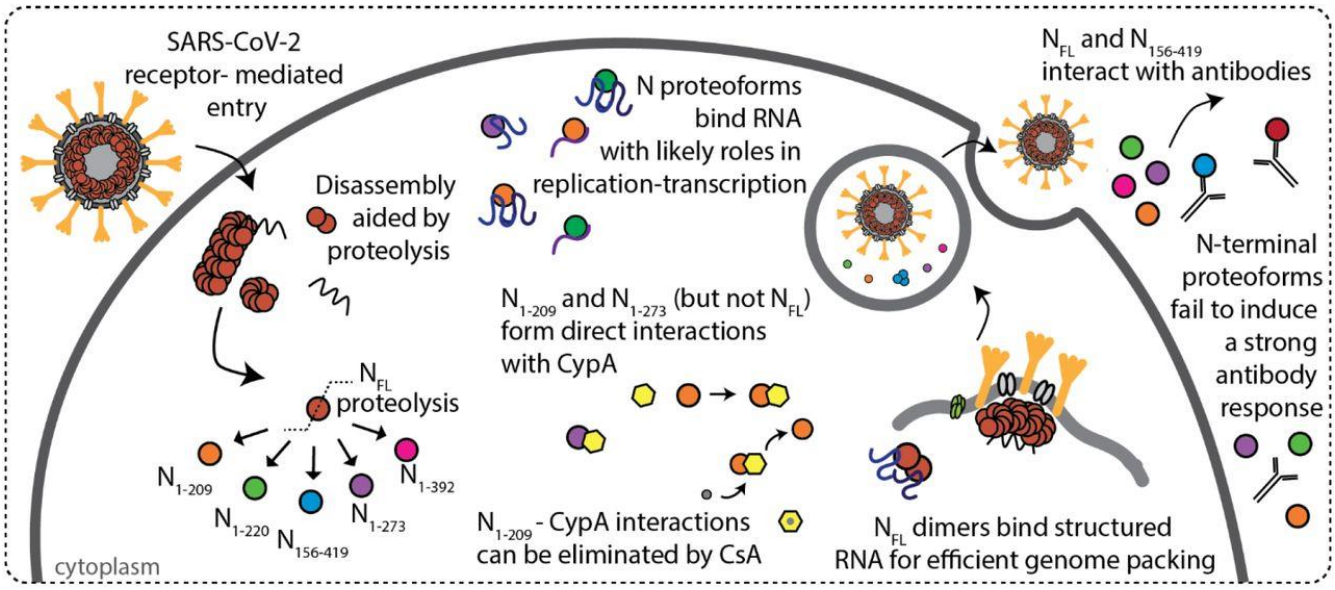
https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1009100



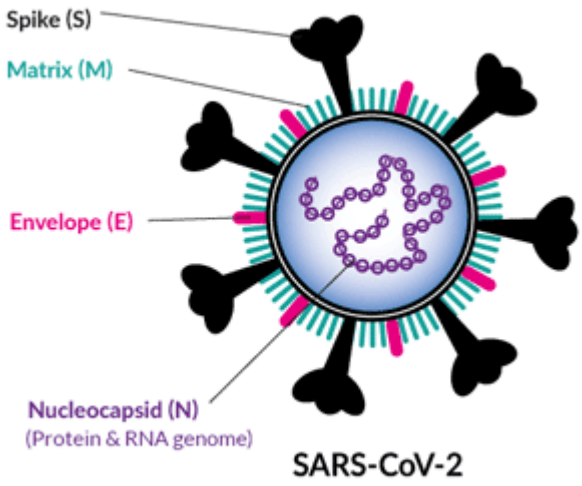
Proteoforms of the SARS-CoV-2 nucleocapsid protein are primed to proliferate the virus and attenuate the antibody response

https://www.biorxiv.org/content/10.1101/2020.10.06.328112v2.full

doi: https://doi.org/10.1101/2020.10.06.328112



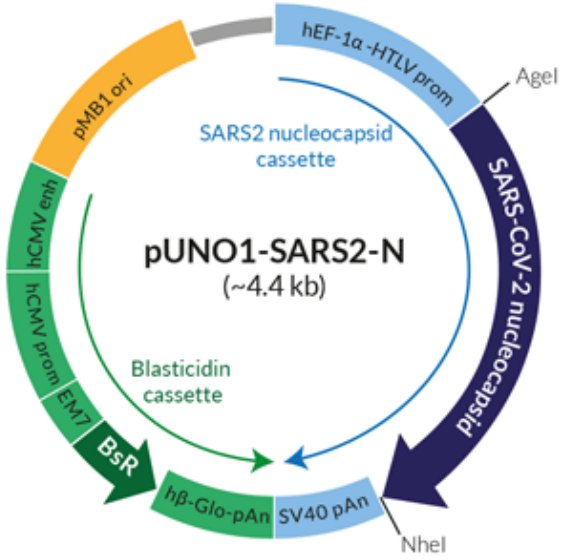
https://www.invivogen.com/sars2-structure-expression-vectors?gclid=Cj0KCQiAv6yCBhCLARIsABqJTjZHdirR5jYQMGmeBMwYT48faBXyKZ5K2L_fhM6JrMGivmWSMJjxiDIaApnDEALw_wcB



Nucleocapsid (N) binds to the viral RNA genome and ensures the maintenance of the RNA in a 'beads-on-a-string' conformation.

PLASMID DESCRIPTION

pUNO1-SARS2-N features a potent mammalian expression cassette comprised of the ubiquitous human EF1α-HTLV composite promoter and the SV40 polyadenylation (pAn) signal. The ORF is flanked by unique restriction sites (AgeI and NheI) to facilitate its subcloning. The plasmid is selectable with blasticidin in both E. coli and mammalian cells. It can be used for transient or stable transfection. It contains no tag.



The Coronavirus Nucleocapsid Is a Multifunctional Protein

7 August 2014
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4147684
https://dx.doi.org/10.3390%2Fv6082991

The coronavirus nucleocapsid (N) is a structural protein that forms complexes with genomic RNA, interacts with the viral membrane protein during virion assembly and plays a critical role in enhancing the efficiency of virus transcription and assembly.

Human Coronavirus Nucleocapsid Protein

https://www.sinobiological.com/research/virus/human-coronavirus-nucleocapsid
The nucleocapsid protein (N-protein) is the most abundant protein in coronavirus. The N-protein is a highly immunogenic phosphoprotein, and it is normally very conserved. The N protein of coronavirus is

often used as a marker in diagnostic assays. During virion assembly, N protein binds to viral RNA and leads to formation of the helical nucleocapsid. The abundance and high hydrophilicity of N protein are supposed to contribute to potent immunity after coroavirus infection.

Nucleocapsid protein, coronavirus

https://www.ebi.ac.uk/interpro/entry/InterPro/IPR001218

Coronavirus (CoV) nucleocapsid (N) proteins have 3 highly conserved domains. The N-terminal domain (NTD) (N1b), the C-terminal domain (CTD)(N2b) and the N3 region.

SARS nucleocapsid phosphoprotein, SARS-NP)

https://www.biovendor.com/sars-cov?utm_source=google&utm_medium=organic

The severe acute respiratory syndrome coronavirus nucleocapsid protein (SARS-CoV NP), a phosphoprotein of 48 kDa, is the most abundant protein in the virus-infected cells. Its primary function is to package the ~30 kb single stranded, 5′-capped positive strand viral genome RNA molecule into a ribonucleoprotein (RNP) complex called the capsid. Ribonucleocapsid packaging is a fundamental part of viral self-assembly and the RNP complex constitutes the essential template for replication by the RNA-dependent RNA polymerase complex. In addition, the N-protein of the SARS-CoV has been shown to modulate the host cellular machinery and may serve regulatory roles during its viral life cycle.

As the most abundantly expressed structural protein during infection, SARS-CoV NP is highly detectable in SARS patients. Therefore, this protein may serve as one of the immunodominant antigens in the early diagnosis of infection. Furthermore, researchers have suggested that antibody against the N protein could modulate cytokine responses such as IL-11; non-neutralizing antibodies against N protein were found to protect mice against lethal infection.

Transient Oligomerization of the SARS-Co-V N Protein – Implication for Virus Ribonucleoprotein Packaging

23 May 2013

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0065045

How I Built a 3-D Model of the Coronavirus for Scientific American

25 June 2020 (Worth reading)

https://www.scientificamerican.com/article/how-i-built-a-3-d-model-of-the-coronavirus-for-scientific-american

Crystal structure of SARS-CoV-2 nucleocapsid protein RNA binding domain reveals potential unique drug targeting sites

July 2020

https://www.sciencedirect.com/science/article/pii/S2211383520305505

https://doi.org/10.1016/j.apsb.2020.04.009

Molecular Architecture of the SARS-CoV-2 Virus

29 October 2020

https://www.cell.com/cell/pdf/S0092-8674(20)31159-4.pdf

https://doi.org/10.1016/j.cell.2020.09.018

Coronavirus SARS-CoV-2

https://nanographics.at/projects/sars-cov-2/

Images and Video links

Molecular biology of coronaviruses: current knowledge

August 2020

https://www.sciencedirect.com/science/article/pii/S2405844020315863#bib73

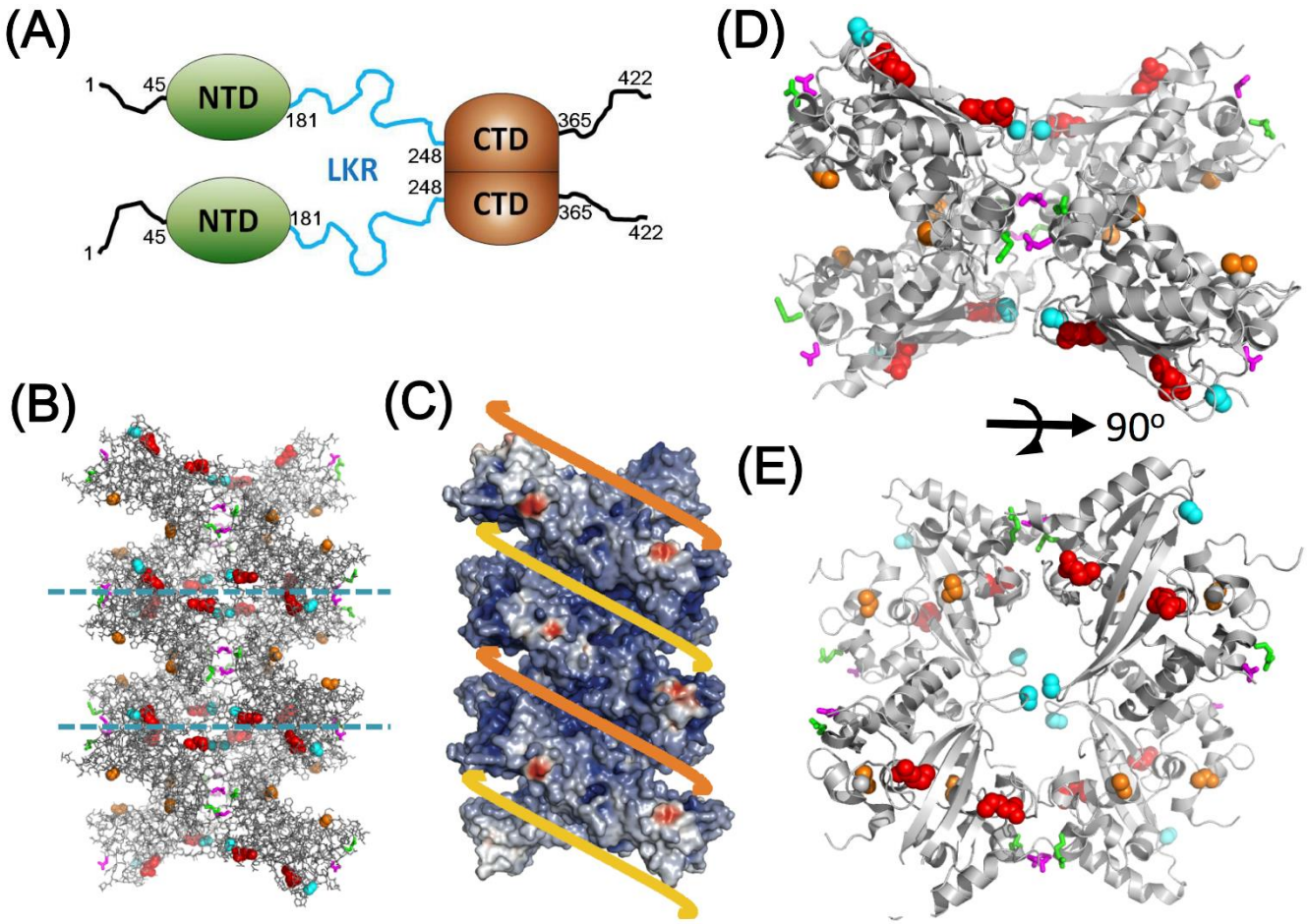
https://doi.org/10.1016/j.heliyon.2020.e04743

Transient Oligomerization of the SARS-CoV N Protein – Implication for Virus Ribonucleoprotein Packaging

https://journals.plos.org/plosone/article/figure?id=10.1371/journal.pone.0065045.g001

The structure packaging of the SARS-CoV N protein and the mutation sites for probing transient molecular interaction.

Figure 1
(A) The domain organization of the N protein. (B) Side view of the crystal structure of 24-mer CTD molecules showing the helical packing. (C) Electrostatic surface of the crystal packing of the CTD 24-mer. Positive charges are colored in blue and negative charges are colored in red. Yellow and orange ribbons represent viral RNA strands wrapping around the helical oligomer structure. (D) A close up side view of a CTD octamer molecule shown in between of the two dashed lines on Fig. 1B. The corresponding top view is shown on (E). Spatial locations of the mutated sites are shown in orange (T264), magenta (Q290), green (R294), red (R320) or cyan (S328) in (B), (D) and (E)



Unraveling the Packaging Mechanism of Coronavirus Ribonucleocapsid

15 March 2017
https://medcraveonline.com/JHVRV/unraveling-the-packaging-mechanism-of-coronavirus-ribonucleocapsid.html
https://doi.org/10.15406/jhvrv.2017.05.00148
This publication contains good written description of the RMA/Protein complex but lacks diagrams and graphics.

SR/RS Motifs as Critical Determinants of Coronavirus Life Cycle

21 August 2020
https://www.frontiersin.org/articles/10.3389/fmolb.2020.00219/full
https://doi.org/10.3389/fmolb.2020.00219

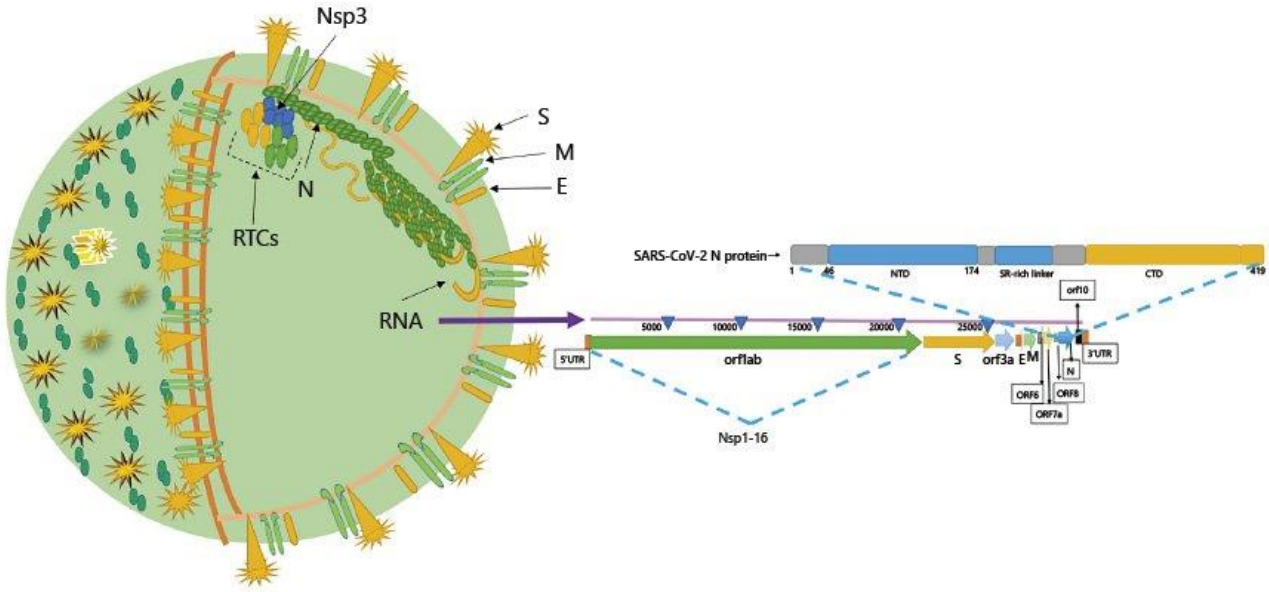
Reference below presented earlier mentions N Protein

Bad News Wrapped in Protein: Inside the Coronavirus Genome

13 April 2020
https://www.nytimes.com/interactive/2020/04/03/science/coronavirus-genome-bad-news-wrapped-in-protein.html

Structures of SARS-CoV-2 RNA-Binding Proteins and Therapeutic Targets

https://doi.org/10.1159/000513686



COVID-19 Proteins

https://www.raybiotech.com/covid19-proteins

Nucleocapsid Protein (N-Protein)

The nucleocapsid protein (N-protein) is a structural protein that binds to the coronavirus RNA genome, thus creating a shell (or capsid) around the enclosed nucleic acid. The N-protein also 1) interacts with the viral membrane protein during viral assembly, 2) assists in RNA synthesis and folding, 3) plays a role in virus budding, and 4) affects host cell responses, including cell cycle and translation.

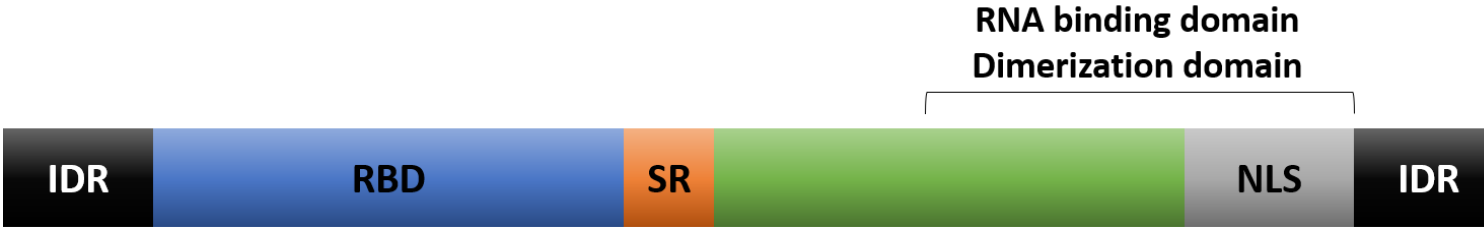


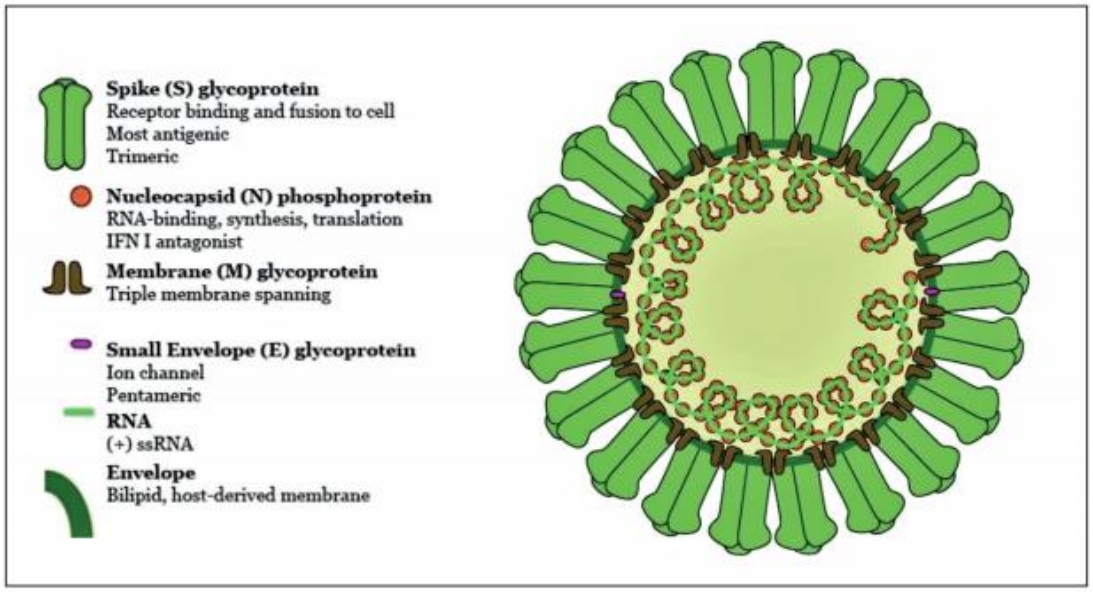
Figure 1. N-protein domains
RBD = RNA binding domain; IDR = intrinsically disordered region; SR = serine-arginine-rich; NLS = nuclear localization signal.

Ribonucleocapsid Formation of Severe Acute Respiratory Syndrome Coronavirus through Molecular Action of the N-Terminal Domain of N Protein ??

1 December 2006. Aimed at specialist scientists.
https://jvi.asm.org/content/81/8/3913
DOI: 10.1128/JVI.02236-06

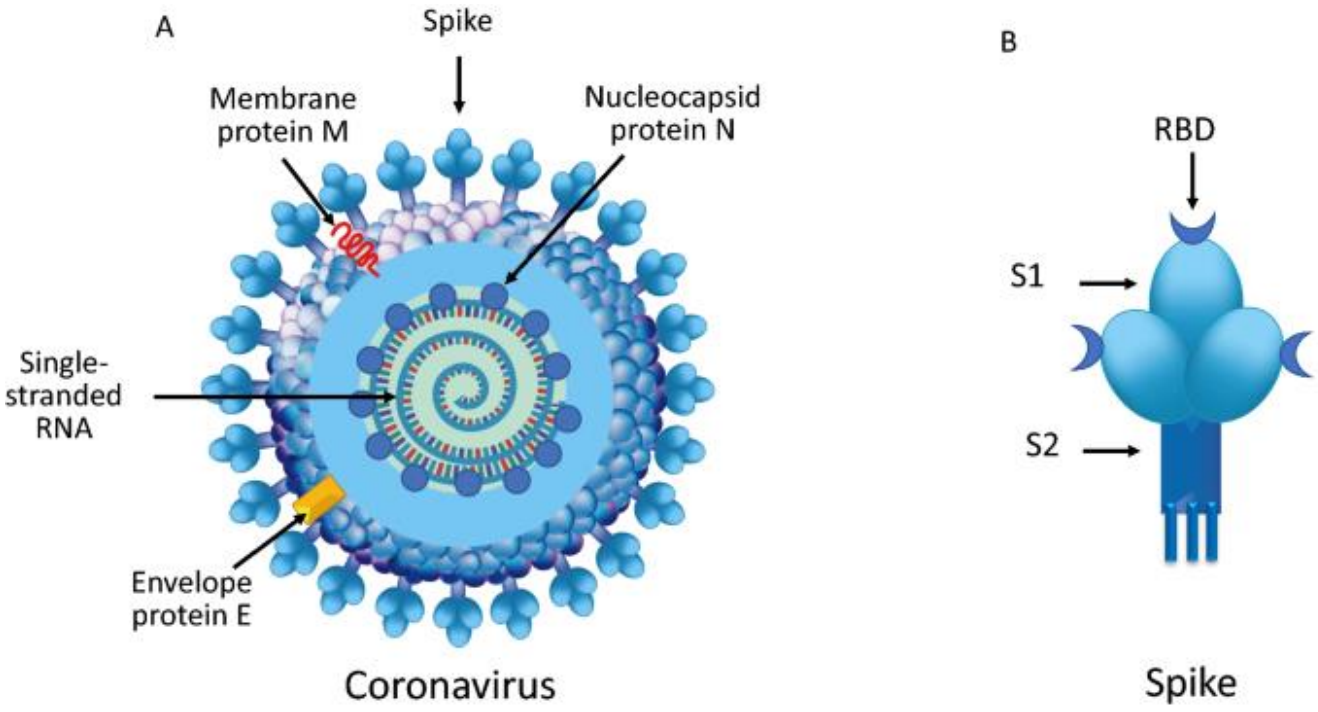
COVID-19 (Novel Coronavirus 2019) – recent trends

https://www.europeanreview.org/wp/wp-content/uploads/2006-2011.pdf



Differences and similarities between SARS-CoV and SARS-CoV-2: spike receptor-binding domain recognition and host cell infection with support of cellular serine proteases

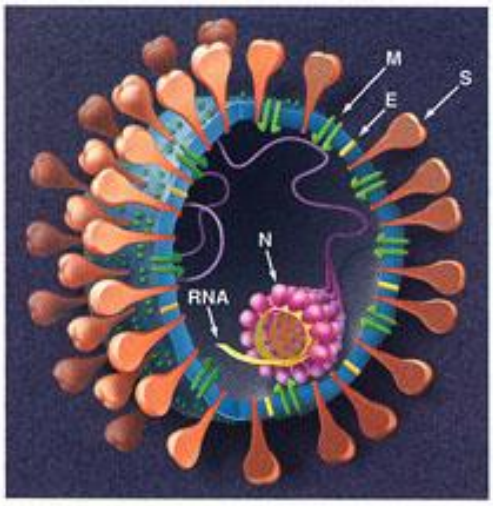
31 July 2020
https://link.springer.com/article/10.1007/s15010-020-01486-5



a Coronaviruses structures. The membrane (M), envelope (E) and spike (S) structural proteins are anchored to the viral envelope which contains the ribonucleoprotein core, i.e., the nucleocapsid protein (N) which acts as a scaffold surrounding the single-stranded RNA. **b** The surface spike is composed by the S1 subunit, which harbors the receptor binding domain (RBD), and by the S2 subunit, the stem which anchors the spike to the viral envelope and, following protease activation, enables host cell fusion.

The SARS coronavirus: a postgenomic era. (Virology)

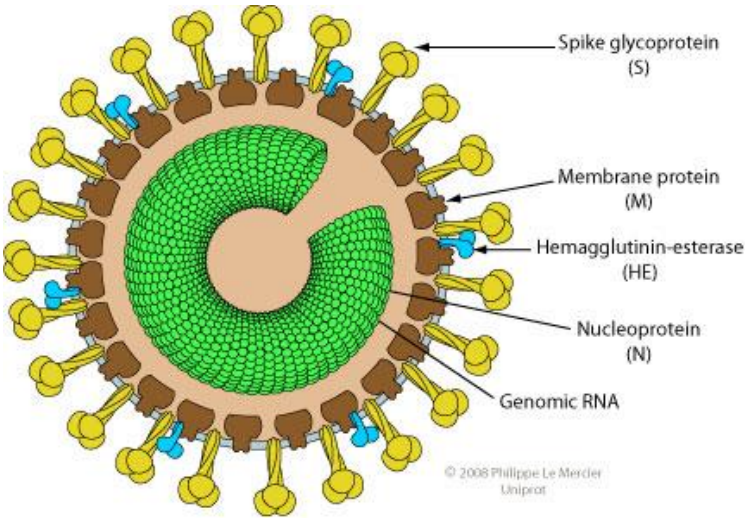
Authors: Kathryn V. Holmes and Luis Enjuanes
Date: May 30, 2003
https://go.gale.com/ps/anonymous?id=GALE%7CA103124325&sid=googleScholar&v=2.1&it=r&linkaccess=fulltext&issn=00368075&p=AONE&sw=w



Coronavirus organization. A model of the coronavirus structure showing the organization of the spike (S), membrane (M), and envelope (E) glycoproteins. The RNA is protected by a helical capsid of N protein monomers.

Torovirinae

https://viralzone.expasy.org/763



Enveloped, spherical, about 120 nm in diameter. The RNA genome associate with the N protein to form the nucleocapsid (helical for the genus coronavirus, and tubular for the genus torovirus).

Targeting SARS-CoV-2 nucleocapsid oligomerization: Insights from molecular docking and molecular dynamics simulations
15 October 2020
https://www.tandfonline.com/doi/full/10.1080/07391102.2020.1839563
https://doi.org/10.1080/07391102.2020.1839563

Structural Characterization of SARS-CoV-2: Where We Are, and Where We Need to Be
17 December
https://www.frontiersin.org/articles/10.3389/fmolb.2020.605236/full#F1
https://doi.org/10.3389/fmolb.2020.605236 and
Structure of the SARS-CoV nsp12 polymerase bound to nsp7 and nsp8 co-factors
28 May 2019
https://www.nature.com/articles/s41467-019-10280-3

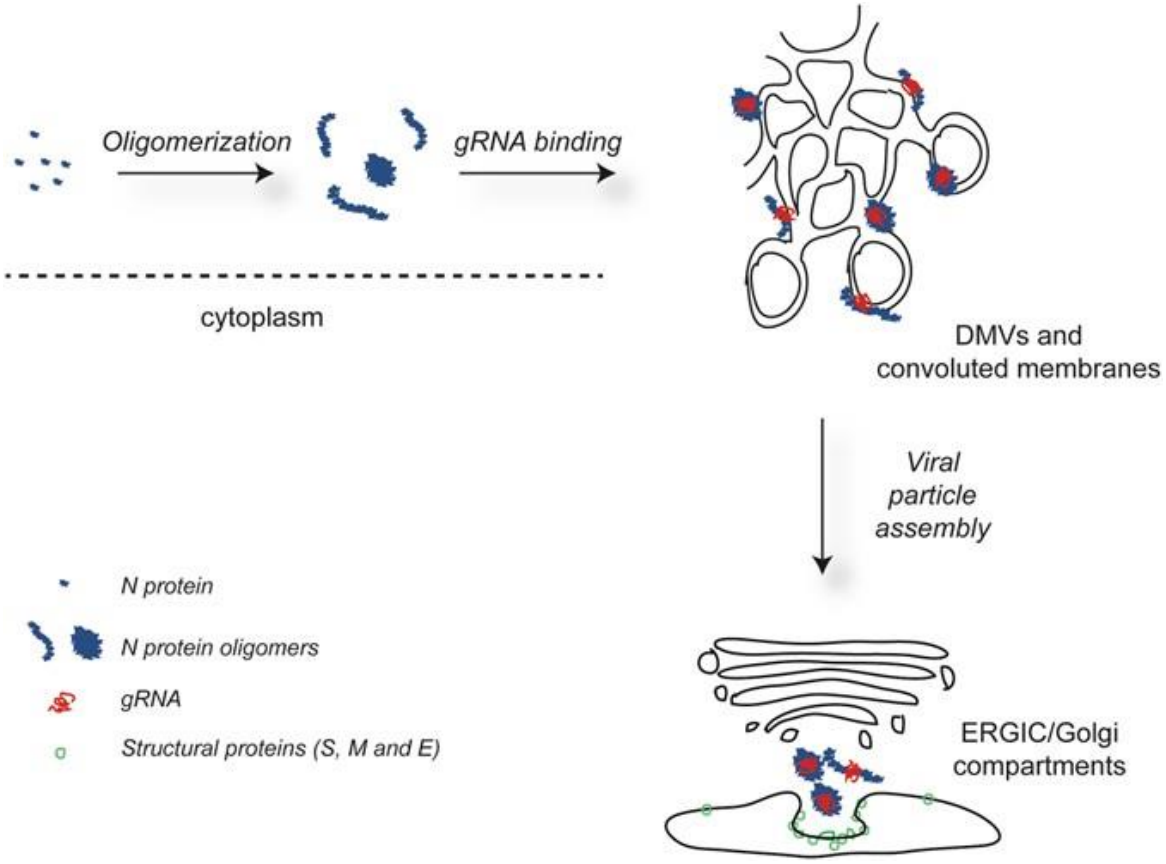
The Nucleocapsid Protein of the SARS Coronavirus: Structure, Function and Therapeutic Potential
22 July 2009
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7176212
https://dx.doi.org/10.1007%2F978-3-642-03683-5_9

Phosphoregulation of Phase Separation by the SARS-CoV-2 N Protein Suggests a Biophysical Basis for its Dual Functions
17 December 2020
https://www.cell.com/molecular-cell/pdf/S1097-2765(20)30803-0.pdf
https://doi.org/10.1016/j.molcel.2020.11.025

Crystal Structure of the Severe Acute Respiratory Syndrome (SARS) Coronavirus Nucleocapsid Protein Dimerization Domain Reveals Evolutionary Linkage between Corona- and Arteriviridae*
Received for publication, March 6, 2006, and in revised form, April 11, 2006 Pub
https://www.jbc.org/article/S0021-9258(20)55740-2/pdf
DOI 10.1074/jbc.M602107200

The Coronavirus Nucleocapsid Is a Multifunctional Protein
7 August 2014
https://www.mdpi.com/1999-4915/6/8/2991/htm
https://doi.org/10.3390/v6082991

Structure of the SARS coronavirus nucleocapsid protein RNA-binding dimerization domain suggests a mechanism for helical packaging of viral RNA.
2 March 2007
http://europepmc.org/article/med/17379242
http://doi.org/10.1016/j.jmb.2007.02.069
Coronavirus nucleocapsid proteins assemble constitutively in high molecular oligomers
18 July 2017 See Fig 5
https://www.nature.com/articles/s41598-017-06062-w

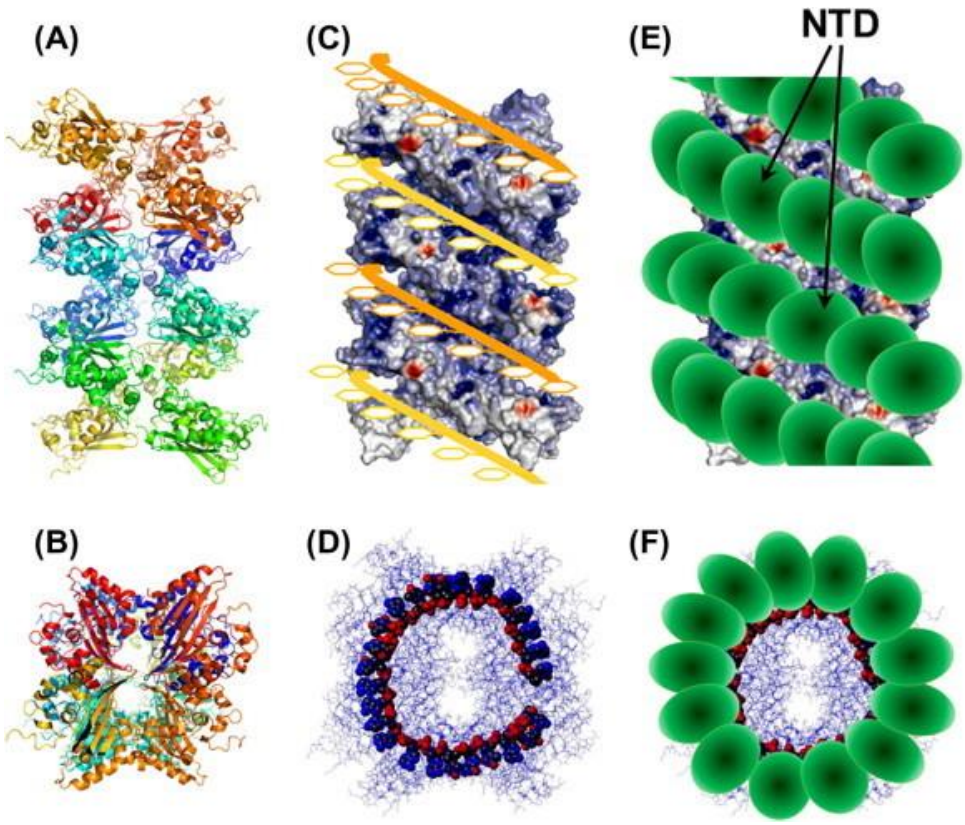


The SARS coronavirus nucleocapsid protein – Forms and functions

March 2014
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7113676
https://dx.doi.org/10.1016%2Fj.antiviral.2013.12.009

Abbreviations: CTD, the C-terminal domain of N protein (a.a. 248–365), DD, the di-domain comprising NTD, LKR and CTD (a.a. 45–365), HCoV, human coronavirus, IDP, intrinsically disordered protein, IDR, intrinsically disordered region, LKR, the linker region of SARS-CoV N protein (a.a. 182–247), N, nucleocapsid protein, NTD, the N-terminal domain of N protein (a.a. 45–181), MHV, mouse hepatitis virus, RMSD, root mean square deviation, RNP, ribonucleoprotein, SARS-CoV, severe acute respiratory syndrome coronavirus

Keywords: SARS, Coronavirus, Nucleocapsid protein, Capsid packaging, Intrinsic disorder, RNP



PMC full text:
Antiviral Res. 2014 Mar; 103: 39–50.
Published online 2014 Jan 11. doi: 10.1016/j.antiviral.2013.12.009

A proposed model of the SARS-CoV ribonucleocapsid protein. The crystal packing of a 24-mer CTD domain is shown in side view (A) and top view (B). The surface charge distribution of the SARS-CoV CTD 24-mer. (C) Top view of the model shows the docking of two RNA chains (orange and yellow ribbons) onto the 24-mer CTD structure. The CTD 24-mer is shown in surface charge representation. The RNA chains were modeled with the phosphate backbone (red spheres) facing inside the groove and bases (yellow rings) pointing outward. (D) Top view of the putative CTD–RNA complex. (E) Schematic of the docking of NTD onto the CTD 24–mer-RNA complex. The NTD domains are represented by ellipsoids.

High-resolution structure and biophysical characterization of the nucleocapsid phosphoprotein dimerization domain from the Covid-19 severe acute respiratory syndrome coronavirus 2

29 January 2021
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7532810
https://dx.doi.org/10.1016%2Fj.bbrc.2020.09.131

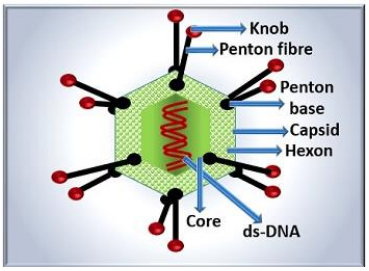
Structural insights into the mechanism of RNA recognition by the N-terminal RNA-binding domain of the SARS-CoV-2 nucleocapsid phosphoprotein
2020
https://www.sciencedirect.com/science/article/pii/S2001037020303597
https://doi.org/10.1016/j.csbj.2020.08.006

The Coronavirus Nucleocapsid Is a Multifunctional Protein
7 August 2014
https://www.mdpi.com/1999-4915/6/8/2991/pdf
doi:10.3390/v6082991

Phosphorylation of SARS-CoV-2 N protein affects its function
1 June 2020
https://www.news-medical.net/news/20200701/Phosphorylation-of-SARS-CoV-2-N-protein-affects-its-function.aspx
and see:
Phosphorylation modulates liquid-liquid phase separation of the SARS-CoV-2 N protein
https://www.biorxiv.org/content/10.1101/2020.06.28.176248v1.full
doi: https://doi.org/10.1101/2020.06.28.176248 and
Now published in *Molecular Cell* doi: 10.1016/j.molcel.2020.11.025

Addendum 7

Adenovirus Vaccines



For more detail see: **https://biologyreader.com/adenovirus.html**

Adenoviral Vector Vaccines for COVID-19: A New Hope?

21 December 2020
https://www.promegaconnections.com/covid-19-vaccines-adenoviral-vectors

Pros and Cons of Adenovirus-Based SARS-CoV-2 Vaccines

9 October 2020
https://www.cell.com/molecular-therapy-family/molecular-therapy/fulltext/S1525-0016(20)30536-0
https://doi.org/10.1016/j.ymthe.2020.10.002

Adenoviruses as vaccine vectors

14 December 2016
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7106330
https://dx.doi.org/10.1016%2Fj.ymthe.2004.07.013

How You Make an Adenovirus Vaccine

8 February 2021
https://blogs.sciencemag.org/pipeline/archives/2021/02/08/how-you-make-an-adenovirus-vaccine and see with graphic:

Adenoviral Vector-Based Vaccines and Gene Therapies: Current Status and Future Prospects

5 November 2018
https://www.intechopen.com/books/adenoviruses/adenoviral-vector-based-vaccines-and-gene-therapies-current-status-and-future-prospects
DOI: 10.5772/intechopen.79697

Chimpanzee-origin adenovirus vectors as vaccine carriers

1 December 2005
https://www.nature.com/articles/3302675
https://doi.org/10.1038/sj.gt.3302675

Vector-Based Vaccines Come to the Fore in the COVID-19 Pandemic

8 September 2020 (Anthony King, Dublin based scientist journalist)
https://www.the-scientist.com/news-opinion/vector-based-vaccines-come-to-the-fore-in-the-covid-19-pandemic-67915

Adenoviral vectors are the new COVID-19 vaccine front-runners. Can they overcome their checkered past?

12 May 2020
https://cen.acs.org/pharmaceuticals/vaccines/Adenoviral-vectors-new-COVID-19/98/i19

Is it the adenovirus vaccine technology, used by AstraZeneca and Johnson & Johnson, causing blood clots? There's no evidence yet
14 April 2021
https://theconversation.com/is-it-the-adenovirus-vaccine-technology-used-by-astrazeneca-and-johnson-and-johnson-causing-blood-clots-theres-no-evidence-yet-158944

What are viral vector-based vaccines and how could they be used against COVID-19?
https://www.gavi.org/vaccineswork/what-are-viral-vector-based-vaccines-and-how-could-they-be-used-against-covid-19

Explaining Johnson & Johnson's, AstraZeneca's new COVID-19 vaccines
2 March 2021
https://wexnermedical.osu.edu/blog/explaining-johnson-johnson-astrazeneca-vaccines

Repurposing Adenoviruses as Vectors for Vaccines
7 May 2019 (This article is from a commercial company)
https://thenativeantigencompany.com/repurposing-adenoviruses-as-vectors-for-vaccines

Challenges in Manufacturing Adenoviral Vectors for Global Vaccine Product Deployment
April 2014
https://www.bataviabiosciences.com/wp-content/uploads/2016/12/vellinga-2014.pdf
DOI: 10.1089/hum.2014.007

What Do We Really Know About Adenovirus Vectors for Vaccines? | MedPage Today
24 February 2021
What Do We Really Know About Adenovirus Vectors for Vaccines? | MedPage Today

What are Adenovirus-Based Vaccines?
10 March 2021
What are Adenovirus-Based Vaccines? (news-medical.net)

How does the Oxford & AstraZeneca COVID-19 vaccine work? A guide to viral vector vaccines (RSC)
30 December 2020
https://www.compoundchem.com/2020/12/30/viral-vector-vaccines

Inside CSL, where Australia's Oxford-AstraZeneca vaccines are being made
12 February 2021 (includes video)
https://www.abc.net.au/news/science/2021-02-12/covid-19-vaccine-oxford-astrazeneca-adenovirus-csl-manufacturing/13140104

Retargeting adenoviruses for therapeutic applications and vaccines
16 January 2020. Gigs 1 & 3 worth a look.
https://febs.onlinelibrary.wiley.com/doi/10.1002/1873-3468.13731
https://doi.org/10.1002/1873-3468.13731

Definition:
Summary of the Public Assessment Report for AstraZeneca COVID-19 Vaccine

https://www.gov.uk/government/publications/regulatory-approval-of-covid-19-vaccine-astrazeneca/summary-of-the-public-assessment-report-for-astrazeneca-covid-19-vaccine
15 April 2021
2.2 Active substance
rINN: not assigned
The active substance is a clear to slightly opalescent solution.

Structure

The active substance, ChAdOx1-S (recombinant), is a recombinant, replication-deficient (E1 and E3 deleted) chimpanzee adenovirus that encodes the SARS-CoV-2 spike protein with a tissue plasminogen activator (tPA) leader sequence.

Adenoviruses are non-encapsulated, icosahedral particles (virions) between 80 and 100 nm in diameter, with prominent fibres protruding from the 12 vertices. The viral capsid is composed of three major proteins (fibre, hexon and penton) with four minor proteins (IIIa, VI, VIII and IX). The particles contain a single copy of the double-stranded DNA genome. The manufacturer has provided the DNA sequence of the 35,539 bp ChAdOx1-S (recombinant) genome.

The expression cassette for the SARS-CoV-2 spike protein fused to the tPA leader uses a modified human cytomegalovirus (CMV) promoter and a bovine growth hormone polyadenylation sequence.

The nucleotide sequence of the SARS-CoV-2 spike protein fused to the tPA leader encoded by ChAdOx1-S (recombinant) have been provided by the manufacturer.

General properties

Adenoviruses such as ChAdOx1-S (recombinant) are non-encapsulated, icosahedral particles (virions) between 80 and 100 nm in diameter, with prominent fibres protruding from the 12 vertices. The particles contain a single copy of the double-stranded DNA genome (contains a transgene to express the SARS-CoV02 virus spike [S] protein).

Viral genome size

The active substance, ChAdOx1-S (recombinant), has a genome size of 35,539 base pairs (bp).

ChAdOx1-S (recombinant) is not the subject of a European Pharmacopoeia (Ph. Eur.) monograph.

Institute of Chemistry of Ireland as a Co-Owner Benefits when you publish in PCCP

Support our Institute by publishing your new research results in the prestigious peer reviewed journal.

Scope

PCCP (*Physical Chemistry Chemical Physics*) is an international journal for the publication of cutting-edge original work in physical chemistry, chemical physics and biophysical chemistry. To be suitable for publication in *PCCP*, articles must include significant new physical insights; this is the prime criterion that referees and the Editors will judge against when evaluating submissions.

The journal has a broad scope which includes spectroscopy, dynamics, kinetics, statistical mechanics, thermodynamics, electrochemistry, catalysis, surface science, quantum mechanics and theoretical developments play an important part in the journal. Interdisciplinary research areas such as polymers and soft matter, materials, nanoscience, surfaces/interfaces, and biophysical chemistry are especially welcomed whenever they include a physico-chemical approach.

PCCP is proud to be a Society journal and is co-owned by 19 national chemical societies. The journal is published by the Royal Society of Chemistry on a not-for-profit basis for the benefit of the whole scientific community.

Impact factor: 4.493*
Publishing frequency: 48 per year
Indexed in MEDLINE and Web of Science

http://pubs.rsc.org/en/journals/journalissues/cp#!recentarticles&adv

IDA IRELAND'S COVID-19 RESPONSE PLAN

COVID-19 (CORONAVIRUS) RESPONSE PLAN

IDA Ireland remains open for business virtually across the globe.

Our focus includes

1. **Engaging** with our 1500+ existing client companies at this time to support them in whatever way we can. Our Account Executives are reaching out to them regularly.

2. **Working** with colleagues across the Government system to plan for the next few weeks to ensure that companies can continue to operate in line with public health guidelines and in many cases provide critical products and services.

3. **Supporting** the Irish Heath Service Executive in all of their efforts, but particularly in securing the necessary supplies of medical equipment that our health system and citizens need.

IDA Ireland

Our Capabilities

We bring together innovative technologies and application expertise to help scientists and clinicians address daunting scientific challenges.

Product Innovations

Operetta CLS High-Content Analysis System

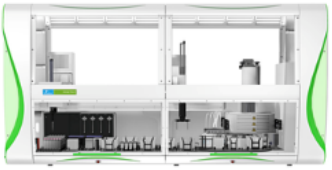
Uncover deep biological understanding in your everyday assays and innovative applications using the Operetta CLS™ high-content analysis system. Featuring a unique combination of technologies, the system delivers all the speed, sensitivity and resolution you need to reveal fine sub-cellula...

Learn More

NexION 2000 ICP Mass Spectrometer

PerkinElmer's NexION® 2000 is the most versatile ICP-MS on the market, featuring an array of unique technologies that combine to deliver the highest performance no matter what your analytical challenge.

Discover the effortless versatility of an instrument that makes it easy...



chemagic Prime Instrument

Automated Nucleic Acid Isolation and Assay Setup

The chemagic™ Prime™ Instrument is a fully automated solution offering hands-free sample transfer, DNA and RNA isolation, normalization (optional), and PCR setup for research applications. This validated, single suppli...

Learn More

PerkinElmer
Dublin, Ireland
C17 The Exchange Calmount Park
Ballymount
Dublin 12
Ireland
http://www.perkinelmer.com/ie
P: 1 800 932 886

https://www.idaireland.com

Takeda announces expansion of stem cell therapy production facility in Ireland

Takeda to invest €36.4 million in Grange Castle site to address growing global demand

Investment will create approximately 100 new jobs over the next three years

DUBLIN, Ireland February 16, 2021 - Takeda Ireland, a subsidiary of Takeda Pharmaceutical Company Ltd, today announced a €36 million investment in its Grange Castle facility. The investment will support the expansion of the company's cell therapy production facility and create approximately 100 new jobs over the next three years.

The commercial scale cell therapy production facility is the first of its kind in Ireland. Following the expansion, the team at Grange Castle will play an important role in supplying European, US and Canadian markets with a cell therapy treatment option for patients.

Commenting on the announcement **An Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar T.D.**, said "I'm really pleased Takeda Ireland is expanding in Grange Castle, creating 100 jobs over the next three years. Our highly skilled workforce is just one of the reasons why Ireland is recognised as a global hub for biopharmaceutical companies like Takeda. I wish them every success with their expansion plans."

Thomas Wozniewski, Takeda Global Manufacturing & Supply Officer, commented: "The investment to expand this state-of-the-art cell therapy production facility highlights the importance of cell therapy for Takeda. The expansion of the cell therapy manufacturing line in Grange Castle will help us to serve more patients worldwide, and it underlines our commitment to Ireland as a key country. With its advanced use of digital technologies, the cell therapy manufacturing lines in Grange Castle are a testimony to our innovation capabilities."

Paul Keogh, Grange Castle Site Head, commented: "Since beginning operations in 2007, the Grange Castle site has grown from strength to strength thanks to a great team and strong investment in our people and technology. The investment announced today further highlights Grange Castle as a trusted manufacturing site in the network and that's something we are very proud of."

CEO of IDA Ireland, Martin Shanahan said: "Takeda's continued investment at its Grange Castle facility and the creation of 100 additional highly skilled roles demonstrates a huge vote of confidence in Ireland and our strong value proposition. Cell therapy is a core pillar in the emerging field of Advanced Therapy Medicinal Products (ATMPs), widely considered as the next generation of pharmaceutical therapies. These products require highly innovate approaches to manufacturing and offer unparalleled opportunities in the treatment of disease. This investment is an important endorsement of Ireland's reputation as a global location of excellence for next generation biopharmaceutical products."

About Takeda Pharmaceutical Company Limited
Takeda Pharmaceutical Company Limited (TSE: 4502/NYSE: TAK) is a global, values-based, R&D-

driven biopharmaceutical leader headquartered in Japan, committed to discover and deliver life-transforming treatments, guided by our commitment to patients, our people and the planet. Takeda focuses its R&D efforts on four therapeutic areas: Oncology, Rare Genetic and Haematology, Neuroscience, and Gastroenterology (GI). We also make targeted R&D investments in Plasma-Derived Therapies and Vaccines. We are focusing on developing highly innovative medicines that contribute to making a difference in people's lives by advancing the frontier of new treatment options and leveraging our enhanced collaborative R&D engine and capabilities to create a robust, modality-diverse pipeline. Our employees are committed to improving quality of life for patients and to working with our partners in health care in approximately 80 countries. For more information, visit https://www.takeda.com/en-ie

IDA Ireland
Wilton Park House,
Wilton Place, Dublin 2
Tel: + 3531 603 4000
Email: idaireland@ida.ie

SIGMA-ALDRICH®

About Sigma-Aldrich: Sigma-Aldrich is a leading Life Science and High Technology company whose biochemical, organic chemical products, kits and services are used in scientific research, including genomic and proteomic research, biotechnology, pharmaceutical development, the diagnosis of disease and as key components in pharmaceutical, diagnostics and high technology manufacturing.

Sigma-Aldrich customers include more than 1.3 million scientists and technologists in life science companies, university and government institutions, hospitals and industry. The Company operates in 35 countries and has nearly 9,000 employees whose objective is to provide excellent service worldwide.

Sigma-Aldrich is committed to accelerating customer success through innovation and leadership in Life Science and High Technology.

For more information about Sigma-Aldrich, please visit its website at **www.sigma-aldrich.com**

Your local contact:

Andreina Moran
Account Manager
Sigma Aldrich Ireland Ltd

086 389 8647
andreina.moran@sial.com

IDA Ireland

https://www.idaireland.com

Driving Recovery & Sustainable Growth 2021-2024

The global environment in which Ireland competes for foreign direct investment is constantly changing. As part of its new strategy, IDA Ireland plans to partner with clients for future growth through 170 RD&I and 130 training investments, to embrace the opportunities of a green recovery with 60 sustainability investments and to target a 20pc increase in client expenditure in Ireland to maximise FDI impact.

READ MOR

IDA Ireland
Wilton Park House,
Wilton Place, Dublin 2
Tel: + 3531 603 4000
Email: idaireland@ida.ie

https://www.idaireland.com

Takeda announces expansion of stem cell therapy production facility in Ireland

Takeda to invest €36.4 million in Grange Castle site to address growing global demand

Investment will create approximately 100 new jobs over the next three years

DUBLIN, Ireland February 16, 2021 - Takeda Ireland, a subsidiary of Takeda Pharmaceutical Company Ltd, today announced a €36 million investment in its Grange Castle facility. The investment will support the expansion of the company's cell therapy production facility and create approximately 100 new jobs over the next three years.

The commercial scale cell therapy production facility is the first of its kind in Ireland. Following the expansion, the team at Grange Castle will play an important role in supplying European, US and Canadian markets with a cell therapy treatment option for patients.

Commenting on the announcement **An Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar T.D.**, said "I'm really pleased Takeda Ireland is expanding in Grange Castle, creating 100 jobs over the next three years. Our highly skilled workforce is just one of the reasons why Ireland is recognised as a global hub for biopharmaceutical companies like Takeda. I wish them every success with their expansion plans."

Thomas Wozniewski, Takeda Global Manufacturing & Supply Officer, commented: "The investment to expand this state-of-the-art cell therapy production facility highlights the importance of cell therapy for Takeda. The expansion of the cell therapy manufacturing line in Grange Castle will help us to serve more patients worldwide, and it underlines our commitment to Ireland as a key country. With its advanced use of digital technologies, the cell therapy manufacturing lines in Grange Castle are a testimony to our innovation capabilities."

Paul Keogh, Grange Castle Site Head, commented: "Since beginning operations in 2007, the Grange Castle site has grown from strength to strength thanks to a great team and strong investment in our people and technology. The investment announced today further highlights Grange Castle as a trusted manufacturing site in the network and that's something we are very proud of."

CEO of IDA Ireland, Martin Shanahan said: "Takeda's continued investment at its Grange Castle facility and the creation of 100 additional highly skilled roles demonstrates a huge vote of confidence in Ireland and our strong value proposition. Cell therapy is a core pillar in the emerging field of Advanced Therapy Medicinal Products (ATMPs), widely considered as the next generation of pharmaceutical therapies. These products require highly innovate approaches to manufacturing and offer unparalleled opportunities in the treatment of disease. This investment is an important endorsement of Ireland's reputation as a global location of excellence for next generation biopharmaceutical products."

About Takeda Pharmaceutical Company Limited
Takeda Pharmaceutical Company Limited (TSE: 4502/NYSE: TAK) is a global, values-based, R&D-driven biopharmaceutical leader headquartered in Japan, committed to discover and deliver life-

transforming treatments, guided by our commitment to patients, our people and the planet. Takeda focuses its R&D efforts on four therapeutic areas: Oncology, Rare Genetic and Haematology, Neuroscience, and Gastroenterology (GI). We also make targeted R&D investments in Plasma-Derived Therapies and Vaccines. We are focusing on developing highly innovative medicines that contribute to making a difference in people's lives by advancing the frontier of new treatment options and leveraging our enhanced collaborative R&D engine and capabilities to create a robust, modality-diverse pipeline. Our employees are committed to improving quality of life for patients and to working with our partners in health care in approximately 80 countries. For more information, visit https://www.takeda.com/en-ie

IDA Ireland
Wilton Park House,
Wilton Place, Dublin 2
Tel: + 3531 603 4000
Email: idaireland@ida.ie

https://www.idaireland.com

SGS International Services Laboratory officially begins operating in Ringaskiddy following recent acquisition of ISL

8 April 2021

Following the recent acquisition from Novartis, International Service Laboratory (ISL) is now **SGS International Services Laboratory.**

SGS International Services Laboratory is central to the SGS Global strategy for the Health & Nutrition sector and is now a significant component of the organisation's global laboratories network. All of the 103 highly skilled employees from ISL have transferred to SGS. It has also been announced that Yvonne Dunne, Head of International Service Laboratory, has been appointed to the newly created position of Health & Nutrition Business Manager - Ireland.

Eugene Kirwan, Managing Director of SGS Ireland said: *"Today is a very significant milestone for the Group and we're very excited about welcoming the new team onboard. The facility is an important step in expanding our local and global Health & Nutrition Business. We believe Ireland represents a strategic global development hub for the sector and the Ringaskiddy site is an important addition to our global network of GMP (Good Manufacturing Practice) approved laboratories".*

Leo Clancy Head of CCBS at IDA Ireland *said: "Today's announcement by SGS adds significantly to its already successful Irish operations. This new investment strengthens the established Life Sciences cluster located in the South West Region and secures an important capability for the sector in Ireland. I wish the team every success with this expansion."*

SGS has committed to investing in the Ringaskiddy site, particularly in the areas of IT and innovation in analytical techniques. Part of the SGS existing local Health & Nutrition Global Services team presently based in Ireland will re-locate to the site including some of the Global Commercial team associates to help expand existing services to new clients, develop new services and other roles in Health & Nutrition for the site.

According to newly appointed **SGS Health & Nutrition Business Manager Ireland, Yvonne**

Dunne, there is strong talent in Ireland, making the Cork base ideal for SGS to grow its Health and Nutrition offering. *"There is a unique pharma cluster in Ireland, and in particular in Cork, with great collaboration and innovation. And through supports from Government and IDA, Ireland has developed a strong national research and third level eco-system, with 30% of students going into STEM. So, we believe there is huge potential for the sector in the country."*

SGS Ireland currently employs over 300 people in Ireland. With 38 locations nationwide, the company provides its specialist services across a wide range of sectors. The company's head office is at Millennium Park in Naas, Co. Kildare. SGS also operates a Customer Service Centre in Galway with over 60 staff delivering a range of services on behalf of key Government bodies and commercial clients in Ireland and abroad.

IDA Ireland
Wilton Park House,
Wilton Place, Dublin 2
Tel: + 3531 603 4000
Email: idaireland@ida.ie

IDA Ireland

https://www.idaireland.com

PRESS RELEASE 28 APR 2021

PPD to Expand GMP Lab in Ireland to Enhance Biopharmaceutical Testing Capabilities

WILMINGTON, N.C. (April 28, 2021) – **PPD, Inc.** (Nasdaq: PPD), a leading global contract research organisation, is expanding its Athlone, Ireland, GMP (good manufacturing practices) laboratory, significantly increasing the size of its current facility and adding cell and gene therapy testing to the operation's portfolio of services.

The expansion enhances PPD's ability to deliver global scientific and technical expertise to meet growing customer demand in Europe, the Middle East and Africa, and the Asia-Pacific region. By offering these services at its Athlone operation, PPD can provide clients in these locations with the same services already available in the U.S. through its Middleton, Wisconsin, GMP lab.

"Our enlarged operations will enhance our capabilities in leading technologies related to biopharmaceutical testing and speciality testing for biologics and small molecules," said **Christopher Fikry, M.D., Executive Vice President of PPD® Laboratories.** *"This expansion will enable PPD to provide customers with additional services aimed at reducing time to market for new drug products in important areas such as cell and gene therapies. We are thankful our expansion has been welcomed and supported by the Irish Government and IDA Ireland, and we're confident these new developments will benefit our customers."*

The Athlone GMP lab provides fully integrated analytical services across all phases of pharmaceutical development and commercialisation, helping clients fulfil regulatory requirements for release testing and qualified person (QP) services for clinical and marketed pharmaceuticals, including small and large molecules, inhaled products, and cell and gene therapies.

The current 4,460 sq. meter (48,000 sq. foot) operation will grow to 7,710 sq. meters (83,000 sq. feet) upon completion of the project, which is expected to be fully functional by mid-2022 and is projected to create 180 new jobs over the next three years. The current operation employs nearly 300 highly skilled scientists and project managers who support the demand for PPD's services, which includes testing to support the development of novel and advanced pharmaceuticals and therapies.

Tánaiste and Minister for Enterprise Trade and Employment Leo Varadkar TD said: *"I'm really pleased that PPD is continuing to invest in its Athlone operations in an expansion that will create 180 jobs over three years and significantly add to the capabilities of the company's current facility. This is a really positive development for Athlone and the Midlands Region."*

***Minister* of State at the Department of Enterprise, Trade and Employment with responsibility for Trade Promotion Robert Troy TD** said*: "I am delighted to see PPD announce plans to expand its presence in Athlone. This is a significant expansion, which will result in the creation of 180 jobs for highly skilled scientists. This announcement demonstrates that Athlone and the Midlands region have the skills, talent, people and connectivity that will enable companies like PPD to embed and grow their operations here. Regional job creation is a key priority of this Government and we will be working to secure further*

investment for all regions in the months and years ahead."

***CEO of IDA Ireland Martin Shanahan** added: "Today's announcement by PPD demonstrates the company's commitment to Ireland and indeed the Midlands Region where it has been in operation for more than 10 years. It will allow the company to avail itself of the rich talent pool that exists in the Midlands and will provide an economic and employment boost to the local and wider Midlands region. We wish PPD continued success."*

In addition to the lab in Athlone, PPD Laboratories includes GMP labs in Middleton, Wisconsin; bioanalytical labs in Middleton and Richmond, Virginia; central labs in Shanghai, China, Brussels, Belgium, Highland Heights, Kentucky, and Singapore; biomarker labs in Highland Heights and Richmond; a vaccine sciences lab in Richmond; and a multipurpose bioanalytical, biomarker and vaccine sciences lab that is nearing completion in Suzhou, China.

END

About PPD

PPD is a leading global contract research organization providing comprehensive, integrated drug development, laboratory and lifecycle management services. Our customers include pharmaceutical, biotechnology, medical device, academic and government organizations. With offices in 47 countries and more than 27,000 professionals worldwide, PPD applies innovative technologies, therapeutic expertise and a firm commitment to quality to help customers bend the cost and time curve of drug development and optimize value in delivering life-changing therapies to improve health. For more information, visit www.ppd.com.

IDA Ireland
Wilton Park House,
Wilton Place, Dublin 2
Tel: + 3531 603 4000
Email: idaireland@ida.ie

https://enterprise-ireland.com/en

Tánaiste announces €48 million invested in start-ups by Enterprise Ireland in 2020

23 February

L-R: Kevin Sherry, Executive Director, Enterprise Ireland; Tánaiste Leo Varadkar TD and Jenny Melia, Divisional Manager, High Potential Start-Ups, Enterprise Ireland

- **125 new start-ups supported in 2020**
- **Enterprise Ireland more than doubles its investment in start-up companies to €48 million in 2020**
- **50% of new start-ups located outside of Dublin**

Tánaiste and Minister for Enterprise, Trade and Employment Leo Varadkar TD has announced that Enterprise Ireland, the government agency responsible for the development and growth of Irish companies in global markets, invested more than €48 million in Irish start-ups in 2020 and supported a total of 125 new start-up companies.

Investment was provided through Enterprise Ireland's High Potential Start-Up (HPSU) and Competitive Start Fund (CSF) programmes.

While the total number of start-ups supported last year almost matched 2019 figures (127 in 2019), the 2020 levels of investment in innovative High Potential Start-Ups was boosted by the Covid-19 Sustaining Enterprise Fund and an increase in follow-on investments to help HPSUs scale internationally.

The investment of more than €48 million is the highest level of funding that Enterprise Ireland has awarded to early stage companies.

Key sectors that Enterprise Ireland invested in in 2020 included fintech, cybersecurity, digital health and agri-tech, with half of the start-ups based outside Dublin. In addition, 38 women-led start-up companies were funded – a key focus of Enterprise Ireland's Women in Business Action Plan.

Leo Varadkar, Tánaiste and Minister for Enterprise, Trade and Employment said: *"I have nothing but admiration for the many entrepreneurs across the country who have been brave enough to start up new businesses during the pandemic. It's been an incredibly difficult year. I have seen countless examples all across the country of business owners overcoming adversity and demonstrating the kind of ingenuity, adaptability and resilience that entrepreneurs are known for.*

"The Government invested more than €48 million directly into start-up companies last year. This allowed us to support 125 new businesses, all of which are aimed at the global market. Congratulations to the teams behind each one of them. You are the job creators of the future and you will all have a really important part to play in Ireland's recovery. The Government will continue to help those starting up on their own, with funding, training and networking opportunities."

Kevin Sherry, Executive Director, Enterprise Ireland commented: *"A strong start-up economy is absolutely vital to the future of Ireland and scaling and growing the export and start-up base is one of Enterprise Ireland's strategic priorities. In what has been an incredibly challenging time for all businesses, it is really important to recognise 125 of Ireland's most exciting new start-up companies with ambitious growth plans. Start-ups are a powerful driver of economic growth, new talent and innovation.*

"Now, more than ever, we need to be innovative and carve out more niches in international markets where business can thrive. Despite the impact of Covid-19, 2020 was another successful year for Irish start-ups, with growth noted in the life sciences and ICT sectors. We are also seeing new opportunities for ambitious entrepreneurs and start-ups in the green economy as well as doing business in a post-pandemic environment."

Start-ups supported by Enterprise Ireland in 2020 include:

- 80 High Potential Start-Up (HPSU) investments - start-up businesses with the potential to create 10 jobs and €1 million in sales within three to four years of starting up.
- 45 Competitive Start Fund (CSF) investments, which inject critical early-stage funding into new businesses.
- 50% of the new start-ups are located outside of Dublin.
- 38 women-led start-up companies were approved investment.
- 12 HPSUs were successfully commercialised in partnership with 3rd level research institutions.
- 44 additional HPSUs received follow-on investment funding as their businesses scaled.

Jenny Melia, Divisional Manager, High Potential Start-Ups, Enterprise Ireland added: *"In Enterprise Ireland, we have always been committed to helping founders to start and grow their businesses internationally and in 2020, we also focused on supporting these businesses as they navigated their way through the pandemic.*

"For the second year running, 38 of the businesses supported were founded by women. Since 2011, the percentage of HPSUs founded by women has grown from 7% to almost 24% in 2020, marking the continuation of this trend, which underpins the Enterprise Ireland Action Plan for Women in Business.

"The Action Plan, which was launched last year, aims to increase the participation of women in entrepreneurship and business leadership. The class of 2020 are great role models for new founders and we look forward to working closely with them to help fulfil their potential and to create strong and sustainable export businesses."

The Enterprise Ireland Start-Up Showcase will be broadcast virtually on Wednesday 24th February with one-to-one virtual investor meetings scheduled to take place following the event.

The virtual event will feature a keynote address from Des Traynor, CSO, Intercom and panel discussions featuring Nicky Deasy, Managing Partner, Yield Lab; Brian Shields, CEO, Neurent Medical; James Ives, CEO, XOCEAN; Helen McBreen, Investment Director, Atlantic Bridge; Conor O'Loughlin, CEO, Glofox and Alan Coleman, CEO, Sweepr.

Register for Start-Up Showcase 2021 and find more information here.

ENDS

For more information, contact:

Conor O'Donovan

Head of Communications

Enterprise Ireland

Conor O'Donovan

+353 87 9671342

Brigid Burke

Press and Media Relations

Enterprise Ireland

Brigid Burke

+353 87 1803995

https://enterprise-ireland.com/en

Tánaiste launches Enterprise Ireland's €1m Competitive Start Fund

10 February

Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar TD, has invited entrepreneurs to apply for Enterprise Ireland's €1m Competitive Start Fund (CSF) which is now open for applications from ambitious founders of early stage start-ups.

Early-stage companies from all sectors with an eligible innovative product or service set for global markets are encouraged to enter the competition. Successful projects can secure up to €50,000 in equity funding.

Applications are especially welcome from eligible companies that offer new services or solutions to address the challenges and opportunities relating to Climate Action with an emphasis on decarbonisation.

The fund will close to applications at **3pm on Tuesday, 2nd March 2021.**

The CSF aims to increase the number of diverse High Potential Start-Ups (HPSUs) that have global potential and the ambition to succeed internationally. The fund is designed to help start-ups achieve key commercial and technical milestones which includes evaluating overseas market opportunities, building prototypes, developing market entry plans and securing third party investment.

Commenting on the announcement, Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar TD said: "A funding boost at the very early stages of starting up a business is always really welcome. Up to €50,000 is available for successful projects under this Fund, giving those companies an important kick-start. These are the employers of the future. The Government is committed to nurturing entrepreneurs at every stage of their business development, whether that's through investments, like this one, or networking and mentoring opportunities."

Manager of Enterprise Ireland's High Potential Start-Up Division, Jenny Melia added: "Enterprise Ireland's ongoing work with start-ups and entrepreneurs is always exciting and offers a sneak preview of what's possible for the future. Throughout the Covid-19 pandemic and post-Brexit, Irish entrepreneurs have continued to be inspired and continue to progress plans to take advantage of potential opportunities to develop an export-led business. Through funding and expert advice, the Competitive Start Fund is designed to help them turn those innovative ideas into profitable companies with global market potential.

"We're looking for innovative solutions and development plans from entrepreneurs across multiple sectors in manufacturing and internationally traded services. We're very interested in projects that will drive the digital and green economy where market opportunities continue to emerge and grow.
"If you are an ambitious entrepreneur or entrepreneurial team at the start of your journey developing an eligible product or service, the Competitive Start Fund can really help you to take your business to the next level and I would strongly encourage you to apply."

Previous CSF winner, Deirdre Lyons, is the Founder and CEO of Examfly which develops online learning tools for professional exams incorporating proven techniques from EdTech and Education Psychology.

“Ideas on their own only have a limited value; you need the business apparatus to wrap around the idea, and that requires focus, time and help,” she said.

“Support through Enterprise Ireland’s CSF was a real turning point for the company as it allowed us to refine the product and gave us the time to research and develop the market. Within six to eight months we had a major client signed up and will be launching our platform with a second client this month.”

A number of CSF application-support workshops will be held online by the National BICs over the coming weeks. Details of these workshops as well as the Competitive Start Fund application form and eligibility criteria, can be accessed on the Enterprise Ireland website here.

ENDS

Notes to editor:

Individual entrepreneurs, early stage companies or prospective businesses must be active in the Manufacturing & Internationally Traded Services sectors, including the following subsectors: Agtech, Cleantech, Consumer Products, e-Health, Enterprise Software, Fintech, Food, Games, Industrial Products, Lifesciences, Manufacturing, Medical Technologies & Devices, Mobile, Renewables, SAAS / Digital Technologies, Engineering / Electronics, Green Technologies / Climate Change Solutions, Deeptech, Internet of Things (IOT), Artificial Reality (AR) / Virtual Reality (VR), Data Intelligence, Quantum Computing.

For further information, please contact:

Brigid Burke

Press & Media Relations

Enterprise Ireland

Brigid Burke

087 1803995

https://enterprise-ireland.com/en

Commissioner Gabriel and Minister Harris launch €95 billion European Research and Innovation Programme

25th March 2021

Horizon Europe - The EU Research & Innovation Programme 2021-2027

European Commissioner for Innovation, Research, Culture, Education and Youth Mariya Gabriel and Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris, TD have today (Thursday) launched the European Union's new research and investment programme, Horizon Europe.

Horizon Europe will be the biggest programme ever undertaken in Europe. The new multidisciplinary programme will run until 2027 and will be backed by a budget of over €95 billion.

It will have three key pillars; Science of Excellence, Global Challenges and European Industrial Competitiveness and Innovative Europe.

Pillar two also includes Research Missions, in five key areas:

- Cancer;
- Adaptation to climate change including societal transformation;
- Climate-neutral and smart cities;
- Soil health and food;
- Healthy oceans, seas, coastal and inland waters

According to Commissioner Gabriel *"Horizon Europe will allow researchers, scientists and innovators to lead a more green, digital and inclusive recovery. With Ireland being a strong innovator, I am confident that its top talents will continue to participate with great success and help deliver new knowledge and solutions for a sustainable future."*

Speaking at the launch today Minister Harris said, *"As we navigate our way through this global pandemic, science and research have been the forefront of the response.*

"Today, we launch a significant investment in research across Europe to ensure societies and economies are ready for the challenges of today and tomorrow. The mission areas for research include cancer, climate-neutral & smart cities and adaption to climate change and social transformation under this €95 billion programme

"We want Irish innovators, researchers and entrepreneurs to be at the centre of this programme and to fulfil their research and innovation ambitions, scale their companies, and support a green recovery.

"We secured more than €1 billion in support for research and innovation over the lifetime of Horizon 2020. I look forward to supporting our researchers and innovators to compete and continue to succeed under Horizon Europe."

Enterprise Ireland coordinates the cross governmental network of National Contacts Points for Horizon Europe.

Speaking at the launch event Garrett Murray, the National Director for Horizon Europe at Enterprise Ireland said, *"To build on our success in Horizon 2020, where over 2,700 Irish entities were involved in grant agreements, Enterprise Ireland encourages all Irish researchers, innovators and newcomers across all disciplines to look at the opportunities under the new Programme and to contact their National Contact Points in Enterprise Ireland and across the Horizon Europe national support network for information, funding, guidance and expert support in evaluating opportunities, and making applications. That we have over 2000 people registered to attend the launch event is a really exciting start to Ireland's Horizon Europe journey".*

Ends.

For more information on the Horizon Europe programme visit http://horizoneurope.ie/

For details of previous Irish success stories visit Success Stories - Horizon Europe

ENDS

For information contact

Paul Daly

Press Office

Enterprise Ireland

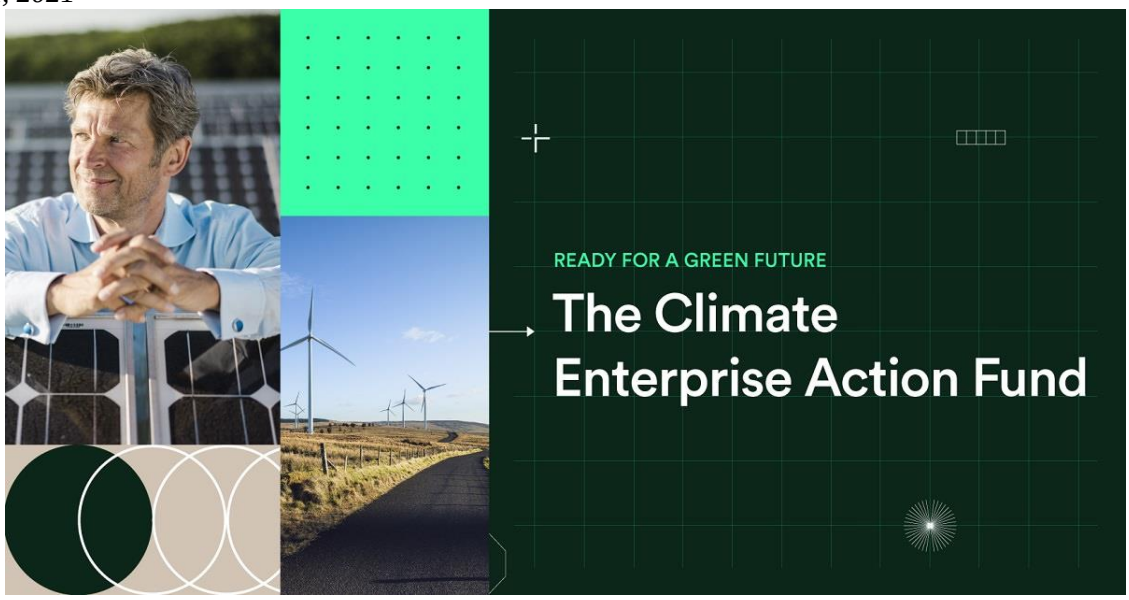
Paul Daly

+353 87 2235187

https://enterprise-ireland.com/en

Tánaiste & Minister Ryan Launch New Climate Fund to Help Businesses Adapt

15th April, 2021



The Climate Enterprise Action Fund

€10m Climate Enterprise Action Fund will help companies reduce emissions & embed sustainability in how they work

An Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar T.D. and the Minister for Environment, Climate and Communications and Minister for Transport Eamon Ryan T.D. today launched the Climate Enterprise Action Fund with an initial allocation of €10m.

The Fund, which will be administered by Enterprise Ireland, will help businesses take action to drive down their emissions and embed sustainability in how they work.

An Tánaiste Leo Varadkar T.D. said:

"The road to recovery after the pandemic must be a sustainable one. We must break the link between economic prosperity and fossil fuels and fully embrace the transition to a low-carbon economy. The enterprise sector accounts for just over 13% of the economy's total emissions so all businesses will have a part to play in achieving the 7% per year, on average, emissions reduction that the Government has committed to over the next decade.

"With our new Climate law, Ireland is now one of the most ambitious countries in the world on climate. I think this presents significant opportunities for Irish businesses, whether that be in the huge expansion of entire industries, such as retrofitting or offshore wind, by becoming an electricity exporter, or new jobs in cleantech. Those that act first, will see the greatest reward.

"This Fund is about helping companies, no matter where they are on their journey towards sustainability, to put a plan in place. We hope these companies become exemplars of best practice in their respective fields, so that others can learn from their experience and see what works. Some of this Fund will also be

channelled into high impact feasibility projects, to explore new ways of working which could ultimately have a really significant impact across Irish enterprise as a whole."

The new fund will:

- Fund up to 850 companies at an early stage of exploring climate and sustainability to develop a high-level company action plan, which will enable them to measure their carbon footprint and identify projects leading to reduced emissions and greater resource efficiency (e.g. energy, water, materials). The plan will assess the company's operations, supply chain, market opportunities and challenges through a climate and sustainability lens.
- Fund up to 100 more advanced companies to develop comprehensive multi-annual business plans with climate change and sustainability actions integrated into the company's overall strategy.
- The fund will also support a small number of public/private partnerships working on high-impact feasibility projects that will enhance climate change and sustainability capabilities across Irish enterprise (e.g. R&D, new ways of working)

Minister Eamon Ryan T.D. said:

"The government has recently published the Climate Bill which commits Ireland to halving our greenhouse gases by 2030 and reaching net zero by 2050. There is now a huge opportunity for Irish business to reap the financial and reputational benefits of being early adopters when it comes to climate action.

"The Enterprise sector will have a key role to play; not only can it take action to reduce its own emissions, it can influence the entire economy by driving innovation in other sectors such as transport, housing, energy and agriculture.

"I would encourage companies to access the fund announced today, along with other supports for businesses such as the EXEED fund from the SEAI. I welcome Enterprise Ireland taking such a proactive approach and I am confident they will help Irish business become leaders in this field."

Julie Sinnamon, CEO of Enterprise Ireland said:

"Supporting Irish companies to reduce their carbon footprint and capitalise on opportunities emerging from the low-carbon transition is a key strategic priority for Enterprise Ireland. As Irish businesses continue to adapt to the evolving Covid-19 pandemic and prepare for getting back on the road to recovery , we need to also build resilience and ensure Irish companies have the capabilities in place to meet the challenges of climate change. Substantial changes are required across the enterprise sector to meet national and EU emissions targets, increasing regulation, changing consumer and buyer preferences. Increasing customer demand for sustainable and innovative products and services will also provide more Irish businesses with opportunities. The new €10m Climate Enterprise Action Fund will help a wide range of businesses to accelerate their planning or take the first step to compete and grow in a low-carbon future.

"Enterprise Ireland recently launched a new international 'Ready for a Green Future' campaign. The campaign promotes Irish innovators and businesses which are delivering sustainable solutions to tackle climate change."

For more details see https://globalambition.ie/climate-enterprise-action-fund/

For more information, please contact:

Paul Daly Press & Media Relations, Enterprise Ireland, Paul Daly

+353 (0) 87 22 35 187

https://enterprise-ireland.com/en

Government announce €95m for ground-breaking projects under Disruptive Technologies Fund

22nd April 2021

Government invests in disruptive technologies in areas such as healthcare, food, factory safety, construction, industrial heating systems and maritime

The Tánaiste and Minister for Enterprise, Trade and Employment, Leo Varadkar T.D., the Minister for Minister for Further and Higher Education, Research, Innovation and Science, Simon Harris T.D. and the Minister of State for Trade Promotion, Digital and Company Regulation Robert Troy T.D. today announced that 29 exciting new projects have succeeded in securing funding under the third round of the Disruptive Technologies Innovation Fund.

The Government is investing €95 million in the successful projects over the next three years. The 29 ground-breaking projects cover areas such as life sciences, medical devices, ICT, artificial intelligence, manufacturing and environmental sustainability.

The projects include sub-sea robotic drilling, artificial intelligence for safety in factories of the future, more effective heating and cooling systems in commercial and industrial businesses, a platform to improve productivity on construction sites, and healthcare solutions in areas such as cancer treatments and chronic knee osteoarthritis.

Announcing the successful projects today, the Tánaiste said:

"The pandemic and Brexit have combined to bring unprecedented economic challenges and volatility to our enterprise sector. But with every challenge comes new opportunities and the Disruptive Technologies Innovation Fund is dedicated to entrepreneurs and researchers working on some really exciting ideas to develop solutions to the problems we face.

"We are funding projects which will have wide-ranging benefits across many areas of society. Projects using AI to make factories safer and drones to detect drug smuggling, for example. There are many successful projects in the health sector, which we hope will result in better patient outcomes for thousands suffering from cancer, heart disease and fractured bones among other conditions. There is also focus on sustainability, with a number of projects looking at ways to improve and reduce energy use.

"These new technologies will create high-quality jobs in existing and emerging sectors, now and over the coming decades. There is a good spread of partners, based all around Ireland, highlighting the strength of our enterprise and research base all across the country.

"The level of DTIF funding involved – at €95million – demonstrates our commitment to continue to invest and rebuild a stronger, more resilient economy after the pandemic."

All projects involve collaborations of between three and eight partners, including SMEs, multinational corporations and research organisations. SME participation is an integral part of the Fund, with 62 SMEs among the 111 organisations involved and 22 leading their project.

The funding announced today brings the total funding awarded under the three DTIF Calls to date to €235m. The Fund, established under the National Development Plan in 2018, commits a total of €500 million of government funding, alongside enterprise co-funding of projects.

Among the successful projects are those that will:

- Develop an adhesive that will stick broken bone tissue together following fracture, allowing it to heal faster
- Use artificial intelligence to develop drones to better detect drug smuggling
- Develop a tool using artificial intelligence to identify breast and prostate cancer patients with early stage disease
- Design and build a prototype robotic drilling system for a wide range of applications including offshore wind
- Use artificial intelligence to trial a solution which will make factories safer for workers
- Use nanotechnology to reduce emissions by 40% in commercial and industrial heating and cooling systems
- Develop next generation therapeutic and gene therapies for gastrointestinal cancer
- Develop a treatment for chronic knee osteoarthritis, to deliver dramatic pain and mobility benefits to patients

Simon Harris T.D., Minister for Further and Higher Education, Research, Innovation and Science also welcomed the DTIF funding:

"The Irish research sector is key to our future economic prospects. Many top-performing indigenous companies have emerged as spin-outs from the research conducted in our universities and higher education institutes. Several recent spin-outs are partners in the consortia that are being awarded funding under the Disruptive Technologies Innovation Fund today. This is in addition to the 37 HE-based partners in those projects. That is a fantastic outcome which reflects the strength of the Irish research sector.

DTIF is an important tool for realising our ambitions as a global innovation leader and a location for research excellence. The level of investment being made today in cutting-edge technologies will create employment opportunities for our graduates and help to maintain Ireland as an attractive destination for top research talent."

Robert Troy T.D., Minister of State for Trade Promotion, Digital and Company Regulation, said:

"The Disruptive Technologies Innovation Fund is a vital tool for financing excellent disruptive and innovative projects and is exactly the kind of fund that Ireland needs right now as we navigate the new normal and embrace the opportunities and challenges that disruptive technologies bring to our workplaces and homes.

"The 29 projects represent the innovativeness of companies across Ireland, from Clare to Dublin and Cork to Westmeath, coming together to bring new levels of digitalisation to a diverse range of industries, such as agriculture, healthcare, construction and more. As a small nation with limited resources, we must work together to maximise the opportunities from the investment in our enterprise sector and research institutions.

"This funding will give the companies involved opportunities to grow their business, even when trading in increasingly competitive markets, through the development of innovative products and services that alter the way that the industry operates."

Julie Sinnamon, CEO, Enterprise Ireland, who administer the Disruptive Technologies Innovation Fund, said:

"Irish entrepreneurs have yet again demonstrated their ingenuity, adaptability and resilience in the face of the challenges they face. The breadth and scale of the projects that have come through the rigorous DTIF evaluation process is a huge tribute to the quality of our innovative companies and the other partners involved.

"The quality of the partnerships involved, with SMEs, multinationals and research organisations combining to share experience, expertise and knowledge, also deserves acknowledgement. We are a small nation with limited resources and so we must continually demonstrate our flexibility and agility. These projects will enable the enterprises involved to be in strong position as the Irish and global economies rebound once the pandemic ends."

A total of 62 applications were received under this third call of the Fund. The eligible projects went through a rigorous and competitive evaluation process involving screening and interview by panels of international experts.

Further details are available on the Department's website.

ENDS

For further information contact

Enterprise Ireland Press Office

https://enterprise-ireland.com/en

Start-up founders to benefit from Enterprise Ireland's new 'Start In Ireland' portal

29th April 2021

Pictured L-R: Kevin Sherry, Executive Director, Global Business Development, Enterprise Ireland and Jenny Melia, Divisional Manager, High Potential Start-Ups, Enterprise Ireland

Online resource provides a one-stop-shop for start-up entrepreneurs

Enterprise Ireland has today announced the launch of 'Start In Ireland', a single online repository of information for all things relating to the Irish start-up landscape.

The new online portal simplifies the process of finding relevant start-up information and provides a pathway through a detailed list of supports available to people who want to start or grow their early-stage businesses. Available on desktop and mobile, users can easily refine their search results to identify suitable supports for their business needs.

Ireland's support for entrepreneurship continues to grow and our thriving start-up community is underpinned by a multitude of relevant supports and events, including start-up 'office hours' for first-time founders, pre-accelerators, accelerators, competitions, hackathons and more.

Commenting on the announcement, Jenny Melia, Divisional Manager, High Potential Start-Ups, Enterprise Ireland said, *"Enterprise Ireland works closely with start-up businesses from the very early-stages of development. While there is a wide range of information available from multiple sources on how to set up your business and the supports available, it can be challenging to find the right information at the right time.*

"So, we are delighted to launch Enterprise Ireland's 'Start In Ireland' portal after an extensive and collaborative development process with industry and stakeholders. We believe that this portal solves a real problem for potential, new and existing start-ups. By offering a one-stop-shop, start-ups can easily access information about the vast array of supports on offer throughout the country."

Updated by industry, the portal can be accessed via Enterprise Ireland sites:

https://globalambition.ie/startinireland/%20 and

https://globalambition.ie/startinireland/ and https://www.enterprise-ireland.com/en/startinireland/.

Enterprise Ireland is also in discussions with industry stakeholders to host the portal on their own sites to ensure the widest access possible.

ENDS

For more information:

Brigid Burke

Press and Media Relations

Enterprise Ireland

Brigid Burke

+087 180 3995

siliconrepublic

UCC researchers leading €3.5m project to turn waste heat into electricity

12 February 2021

The EU-funded project could provide a major breakthrough in sustainable energy.

A project led by researchers at University College Cork (UCC) has received €3.5m in EU funding to develop a revolutionary way of converting waste heat into electricity.

The Translate project will involve scientists from Ireland, Germany, Latvia and Spain.

Building on advances in nanochemistry and materials science, UCC's Prof Justin Holmes and the research team aim to construct a device that can harvest and store waste heat produced by power generators, factories and domestic heating systems.

To continue reading this article by Sarah Harford go to:

https://www.siliconrepublic.com/innovation/ucc-researchers-waste-heat-electricity

Sarah Harford is sub-editor of Silicon Republic

editorial@siliconrepublic.com

siliconrepublic

‘Multiferroic materials have potential to revolutionise data storage capacity’

3 February 2021

Dr Lynette Keeney, senior researcher at Tyndall National Institute. Image: Clare Keogh

Dr Lynette Keeney at Tyndall National Institute is leading research into ground-breaking materials that are bringing us closer to next-generation data storage.

In 2015 and again in 2020, Dr Lynette Keeney was awarded prestigious University Research Fellowship Awards from the Royal Society and Science Foundation Ireland (SFI) for her research project, ‘Memories are made of this’.

Memory, in Keeney’s research, is made of multiferroics. These are materials that exhibit multiple primary ferroic properties in the same phase. These properties include ferromagnetism (magnetisation that is switchable by an applied magnetic field), ferroelectricity (electric polarisation that is switchable by an applied electric field) and ferroelasticity (a deformation that is switchable by an applied stress).

For Keeney, the focus is on the combined properties of magnetism and electric polarisation, because of the possible applications in data storage. These materials are rare, but in 2013, Keeney made a research breakthrough by developing a multiferroic material that operates at room temperature.

To continue reading this article go to:

‘Multiferroic materials have potential to revolutionise data storage capacity’ (siliconrepublic.com)

siliconrepublic

Kinetic Labs launches rentable lab space in Waterford city

16 February 2021

The new Kinetic Labs incubator offers 400 sq m of wet lab space for both start-ups and established life science companies.

Late last year, Enterprise Ireland announced regional funding for manufacturing in the mid-west and life sciences research in the south-east. One of the projects supported was Kinetic Labs, which is officially launching today (16 February) to support science-based companies in Waterford city.

According to its founders, Kinetic Labs is Ireland's first private 'rent a lab' space. Start-ups and larger companies can rent the facility's 400 sq m of wet lab space, office amenities, meeting rooms and café. Some of the wet lab space is furnished for smaller start-ups, with other areas left unfurnished for established companies.

Alongside the Enterprise Ireland grant, the facility is funded by WorkLab and Waterford City and County Council. One of its directors, ….

Continue to read the article by Lisa Ardill:-

Kinetic Labs launches rentable lab space in Waterford city (siliconrepublic.com)

Lisa Ardill is careers editor at Silicon Republic
editorial@siliconrepublic.com

siliconrepublic

13 Irish people shaping science and technology on the world stage

18 March

Ireland's international influence is apparent in the number of Irish people taking leading positions in science and technology around the world.

To mark St Patrick's Day, we at Silicon Republic are shining a spotlight on Ireland's influencers in science and technology around the world.

These 13 innovators have vital roles in shaping the future of science, technology, business and society. Ireland has produced people who are influencing international health and transforming financial services. We are driving innovation in space travel and semiconductors. And, while wearing the green jersey, Irish people are taking up key roles in driving us towards a sustainable future…..

To read the full article go to:

10 innovative Irish companies steering us towards a green future (siliconrepublic.com)

Elaine Burke is the editor of Silicon Republic

editorial@siliconrepublic.com

siliconrepublic

10 innovative Irish companies steering us towards a green future

19 March

Enterprise Ireland has launched a new campaign spotlighting companies from Ireland that are scoring sustainability goals.

This week, as the world turned green for St Patrick's Day, Tánaiste Leo Varadkar, TD, launched an international green innovation campaign from Enterprise Ireland.

Taking the opportunity of the national holiday to showcase Ireland's green innovators and the contribution they make around the world, Varadkar said: "Climate action is, after all, an enormous business opportunity.

"As the world emerges from Covid-19, we need to understand that there will be no return to the old normal. We'll need to build back better and prioritise the sustainable investments that underpin a global green recovery and the transition to low-carbon economies."

T read more go to:-

10 innovative Irish companies steering us towards a green future (siliconrepublic.com)

Elaine Burke is the editor of Silicon Republic

editorial@siliconrepublic.com

This article first appeared on www.siliconrepublic.com

siliconrepublic

€95bn Horizon Europe funding programme launches in Ireland

Horizon Europe, the largest ever funding instrument for research and innovation in Europe, has officially launched in Ireland.

This is the ninth framework programme for research and innovation from the EU and directly follows Horizon 2020, which began in 2014.

With a budget of €95.5bn, Horizon Europe will run from 2021 to 2027. The overarching goals of the programme are to strengthen science and technology in the European Union, boost the region's capacity and competitiveness in innovation, and deliver research projects that serve the EU's priorities.

Last month also saw the launch of the European Innovation Council (EIC), which is part of the Horizon Europe initiative. More than €10bn has been allocated to the EIC, which will support research into emerging tech with an accelerator programme and a dedicated equity fund for innovative start-ups and SMEs.

For the rest of this article go to link below:

Elaine Burke is the editor of Silicon Republic
editorial@siliconrepublic.com

This article first appeared on www.siliconrepublic.com and can be found at:

www.siliconrepublic.com and can be found at:
www.siliconrepublic.com/innovation/horizon-europe-ireland-launch

siliconrepublic

All scientists can learn from seeing the world at the nanoscale

21 April 2021

Bernal Institute's Dr Andy Stewart wants every scientist to be able to understand materials from the molecules up.

Dr Andy Stewart's academic career has taken him from the University of Glasgow, where he completed his PhD, to Cornell, Stony Brook, Oxford, Mainz and, now, University of Limerick.

At the Bernal Institute, University of Limerick has gathered together a multidisciplinary team of world-leading materials scientists and engineers, with Stewart among them.

Stewart's research is pushing the limits of our understanding of the structure of materials down to the nanometre through the development of x-ray and electron diffraction, and scattering techniques. His goal? To automate the use of electron microscopes so that any researcher can benefit from a nanoscale worldview.

To continue reading this article go to:

All scientists can learn from seeing the world at the nanoscale (siliconrepublic.com)

This article first appeared on www.siliconrepublic.com and can be found at:

siliconrepublic

Four researchers in Ireland win grants from €500m ERC fund

22 April 2021

The European Research Council awarded grants to more than 200 researchers across Europe as part of its 2020 Advanced Grants competition.

Four Ireland-based researchers are among the winners of the latest grant competition from the European Research Council, worth more than €500m.

The 2020 Advanced Grants competition awarded a total of 209 leading researchers across Europe with funding that will allow them to advance their work.

Winning research includes studies on the links between obesity and pancreatic cancer, threats from wildlife viruses, brain-inspired neural network computer chips, and new ways for architects to design the buildings of the future.

To continue reading this article go to:

Four researchers in Ireland win grants from €500m ERC fund (siliconrepublic.com)

This article by

Jenny Darmody is the deputy editor of Silicon Republic

editorial@siliconrepublic.com

siliconrepublic

Irish universities among the world's 'best for sustainability'

22 April 2021

University College Cork came eighth overall in this year's Impact Rankings of sustainable universities.

Universities in Ireland are among the best in the world when it comes to sustainability.

That's according to the 2021 Impact Rankings from Times Higher Education, which looked at how more than 1,000 universities from 94 countries have contributed to sustainability under the United Nations' Sustainable Development Goals (SDGs).

University College Cork (UCC) secured a top 10 spot in the overall rankings, coming in eighth place behind universities in the UK, Australia, Canada and Denmark.

UCC was ranked highly in the responsible consumption and production category, which measured universities' research on responsible consumption and their approach to the sustainable use of resources.

To continue reading go to

Irish universities among the world's 'best for sustainability' (siliconrepublic.com)

This article by

Sarah Harford is sub-editor of Silicon Republic

editorial@siliconrepublic.com

siliconrepublic

Irish scientists create graphene sensor for wearable medical devices

A team at Trinity College Dublin is currently exploring medical applications for its flexible graphene-based sensor.

Graphene has been hailed as a ‘wonder material’ as it is incredibly strong, but also light and flexible.

Now, scientists in Ireland are making use of these properties with a development that could have applications in the areas of wearable electronics and medical diagnostic devices.

Researchers at Trinity College Dublin’s School of Physics and at AMBER, the Science Foundation Ireland research centre for advanced materials, have developed a next-generation graphene-based sensing technology.

The team is led by nanoscientist Prof Jonathan Coleman, who is head of the School of Physics at Trinity. Coleman’s team has previously created nanocomposites of graphene with polymers including those found in rubber bands and silly putty.

To continue reading this article go to

Irish scientists create graphene sensor for wearable medical devices (siliconrepublic.com)

This article by

Sarah Harford is sub-editor of Silicon Republic

editorial@siliconrepublic.com

Advion


Advion
Mass Spectrometry for Chemists
Reaction Monitoring &
Compound Identification
in 30 seconds
Direct mass analysis
of solid and liquid
samples – ASAP®
Direct mass analysis
from TLC-plates –
Plate Express™
expression
Advion
For more Information:
info@advion.com
www.advion.com

Industry and Business
Promoting Manufacturing Excellence

MANUFACTURING & SUPPLY CHAIN

National Manufacturing & Supply Chain Conference & Exhibition 12 – 13 May 2021

Join us at the 2021 National Manufacturing Conference & Exhibition on the 12 – 13 of May to hear from an impressive line-up of manufacturing leaders, academics and government agencies who will engage in a stimulating blend of keynote addresses and debates.

Creating an Innovative Manufacturing & Supply chain Ecosystem

Companies invited to attend include:

Johnson & Johnson, Standard Brands, Intel, Dell Products, Pfizer, Smurfit Packaging, Kerry Group, Boston Scientific, Forest Laboratories, Glanbia, Gilead Sciences, Glen Dimplex, Astellas Ireland, Irish Dairy Board, Swords Laboratories, Kellogg Europe, Benex, Aryzta, Dawn Meats, Genzyme Ireland, Irish Food Processors, Abbott Ireland, Atlantic Industries, Pepsi-Cola, , Diageo, Elan, Medtronic Vasvular, Glaxosmithkline, Irish Distillers, Eli Lilly, Fyffes, Lakeland Dairies, Green Isle Foods, Allergan, Bausch & Lomb, Baxter Healthcare, Thermo King, KCI Medical Resources, Phardiag, Greencore, Teleflex Medical,

Rosderra Meats, Merck Millipore, McDermott Laboratories, GE Healthcare, Cadburys, Connacht Gold, Danone Baby Nutrition, Liffey Meats, Monaghan Mushrooms, Takeda Ireland, Helsinn Birex, Recordati, Cook Ireland, Teva Pharmaceutical, Henkel Ireland, Fair Oak Foods, Stiefel Laboratories, C&D Foods, Carbery Milk Products, Leo Pharmaceuticals, Project Management, Shire Pharmaceuticals, Tibotec Pharmaceuticals, Vetpharm International, Renishaw Ireland, Proctor & Gamble, Creganna, FMC International, Donegal Meat Processors, AllTech, Novartis, Rottapharm, Barclay Chemicals, Cognis Ireland, HJ Heinze, Becton Dickenson, ABB, Bimedia, Connaught Electronics, Zimmer Orthopaedics, Lake Region Manufacturing, Sanofi Aventis Ireland, Pinewood Laboratories, Clonmel Healthcare, Merit Medical and many more….

New approaches and technology have been introduced in recent years that have created significant organisational and process improvements. The aim of the conference is to showcase such innovative approaches and to disseminate the cutting-edge research that underpins them.

The conference will be of interest to senior management, established practicing engineers and researchers together with those that are much earlier in their careers.

Delegates have registered from leading food, pharmaceutical, medical, chemical, electronics and engineering manufacturing sectors.

Manufacturing on this island of Ireland has some of the best people, products, brands and innovation. We deserve nothing less than the best business environment to chart a new economic course to growth. But government needs to set the climate and conditions to allow this to happen.

Manufacturers small and large from across the country will gather to challenge political decision makers to deliver a business environment which manufacturing deserves. Delegates attending the conference will:

– gain industry insights to help their business plan ahead
– share good practice and learn from each other’s experience
– connected with senior business leaders to find new business opportunities
– meet with key technology providers in the dedicated exhibition area

Procurement, Lean Manufacturing, Control & Automation, Supply Chain Optimisation, Information Technology Logistics, Energy Management, Facilities Management Sustainability, Project Management, Health & Safety Warehouse Management, Materials Handling & Robotics

Register Now

To book your FREE place at the event

http://www.manufacturingevent.com/delegates

Industry and Business
Promoting Manufacturing Excellence

MANUFACTURING & SUPPLY CHAIN

Manufacturing and Supply Chain Awards, January 29th 2020 Citywest Hotel.

WINNERS ANNOUNCED

BOSTON SCIENTIFIC CORK & ITS

Boston Scientific is a multinational company with manufacturing sites all over the world. Its base in cork is home to over 1200 employees and a centre of excellence in automation. This boasts a wide variety of technologies completing a large array of manufacturing tasks from simple pick and place applications to complex vision pick and intricate assembly processes. Boston Scientific has once again collaborated with ITS an Irish based automation company in Middleton to develop an application fit for use in the manufacturing line which also pushes the known boundaries of what is considered a collaborative cell.

Ctrl click

INDUSTRY RESEARCH PARTNERSHIP OF THE YEAR
CONTRACT MANUFACTURER OF THE YEAR
HEALTH & SAFETY PROJECT OF THE YEAR
SUSTAINABLE MANUFACTURER OF THE YEAR SPONSORED BY A.I.B
BEST SUPPLY CHAIN INNOVATION SPONSORED BY RHENUS LOGISTICS
CONTRIBUTION TO THE INDUSTRY AWARD
ENGINEERING MANUFACTURING TEAM OF THE YEAR SPONSORED BY FESTO
ICT MANUFACTURING TEAM OF THE YEAR
LIFESCIENCES MANUFACTURING TEAM OF THE YEAR SPONSORED BY BDO
SMART FACTORY MANUFACTURER OF THE YEAR
BEST TRAINING & DEVELOPMENT PROGRAM
MICRO/SME MANUFACTURING COMPANY OF THE YEAR SPONSORED BY BANK OF IRELAND
LARGE MANUFACTURING COMPANY OF THE YEAR
GRAN PRIX IMR MANUFACTURER OF THE YEAR
OUTSTANDING CONTRIBUTION TO THE INDUSTRY
PRODUCT INNOVATION & DESIGN SPONSORED BY GS1
LEAN MANUFACTURING COMPANY OF THE YEAR SPONSORED BY SA PARTNERS

Industry and Business
Promoting Manufacturing Excellence

MANUFACTURING & SUPPLY CHAIN

Awards 2021

Watch out for:

Visit: https://www.awards.manufacturingevent.com