

June
2021

समाचार पत्रों से चयित अंश Newspapers Clippings

A Daily service to keep DRDO Fraternity abreast with DRDO Technologies, Defence Technologies, Defence Policies, International Relations and Science & Technology

खंड : 46 अंक : 113 10 जून 2021

Vol.: 46 Issue : 113 10 June 2021



रक्षा विज्ञान पुस्तकालय
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Thu, 10 June 2021

Understanding the 'Sub Text': A deep dive into India's Rs 43,000 Crore Project 75-I

The Make in India project to build six conventional submarines was cleared by the Centre's Defence Acquisition Council after staying stuck for over two decades.

It took 21 years. And there was a palpable sense of relief in the Indian Navy headquarters as the central government's Defence Acquisition Council cleared the procurement of six conventional submarines. They will be built under Project 75-I. 'I' for India because it is one of the biggest defence projects to be approved under the Make in India banner. The biggest criteria to build the P75-I submarines is that they should have the capability to stay underwater for over two weeks with cutting-edge air-independent propulsion. Our current submarines, most 25 years old, have the endurance to stay submerged only for a few days. The strength of a submarine is its stealth. The quieter it is, the longer it can sustain itself underwater unseen by the enemy, the better it is. This batch of six will cost around Rs 43,000 crore. When ready, these submarines will have the capability to carry 18 land-attack cruise missiles and heavy-duty torpedoes.



Representational image

How it started

In 1999, right after the Kargil War, the need was felt to strengthen India's underwater force. The Cabinet Committee on Security under Prime Minister Atal Bihari Vajpayee approved a 30-year plan to build submarines: 24 of them by 2030. They were to be conventional submarines. For eight years, things didn't move. In 2000, under PM Dr Manmohan Singh, this particular project was approved. But, for the next 12 years again, it was put on the back burner. In 2019, the Narendra Modi government approved the acceptance for necessity. The first submarine of Project 75-I will be delivered only by 2031.

What types of submarines is India getting?

The initial 1999 plan was to build 24 conventional submarines. Which means submarines that are propelled by electricity and diesel. But there has been a bit of a change now. Of the 24, six will now be nuclear submarines. Such a vessel is powered by a nuclear reactor. This gives it two big advantages over conventional submarines. First, unlike conventional subs, they don't need to surface frequently to breathe. And second, the power generated by nuclear reactors gives them the freedom of limitless voyage at high speeds. Conventional submarines on the other hand run on batteries that have to be topped up periodically. This means the boat has to become indiscreet by rising to periscope depth and extend its snort mast above water to ingest air. This snorkelling exposes them to all kinds of threats. But conventional submarines have their advantages as well.

They are much cheaper than nuclear submarines. Since their hull is smaller they manoeuvre well in shallow waters and make for good deterrence in their littoral zone.

Countries like the United States, United Kingdom and France have moved completely to nuclear submarines, but most other countries have structured their navies to include both.

Not enough subs

India has 15 conventional submarines and one nuclear sub. Out of them, 12 are really old. At 25, they should ideally be on their way out. At any given point, only half are operational. The Indian Navy recently inducted three of the six French-origin Scorpene submarines that have been made under Project 75, which is the predecessor to P75-I. On the day the announcement on P75-I came, the nation also bid goodbye to INS Chakra, the nuclear-powered attack submarine or SSN that was on a 10-year lease from Russia. We are left with a solitary nuclear-powered and nuclear-armed submarine, also called SSBN: the made-in-India INS Arihant. The second SSBN, INS Arighat, is to be commissioned later this year. INS Chakra's replacement from Russia will arrive on Indian shores only by 2025.

Rising 'C' level

China already has the world's largest navy: 350 warships, 50 conventional submarines, and 10 nuclear submarines. The plan is to reach a force level of 450 by the end of the decade. The world has seen Beijing's aggression in the South China Sea. The Indian Ocean region is next. Already Chinese warships and submarines are being spotted in the region fairly regularly. China is also helping Pakistan build its naval muscle. Under a \$7 billion deal, Islamabad is on track to get eight Yuan-class submarines and four multi-role frigates from China.

The timeline

The process of awarding the contract is complex and will take at least two years. The navy will roll out the RFP, i.e., request for proposal, this month. This marks the beginning of the tendering process. Then the two bidders, Larsen and Toubro and Mazagon Dock Shipbuilders Limited, will select their foreign collaborator out of the five that the Government of India has already picked. After that, a techno-commercial proposal will be thrashed out. Then both MDL and L&T will submit their final bids to the defence ministry. Both bids will be evaluated. The pair with the lowest bid will be awarded the contract. That is two years gone. Then add another eight years for construction. So the first submarine under P75-I is at least 10 years away.

Strategic partnership and Make in India

The clearance for P75-I is a landmark for two reasons. First, it is the largest under the Make in India banner. And second, this is the first project that has been cleared under the strategic partnership model. A strategic partnership essentially is a roadmap to give major military contracts to the private sector and break the monopoly of the public sector. It means that an Indian manufacturer will collaborate with a foreign company with expertise in making a particular defence platform. They will set up production facilities in India and manufacture the platform here. The idea is to cut the country's dependence on imports and ensure greater self-reliance. Just for perspective, India is the second-biggest arms importer in the world after Saudi Arabia. In the P75-I project, the first five submarines will be 45 per cent indigenous and the sixth will have to have 60 per cent Indian content.

The unexplained

So why has India not been able to design and build its own submarines? After all, India inducted its first sub some 50 years ago. And the navy has an in-house design bureau called the Submarine Design Group to do precisely that. In the last three decades, India has spent billions of dollars for transfer of technology (ToT) every time it bought submarines from Germany, Russia and France. ToT means that India has the blueprint to build the submarines on its own. Why has this ToT not been put to good use is a matter of conjecture.

<https://www.news18.com/news/india/understanding-the-sub-text-a-deep-dive-into-indias-rs-43000-crore-project-75-i-3826502.html>

The Tribune

Thu, 10 June 2021

Delayed by Covid, HAL jet deliveries to start from July

By Ajai Banerjee

New Delhi: Amid the Covid gloom, public sector giant Hindustan Aeronautics Limited (HAL) too has had to slow down the production of helicopters and fighter jets like Tejas.

The Chairman-cum-Managing Director of the HAL, R Madhavan, in a telephonic chat with The Tribune, said over the past three months, a delay in production had been witnessed as many of the suppliers weren't able to deliver raw material on time. "But things are normalising now," he said, hopeful of ensuring timely deliveries from July in case there was no third wave.

Owned by the Ministry of Defence, the HAL, headquartered in Bengaluru, is looking to work overtime and is hopeful of stabilising production lines to cover up for the lost man-days.

On the production of a batch of 20 Tejas jets called the 'Final Operational Clearance' version, Madhavan said, "We have to produce 10 more of these, which will be done this fiscal."

Separately, four jets are ready and IAF pilots will soon be coming to Bengaluru to fly these away from the Tejas facility. He said the production of trainers, part of 83 jets ordered for the Tejas Mark1-A version, would commence next year (2022-23 fiscal).

About the Advanced Medium Combat Aircraft (AMCA), Madhavan said, "We have to decide how we produce the jet after freezing (finalising) its design. We want to bring in private Indian partners for the production."

On helicopter business, he said the order for 15 light combat helicopter (tested extensively in war-like conditions in Ladakh last summer) "should have come in by now". Pending the order, the HAL is producing five to seven LCH this year. The government has specified the need for 150 such machines.

About the light utility helicopter (LUH), Madhavan said, "We plan to have the first delivery in August 2022 to mark 75 years of Independence."

On making the bigger 10-12 tonne helicopter called the Indian Multi-Role Helicopter (IMRH), he said, "The wind tunnel tests are yet to be conducted. The Army and the IAF are on board and the Navy has also given its requirements. The version will be created on the same platform."

<https://www.tribuneindia.com/news/nation/delayed-by-covid-hal-jet-deliveries-to-start-from-july-266052>



R Madhavan, HAL Chairman

“

R Madhavan, HAL Chairman

'Will work overtime'

Many of our suppliers weren't able to deliver raw material on time. But things are normalising now

”

Thu, 10 June 2021

IIT Roorkee professor's and alumni team up to win DRDO's innovation contest

The aim of the contest was also to realise the goal of Aatmanirbhar Bharat as promoted by Prime Minister Narendra Modi, according to DRDO

A professor at IIT Roorkee and a start-up, led by founders from the college, have won an all India innovation-based contest that was organised by DRDO, the institute said in a statement on Wednesday.

Defence Research and Development Organisation (DRDO) conducted the contest, Dare to Dream 2.0, in the memory of former president APJ Abdul Kalam to identify novel ideas and technologies with the potential to help defence forces and to fulfill aerospace needs.

The aim of the contest was also to realise the goal of Aatmanirbhar Bharat as promoted by Prime Minister Narendra Modi, according to DRDO. Professor Sudipta Sarkar, who won the competition in the domain of 'Eco-friendly Explosive Waste Management', proposed a novel process to remediate waste and waste water, containing Trinitrotoluene (TNT), using innocuous and inexpensive chemicals and microbes, which requires minimal or no net energy.

I am delighted with this accomplishment of Prof Sudipta Sarkar and the Log9 (start-up) team. Their success vividly illustrates the pursuit of excellence by IIT Roorkee," IIT Roorkee Director Ajit Kumar Chaturvedi said.

<https://www.edexlive.com/news/2021/jun/09/iit-roorkee-professor-alumni-win-drdo-innovation-contest-21538.html>



IIT Roorkee| Pic: iitr.ac.in

आईआईटी प्रोफेसर, स्टार्टअप ने डीआरडीओ प्रतियोगिता जीती

देहरादून: भारतीय प्रौद्योगिकी संस्थान (आईआईटी) रुड़की के प्रोफेसर सुदीप्ता सरकार और प्रतिष्ठित संस्थान में विकसित स्टार्टअप 'लॉग 9 मटेरियल्स' को अपने-अपने क्षेत्रों में 'डेयर टू ड्रीम 2.0 इनोवेशन कंटेस्ट' में विजेता घोषित किया गया है।

इसका आयोजन रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने रक्षा और एयरोस्पेस क्षेत्र में नवीन विचारों और प्रौद्योगिकियों की पहचान और प्रोत्साहन के लिए पूर्व राष्ट्रपति डॉ एपीजे अब्दुल कलाम की स्मृति में प्रधानमंत्री नरेंद्र मोदी के स्वप्न 'आत्मनिर्भर भारत' के लक्ष्य को साकार करने के लिए किया था।

पर्यावरण इंजीनियरिंग विशेषज्ञ प्रोफेसर सुदीप्ता सरकार को 'इको-फ्रेंडली एक्सप्लोसिव वेस्ट मैनेजमेंट' में प्रस्तुत "हाइब्रिड अनएरोबिक रिएक्टर एंड माइक्रोबियल फ्यूल सेल फॉर एन्हांस्ड बायोडिग्रेडेशन एंड एनर्जी हार्वेस्टिंग फ्रॉम वेस्टवाटर कंटेनिंग टीएनटी-एचएनएमएफसी' नामक प्रविष्टि के लिए विजेता घोषित किया गया।

लॉग 9 मटेरियल्स साइंस प्राइवेट लिमिटेड ने "डेयर 2 ड्रीम 2.0" नवाचार प्रतियोगिता में आग से बचाने वाली सामग्री और प्रौद्योगिकी विकसित करने के लिए द्वितीय पुरस्कार जीता।

आईआईटी रुड़की के निदेशक प्रो. अजीत कुमार चतुर्वेदी ने खुशी जाहिर करते हुए कहा, "मैं प्रो. सुदीप्ता सरकार और लॉग9 टीम की इस उपलब्धि से प्रसन्न हूँ। उनकी सफलता स्पष्ट रूप से आईआईटी रुड़की द्वारा उत्कृष्टता की खोज को दर्शाती है।"

प्रोफेसर सरकार ने कहा, "मैं प्रतियोगिता में विजेता घोषित होने पर सम्मानित महसूस कर रहा हूँ। मैं अपने काम के माध्यम से संस्था और अपने राष्ट्र की सेवा करने का प्रयास करता रहूंगा।"

<https://navbharattimes.indiatimes.com/state/uttarakhand/dehradun/iit-professor-startup-wins-drdo-competition/articleshow/83378793.cms>

COVID 19: DRDO's Contribution



Press Information Bureau
Government of India

Ministry of Science & Technology

Wed, 09 June 2021 2:23PM

CSIR-IICT licenses process know how for synthesis of 2-Deoxy-D-Glucose to Lee Pharma Ltd.

Indian Institute of Chemical Technology, (IICT), a constituent laboratory of CSIR and Lee Pharma, an integrated pharmaceutical company, based in Hyderabad have entered into a non-exclusive licensing agreement for the synthesis of 2-Deoxy-D-Glucose (2-DG). Recently, 2-DG developed by DRDO and Dr Reddy's Laboratories has received approval for use in Covid-19 patients. It has been found to help speed up recovery and reduce oxygen dependence and Dr. Reddy's Laboratories has launched the drug in the form of sachets.

Lee Pharma informed that they would file the application for getting the approval from DCGI, New Delhi. Lee Pharma will manufacture and commercialize the 2-DG sachets from their formulation facility located at SEZ, Duvvada, Visakhapatnam, Andhra Pradesh, which has the accreditations, by global regulatory agencies.

Dr. Srivari Chandrashekar, Director CSIR-IICT highlighted that "There is role of CSIR in development of 2-DG, as CSIR-CCMB tested the drug on SARS-CoV-2 viral cultures. CSIR has been engaged in development of drugs for treatment of Covid-19 and has undertaken many clinical trials for repurposed drugs. Additionally, this agreement with Lee Pharma Ltd. is towards increasing affordable therapeutic options for treatment of Covid-19".

Raghumitra Alla, Director, Lee Pharma said, "This collaboration with CSIR-IICT for 2-DG, API is part of our broader strategy for enhancing Covid-19 treatment options. Further CSIR-IICT, Hyderabad is well-known for its high quality research & development of various new molecules and we feel proud to be associated with them."

<https://pib.gov.in/PressReleasePage.aspx?PRID=1725576>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 01 June 2021 5:02PM

सीएसआईआर-आईआईसीटी ने 2-डीऑक्सि-डी-ग्लूकोज के संश्लेषण के लिए ली फार्मा लिमिटेड को प्रक्रिया जानकारी का लाइसेंस दिया

सीएसआईआर की अंगीभूत प्रयोगशाला इंडियन इंस्टीट्यूट ऑफ केमिकल टेक्नोलॉजी (आईआईसीटी) और हैदराबाद की एकीकृत दवा कंपनी ली फार्मा ने 2-डीऑक्सि-डी-ग्लूकोज के संश्लेषण के लिए गैर-विशिष्ट लाइसेंसिंग समझौता किया है। डीआरडीओ तथा डॉ. रेड्डीज लेबोरेटरीज द्वारा विकसित 2-डीजी को कोविड-19 रोगियों में इस्तेमाल के लिए हाल ही में अनुमति मिली है। इसे कोविड-19 पीड़ितों के तेजी से ठीक होने में उपयोगी पाया गया है और और डॉ. रेड्डीज लेबोरेटरीज ने इस दवा को सैशे में लांच किया है।

ली फार्मा ने बताया है कि वह डीसीजीआई, नई दिल्ली से मंजूरी के लिए आवेदन करेगी। ली फार्मा आंध्र प्रदेश स्थित अपनी फॉर्मूलेशन सुविधा एसईजेड, डुववडा, विशाखापत्तनम में इसे बनाएगी और इसका व्यावसायीकरण करेगी। यह फॉर्मूलेशन सुविधा वैश्विक नियामक एजेंसियों से मान्य है।

सीएसआईआर-आईआईसीटी के निदेशक डॉ. श्रीवरी चंद्रशेखर ने कहा कि 2-डीजी को विकसित करने में सीएसआईआर की भूमिका रही है क्योंकि सीएसआईआर-सीसीएमबी ने सार्स-सीओवी-2 विषाणु कल्चर पर इस दवा का परीक्षण किया है। सीएसआईआर कोविड-19 के इलाज के लिए दवाओं के विकास में शामिल रही है। सीएसआईआर कोविड-19 के उपचार के लिए औषधियों के विकास में लगी हुई है और उसने पुनःउद्देश्य के लिए अनेक नैदानिक परीक्षण किए हैं। इसके अतिरिक्त ली फार्मा लिमिटेड के साथ यह समझौता कोविड-19 के उपचार के लिए सस्ती चिकित्सीय विकल्पों को बढ़ाने की दिशा में है।

ली फार्मा के निदेशक रघुमित्र अल्ला ने कहा कि 2-डीजी, एपीआई के लिए सीएसआईआर-आईआईसीटी के साथ यह सहयोग कोविड-19 उपचार विकल्पों को बढ़ाने के लिए हमारी व्यापक रणनीति का हिस्सा है। इसके अलावा सीएसआईआर-आईआईसीटी, हैदराबाद अपने उच्च गुणवत्ता वाले अनुसंधान और विभिन्न नए अणुओं के विकास के लिए प्रसिद्ध है और हम उनके साथ जुड़े होने पर गर्व महसूस करते हैं।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1725633>

Hyderabad: Indian Institute of Chemical Technology licences 2-DG process knowhow to Lee Pharma

By Swati Bhardwaj

Hyderabad: For those disappointed at Covid-19 wonder drug 2-DG (2-Deoxy-D-Glucose) being priced at a hefty Rs 990 per sachet, here's some good news. More manufacturers are expected to jump into the fray for churning out sachets of the oral drug that is found to help speed up recovery and reduce oxygen dependence.

Not only has Indian Institute of Chemical Technology (IICT), which is part of the Council of Scientific & Industrial Research (CSIR) has licenced the process knowhow for synthesis of 2-DG to Hyderabad-based Lee Pharma through a non-exclusive agreement, the Defence Research & Development Organisation (DRDO) too has invited expressions of interest (EoIs) from pharma companies interested in manufacturing this drug.



The drug was developed by scientists at DRDO's Institute of Nuclear Medicine and Allied Sciences and licenced to Hyderabad-based pharma major Dr Reddy's Laboratories

The drug was developed by scientists at DRDO's Institute of Nuclear Medicine and Allied Sciences and licenced to Hyderabad-based pharma major Dr Reddy's Laboratories with a promise of ensuring accessibility and affordability.

Lee Pharma will be filing an application seeking approval from the Drugs Controller General of India (DCGI) for manufacturing and commercialising the drug from their formulations facility located at the Duvvada SEZ in Visakhapatnam, Andhra Pradesh.

CSIR-IICT director Dr Srivari Chandrashekar said CSIR-CCMB played a role in the development of 2-DG as they tested it on SARS-CoV-2 viral cultures and said the agreement with Lee Pharma is aimed at increasing affordable treatment options.

On the other hand, DRDO has set June 17 as the last date for submitting applications for EoIs for transfer of technology for manufacturing 2-DG. "The EoI submitted will be scrutinised by a committee. Only up to 15 industries will be given ToT on their capabilities, technical handholding capability of DRDO and on First Come First Served Basis," DRDO said.

<https://timesofindia.indiatimes.com/city/hyderabad/iict-licences-2-dg-process-knowhow-to-lee-pharma/articleshow/83383246.cms>

Thu, 10 June 2021

2-DG found safe in trials: DRDO Chief

Anant Narayan Bhatt, Lead Developer-2DG, INMAS-DRDO, said that DRDO, along with its industry partner Dr Reddy's conducted Phase-II and Phase-III clinical trials to test its safety

Hyderabad: Defence Research and Development Organisation (DRDO) Chairman G Satheesh Reddy said that 2-Deoxy-D-Glucose (2-DG) inhibits SARS-CoV-2 growth in Covid-19 patients due to its unique mechanism and has been found safe and effective in clinical trials.

While participating in a webinar on 2-DG organised by the Federation of Telangana Chambers of Commerce and Industry (FTCCI), in association with DRDO and Dr Reddy's Laboratories, Satheesh Reddy said that production of the drug was scalable and could be easily stored and distributed.

Anant Narayan Bhatt, Lead Developer-2DG, INMAS-DRDO, said that DRDO, along with its industry partner Dr Reddy's conducted Phase-II and Phase-III clinical trials to test the safety and efficacy of the drug in Covid patients.

The trials were conducted on 330 patients between May 2020 and March 2021 at 27 Covid hospitals across various States including Andhra Pradesh, Telangana, Karnataka and Tamil Nadu, said Anant Narayan and added that on May 1, DCGI granted permission for emergency use of this drug.

<https://www.newindianexpress.com/cities/hyderabad/2021/jun/09/2-dg-found-safe-in-trials-drdo-chief-2313548.html>



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(Express Illustrations)

DRDO invites EoIs for 2-DG technology transfer for bulk production

Last date to submit EoI applications through email is June 17. EoI submitted by industries will be scrutinised by a Technical Assessment Committee, a DRDO statement said

The Defence Research and Development Organisation (DRDO) has invited Expression of Interests (EoIs) to transfer the technology to pharmaceutical companies for production for 2-DC. The defence research organisation developed 2-Deoxy-D-Glucose (2-DG), a drug used for the treatment of COVID-19 patients. The drug has been priced at Rs 990, despite the earlier claims that it'll be priced affordably.

The last date to submit EoI applications through email is June 17. "The EoI submitted by industries will be scrutinised by a Technical Assessment Committee (TAC). Only up to 15 industries will be given ToT on their capabilities, technical handholding capability of DRDO and on First Come First Served Basis," a DRDO statement said.

The data obtained from clinical trial results show that the drug helps in faster recovery of patients admitted in hospitals and also reduces supplemental oxygen dependence. The results revealed a majority of patients treated with 2-DG showed RT-PCR negative conversion.

The bidders should have a drug licence to manufacture Active Pharmaceutical Ingredient (API) from Drug Licencing Authorities and WHO GMP (Good Manufacturing Practices) certification, among others.

The DRDO-developed 2 DG drug spreads through the body like glucose. It reaches the virus-infected cells and prevents virus growth by stopping viral synthesis and destroys the protein's energy production. The drug also works on virus infection spread into the lungs, which helps decrease patient's dependability on oxygen.

DRDO Project Director and Scientist of 2-DG, Dr Sudhir Chandana has said that when the pandemic hit India in April 2020, they discovered that 2-DG halts the spread of COVID-19 inside the body cells. "After the findings, we asked the DCGI for permission to conduct clinical trials," he said. In May 2020, the DRDO received permission to conduct the clinical trials. The phase 2 trials were concluded in October 2020.

The results showed that in terms of improvement of vital signs of COVID-19 symptomatic patients, there was a difference of 2.5 days compared to Standard of Care (SoC). Approval for Phase - III clinical trials were granted in November 2020. These were conducted in 27 COVID-19 hospitals spread across several states. "Clinical trial results have shown that this molecule helps in faster recovery of hospitalised patients and reduces supplemental oxygen dependence," an official DRDO statement had explained earlier.

<https://www.businesstoday.in/coronavirus/drdo-invites-eois-for-2-dg-technology-transfer-for-bulk-production/story/441205.html>

DRDO invites EoI to transfer technology of 2-DG drug for bulk production

The 2-DG was developed by the Institute of Nuclear Medicine and Allied Sciences, a lab of DRDO, in collaboration with Dr. Reddy's Laboratories

Hyderabad: The Defence Research and Development Organisation (DRDO), which developed 2-Deoxy-D- Glucose (2-DG), a drug used for treatment of COVID-19 patients, has called for Expression of Interest (EoI) to transfer the technology to Indian pharmaceutical industries for production.

The 2-DG was developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), a lab of DRDO, in collaboration with Dr. Reddy's Laboratories.

Clinical trial results have shown that this molecule helps in faster recovery of hospitalised patients and reduces supplemental oxygen dependence.

Higher proportion of patients treated with 2-DG showed RT-PCR negative conversion in COVID-19 patients. According to the EoI document, applications should be submitted before June 17 through email.

“The EoI submitted by industries will be scrutinised by a Technical Assessment Committee (TAC).

Only up to 15 industries will be given ToT on their capabilities, technical hand holding capability of DRDO and on first-come-first-served basis,” it said.

The bidders should have a Drug license to manufacture Active Pharmaceutical Ingredient (API) from Drug Licensing Authorities and WHO GMP (Good manufacturing Practices) certification among others.

Laboratory synthesis process for 2-DG has been developed using D-Glucose as starting material. The synthesis process consists of conversion of D-Glucose to 2-DG through five chemical reaction steps followed by purification.

The process has been established at batch scale (100g) and pilot plant scale (500g) and necessary patents have been filed by DRDO in this regard, the Defence body said.

<https://www.thehindu.com/business/drdo-invites-eoi-to-transfer-technology-of-2-dg-drug-for-bulk-production/article34766711.ece>



An anti-COVID-19 therapeutic application of the drug 2-deoxy-D-glucose (2-DG) has been developed by INMAS, a lab of DRDO, in collaboration with Dr Reddy's Laboratories, Hyderabad. The drug will help in faster recovery of Covid-19 patients. [Twitter/@DRDO_](https://twitter.com/DRDO_)

DRDO ने 2-डीजी दवा की तकनीक देने के लिए ईओआई किए आमंत्रित, जानिए कब है आखिरी तारीख

कोविड-19 मरीजों के इलाज में इस्तेमाल की जानी वाली दवा 2-डिऑक्सी-डी-ग्लूकोज (2-डीजी) विकसित करने वाले रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने इस दवा को बनाने की तकनीक भारतीय दवा कंपनी को हस्तांतरित करने के लिए रुचि पत्र (ईओआई) आमंत्रित की है। ईओआई दस्तावेज के अनुसार, आवेदन ईमेल के जरिए 17 जून से पहले भेजे जाने चाहिए।

कोविड-19 मरीजों के इलाज में इस्तेमाल की जानी वाली दवा 2-डिऑक्सी-डी-ग्लूकोज (2-डीजी) विकसित करने वाले रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) ने इस दवा को बनाने की तकनीक भारतीय दवा कंपनी को हस्तांतरित करने के लिए रुचि पत्र (ईओआई) आमंत्रित की है। 2-डीजी दवा डीआरडीओ की प्रयोगशाला, नाभिकीय औषधि एवं सम्बद्ध विज्ञान संस्थान (आईएनएमएस) ने डॉ. रेड्डी लेबोरेटरीज के साथ मिलकर विकसित की है। क्लिनिकल ट्रायल के नतीजों में देखा गया कि यह दवा अस्पताल में भर्ती मरीजों को तेजी से बीमारी से उबरने और ऑक्सीजन पर निर्भरता को कम करने में मदद करती है।

ईओआई दस्तावेज के अनुसार, आवेदन ईमेल के जरिए 17 जून से पहले भेजे जाने चाहिए। इसमें कहा गया है, “कंपनियों द्वारा दी जाने वाली ईओआई की एक तकनीकी आकलन समिति (टीएसी) जांच करेगी। केवल 15 कंपनियों को ही उनकी क्षमताओं और पहले आओ पहले पाओ के आधार पर टीओटी दिया जाएगा।” बोली लगाने वाली कंपनियों के पास ड्रग लाइसेंसिंग एथॉरिटीज से एक्टिव फार्मास्युटिकल इंग्रेडिएंट (एपीआई) से दवा बनाने का लाइसेंस होना चाहिए।

डीआरडीओ ने डाक्टर रेड्डी लैब के साथ मिलकर तैयार की दवा

आपको बता दें कि कोरोना महामारी के बीच डीआरडीओ ने एक बड़ी राहत की खबर दी थी। डीआरडीओ ने एंटी-कोविड दवाई बनाने का दावा किया था। डीआरडीओ का दावा है कि ग्लूकोज़ पर आधारित इस दवाई के सेवन से कोरोना से ग्रस्त मरीजों को ऑक्सीजन पर ज्यादा निर्भर नहीं होना पड़ेगा और जल्दी स्वस्थ हो जाएंगे। डीआरडीओ ने एंटी-कोविड मेडिसिन '2-डिऑक्सी-डी-ग्लूकोज़' (2डीजी) को डाक्टर रेड्डी लैब के साथ मिलकर तैयार किया है और क्लिनिकल-ट्रायल के बाद ड्रग्स कंट्रोलर जनरल ऑफ इंडिया ने इस दवाई को इमरजेंसी इस्तेमाल के लिए हरी झंडी दे दी है।

<https://www.abplive.com/news/india/drdo-invites-eoi-to-provide-technology-of-2-dg-medicine-know-when-is-the-last-date-1924811>

Thu, 10 June 2021

J&K L-G inaugurates DRDO's 500-bed Covid Hospital at Srinagar's Khonmoh

J&K Lieutenant Governor Manoj Sinha inaugurated a 500-bed dedicated Covid facility set up by the DRDO in Srinagar's Khonmoh to help the Union Territory in its fight against Covid-19 pandemic

By Sunil Bhat

Jammu: Jammu and Kashmir Lieutenant Governor Manoj Sinha on Sunday inaugurated a 500-bed Covid-19 facility set up by the Defence Research and Development Organisation (DRDO) at Khonmoh in Srinagar.

After constructing a 500-bed Covid hospital in Jammu, DRDO completed the 500-bed hospital in Srinagar in just 17 days.

The Covid facility in Srinagar houses all the requisite modern facilities. The hospital is centrally air-conditioned and has the capacity for 125 ICU beds.

Out of 125 ICU beds, 25 are reserved for children and 375 beds have 24-hour oxygen connectivity.

The Covid care facility will fully start its operations once the trial run of all the medicare facilities is completed.

The L-G expressed his gratitude to Prime Minister Narendra Modi, Home Minister Amit Shah, and Defence Minister Rajnath Singh, for providing the necessary assistance and interventions in augmenting healthcare and medical facilities across Jammu and Kashmir.

He added that recently, the Union Territory had received 16 Medical Oxygen Generation Plants from Europe in a short span of three weeks, substantially enhancing the medical oxygen availability in the region.

The L-G also lauded the DRDO for playing a key role in India's fight against Covid-19.

"I acknowledge the hard work of DRDO officials, who have completed both the hospitals in a short span of time, adding 1000 additional beds to serve the people in Jammu and Kashmir," said L-G Manoj Sinha.

Speaking on the UT government's initiatives aimed towards transforming J&K's health system in view of Covid-19 pandemic, the L-G remarked that the strategy has been to implement a host of interventions in response to the evolving situations and then quantifying the impact of those initiatives in providing relief to the patients and strengthening the overall healthcare delivery system in the Union Territory.

The L-G highlighted some notable interventions, including continuous augmentation of ICU and oxygen-supported beds, deployment of former medical staff and fast track deployment of newly qualified staff, decentralization of health system through Panchayat Covid Care Centres, and starting an accelerated vaccination drive.

The J&K Lieutenant Governor observed that it was due to collective efforts that J&K now has a greater capacity to treat all Covid-19 and other patients.

Taking timely decisions to increase hospital capacity in response to the pandemic lead to better management of patients, the L-G added.



J&K Lieutenant Governor Manoj Sinha inaugurated the Covid care facility at Srinagar's Khonmoh. (Photo: Sunil Ji Bhat)

He also thanked and congratulated all the PRI representatives, government officers, health department, police and security forces for continuously working during the pandemic.

“With the active participation of all of you, we have handled the situation of Corona in J&K in a better way,” L-G Manoj Sinha said.

L-G reviews Covid care facilities

Meanwhile, the Lieutenant Governor took a round of the various sections of the facility and enquired about the Covid care facilities to be extended to the patients, including diagnostic facilities, medical equipment, oxygen supply, doctors, paramedics and other healthcare facilities.

Adhering to the directions of the L-G for developing specialized critical care for infants and children, a 25-bed Pediatric Intensive Care Unit (PICU) has been established in the facility.

Pertinently, on May 30, J&K Lieutenant Governor Manoj Sinha had visited the site of this DRDO’s Covid hospital and passed specific direction for the early completion of the facility.

<https://www.indiatoday.in/coronavirus-outbreak/story/lg-inaugurates-500-bed-covid-hospital-at-srinagar-1812983-2021-06-10>

Outlook

Thu, 10 June 2021

J&K Lt Governor Manoj Sinha inaugurates 500-bedded DRDO hospital in Srinagar

*Earlier, the Defence Research and Development Organisation (DRDO)
had constructed a 500-bedded Covid hospital in Jammu as well*

By Naseer Ganai

Jammu and Kashmir Lieutenant Governor Manoj Sinha on Wednesday inaugurated a 500-bedded Covid hospital in Srinagar. The facility was constructed by the Defence Research and Development Organisation (DRDO). National Conference chief Farooq Abdullah also took part in the inauguration ceremony.

Housing all requisite modern facilities, the centrally air-conditioned hospital can accommodate 125 ICU beds, out of which 25 are reserved for children and 375 beds with 24-hour oxygen connectivity. “Ten bedded triage area has also been built in 100 sqm. The covid care facility will start its operations once the trial run of all the medical facilities is completed,” a government spokesman said.

Prior to this, DRDO had constructed a 500-bedded Covid hospital in Jammu as well.

Speaking on the occasion, the Lt Governor lauded DRDO for playing a key role in India's fight against Covid-19. “I acknowledge the hard work of DRDO officials, who have completed both the hospitals in a short span of time, adding 1,000 additional beds to serve the people of Jammu and Kashmir,” Sinha said.

Speaking about the government’s initiatives to transform J&K’s health system in view of the covid pandemic, Sinha said, “Our strategy has been to implement a host of interventions in response to the evolving situation and then quantifying the impact of those initiatives in providing relief to the patients and strengthening the overall healthcare delivery system.”

“Some notable interventions include continuous augmentation of ICU and oxygen supported beds, deployment of former medical staff, fast track deployment of newly qualified staff,



Housing all requisite modern facilities, the centrally air-conditioned hospital can accommodate 125 ICU beds

decentralization of health system through Panchayat Covid Care Centres and starting an accelerated vaccination drive,” he added.

Sinha further said that it is because of the collective efforts of all organisations, that health officials in J&K now have more means to treat Covid-19 patients.

<https://www.outlookindia.com/website/story/india-news-jk-lt-governor-manoj-sinha-inaugurates-500-bedded-drdo-hospital-in-srinagar/384786>

Defence News

Defence Strategic: National/International



Press Information Bureau
Government of India

Ministry of Defence

Wed, 09 June 2021 1:09PM

Indo-Thai coordinated patrol (CORPAT)

The 31st edition of India-Thailand Coordinated Patrol (Indo-Thai CORPAT) between the Indian Navy and the Royal Thai Navy is being conducted from 09 – 11 June 2021. Indian Naval Ship (INS) *Saryu*, an indigenously built Naval Offshore Patrol Vessel and His Majesty's Thailand Ship (HTMS) *Krabi*, an Offshore Patrol Vessel, along with Dornier Maritime Patrol Aircraft from both navies are participating in the CORPAT.

Towards reinforcing maritime links between the two countries and with an aim of keeping this vital part of the Indian Ocean safe and secure for international trade, the two navies have been undertaking CORPAT bi-annually along their International Maritime Boundary Line (IMBL) since 2005. CORPAT builds up understanding and interoperability between navies and facilitates institution of measures to prevent and suppress unlawful activities like Illegal Unreported Unregulated (IUU) fishing, drug trafficking, maritime terrorism, armed robbery and piracy. It further helps enhance the operational synergy by exchange of information for prevention of smuggling, illegal immigration and for conduct of SAR operations at sea.



File Photos of Earlier Editions of Indo Thai Corpat

As part of Government of India's vision of SAGAR (Security And Growth for All in the Region), the Indian Navy has been proactively engaging with the countries in the Indian Ocean Region towards enhancing regional maritime security. This has been through bilateral and multilateral exercises, Coordinated Patrols, Joint EEZ Surveillance, and Humanitarian Assistance and Disaster Relief (HADR) operations. The Indian Navy and Royal Thai Navy have especially enjoyed a close and friendly relationship covering a wide spectrum of activities and interactions, which have strengthened over the years.

The 31st Indo-Thai CORPAT will contribute towards Indian Navy's efforts to consolidate interoperability and forge strong bonds of friendship with Royal Thai Navy.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1725559>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 01 June 2021 5:02PM

भारत-थाईलैंड समन्वित गश्त (कॉर्पेट)

भारतीय नौसेना और रॉयल थाई नौसेना के बीच भारत-थाईलैंड समन्वित गश्त (इंडो-थाई कॉर्पेट) का 31 वां संस्करण दिनांक 09 से 11 जून 2021 के बीच आयोजित किया जा रहा है। भारतीय नौसेना का स्वदेशी निर्मित नौसैनिक अपतटीय गश्ती पोत जहाज (आईएनएस) सरयू एवं थाईलैंड का अपतटीय गश्ती पोत हिज मजेस्टीस थाईलैंड शिप (एचटीएमएस) कर्बी तथा दोनों नौसेनाओं के डोर्नियर समुद्री गश्ती विमान- कॉर्पेट में भाग ले रहे हैं।



दोनों देशों के बीच समुद्री संपर्कों को मजबूत करने और हिंद महासागर के इस महत्वपूर्ण हिस्से को अंतरराष्ट्रीय व्यापार के लिए सुरक्षित रखने के उद्देश्य से दोनों नौसेनाएं 2005 से अपनी अंतरराष्ट्रीय समुद्री सीमा रेखा (आईएमबीएल) पर कॉर्पेट का द्वि-वार्षिक आयोजन कर रही हैं।

कॉर्पेट नौसेनाओं के बीच समझ और अंतरसंचालनीयता निर्मित करती है और अवैध असूचित अनियमित (आईयूयू) मछली पकड़ना, मादक पदार्थों की तस्करी, समुद्री आतंकवाद, सशस्त्र डकैती और समुद्री डकैती जैसी गैरकानूनी गतिविधियों को रोकने और खत्म करने के उपायों के ढांचे को सुविधा प्रदान करता है। यह तस्करी रोकने, अवैध आप्रवास की रोकथाम करने और समुद्र में खोजबीन एवं बचाव के संचालन के लिए सूचनाओं का आदान-प्रदान करके अभियान संबंधी तालमेल को बढ़ाने में मदद करता है।

इंडो थाई कॉर्पेट के पुराने संस्करणों की फाइल तस्वीरें

सागर (सिक्वोरिटी एंड ग्रोथ फ़ॉर ऑल इन द रीजन) के भारत सरकार के दृष्टिकोण के एक भाग के तौर पर, भारतीय नौसेना क्षेत्रीय समुद्री सुरक्षा बढ़ाने की दिशा में हिंद महासागर क्षेत्र के देशों के साथ सक्रिय रूप से जुड़ रही है। ऐसा द्विपक्षीय और बहुपक्षीय अभ्यासों, समन्वित गश्ती, संयुक्त ईईजेड निगरानी और मानवीय सहायता तथा आपदा राहत (एचएडीआर) अभियानों के माध्यम से किया गया है। भारतीय नौसेना और रॉयल थाई नौसेना के बीच विशेष रूप से एक घनिष्ठ और मैत्रीपूर्ण संबंध रहे हैं जिसमें अनेक प्रकार की गतिविधियां और आपसी तालमेल शामिल हैं, जो पिछले कुछ वर्षों में मजबूत हुए हैं।

31वीं भारत-थाई कॉर्पेट भारतीय नौसेना के अंतर-संचालनीय क्षमता को मजबूत करने एवं रॉयल थाई नौसेना के साथ मित्रता के सुदृढ संबंध बनाने के प्रयासों में योगदान देगी।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1725729>

Defence Ministry approves Rs 498.8 cr for startups, innovation

New Delhi: The Defence Ministry on Wednesday approved Rs 498.8 crore to support startups and innovation in the defence manufacturing sector.

Defence Secretary Ajay Kumar said that the step is a big boost to startups in defence. He stated that the approval will give a big boost to become self reliant in the defence manufacturing sector.

Sanjay Jaju, Additional Secretary heading Defence Production, stated on social media “The Scheme with budgetary support of Rs 498.8 crore for iDEX aims to support 300 startups and 20 partner incubators over next five years to produce functional prototypes and foster innovation in Defence.”

Earlier, Defence Minister Rajnath Singh said that the iDEX initiative stands out as one of the most effective and well-executed defence startup ecosystems created in our country and it would be a decisive step towards achieving self-reliance in the spirit of the “Atmanirbhar Bharat” campaign.

Singh said for the first time an atmosphere has been created in the country when different stakeholders have been brought together to push for innovations in the defence sector.

In 2018, the Ministry of Defence (MoD) had introduced the “Innovations for Defence Excellence” (iDEX) initiative.

iDEX is aimed at creating an ecosystem which fosters innovation and encourages technology development in Defence by engaging research and development institutes, academia, industries, start ups and even individual innovators.

iDEX will function under the aegis of the Defence Innovation Organisation (DIO) (formed as a ‘Not For Profit’ company under Section 8 of the Companies Act,2013), as its executive arm.

<https://www.bhaskarlive.in/defence-ministry-approves-rs-498-8-cr-for-startups-innovation/>



Thu, 10 June 2021

Researchers realize unconventional coherent control of solid-state spin qubits

A research team led by Prof. Guo Guangcan from the University of Science and Technology of China (USTC) of the Chinese Academy of Sciences (CAS), together with Prof. Adam Gali from Wigner Research Centre for Physics, realized robust coherent control of solid-state spin qubits using anti-Stokes (AS) excitation, broadening the boundary of quantum information processing and quantum sensing. This study was published in *Nature Communications*.

Solid-state color center spin qubits play an important role in quantum computing, quantum networks and high-sensitivity quantum sensing. Considered as the basis of quantum technology application, optically detected magnetic resonance (ODMR) technology offers a readout approach to detect the spin state. Conventional ODMR detection of solid-state spin states is almost all under Stokes excitation, which requires that the excitation laser has higher energy than emitted photons.

To extend the scope of solid-state quantum technologies, the researchers first realized the AS excited ODMR detection of silicon vacancy defect spin in silicon carbide (SiC), where the energy of exciting laser is lower than that of the emission photons.

By investigating the dependence of laser power and temperature on AS excited ODMR signals, the researchers proved that the AS photoluminescence (PL) was induced by phonon-assisted single photon absorption process, and was applicable to all-optical high-temperature temperature sensing.

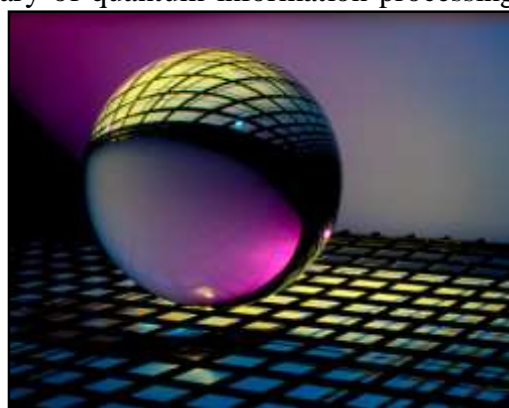
On the basis of this, they found that AS and Stokes excited ODMR followed similar behavior facing the change of laser power, microwave (MW) power and temperature, while the AS ODMR contrast remained approximately three times larger than the Stokes one.

Furthermore, the researchers realized the coherent manipulation of solid-state spin states in SiC under AS excitation. The results showed that the AS excitation method increased the signal contrast by around three times, enabling the potential applications of AS excited ODMR approach to quantum information processing and quantum sensing.

This study improves any ODMR-based measurement. This AS demonstration can be used in yet unforeseen development.

More information: Jun-Feng Wang et al, Robust coherent control of solid-state spin qubits using anti-Stokes excitation, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-23471-8](https://doi.org/10.1038/s41467-021-23471-8)

Journal information: [Nature Communications](https://phys.org/news/2021-06-unconventional-coherent-solid-state-qubits.html)
<https://phys.org/news/2021-06-unconventional-coherent-solid-state-qubits.html>

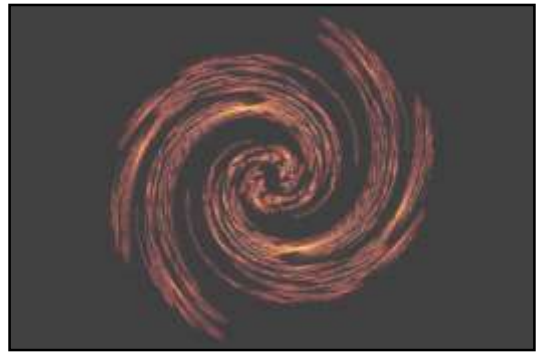


Credit: Unsplash/CC0 Public Domain

Study: Important contribution to spintronics has received little consideration until now

The movement of electrons can have a significantly greater influence on spintronic effects than previously assumed. This discovery was made by an international team of researchers led by physicists from the Martin Luther University Halle-Wittenberg (MLU). Until now, a calculation of these effects took, above all, the spin of electrons into consideration. The study was published in the journal *Physical Review Research* and offers a new approach in developing spintronic components.

Many technical devices are based on conventional semiconductor electronics. Charge currents are used to store and process information in these components. However, this electric current generates heat and energy is lost. To get around this problem, spintronics uses a fundamental property of electrons known as spin. "This is an intrinsic angular momentum, which can be imagined as a rotational movement of the electron around its own axis," explains Dr. Annika Johansson, a physicist at MLU. The spin is linked to a magnetic moment that, in addition to the charge of the electrons, could be used in a new generation of fast and energy-efficient components.



Credit: CC0 Public Domain

Achieving this requires an efficient conversion between charge and spin currents. This conversion is made possible by the Edelstein effect: by applying an electric field, a charge current is generated in an originally non-magnetic material. In addition, the electron spins align, and the material becomes magnetic. "Previous papers on the Edelstein effect primarily focused on how electron spin contributes to magnetisation, but electrons can also carry an orbital moment that also contributes to magnetisation. If the spin is the intrinsic rotation of the electron, then the orbital moment is the motion around the nucleus of the atom," says Johansson. This is similar to the earth, which rotates both on its own axis and around the sun. Like spin, this orbital moment generates a magnetic moment.

In this latest study, the researchers used simulations to investigate the interface between two oxide materials commonly used in spintronics. "Although both materials are insulators, a metallic electron gas is present at their interface which is known for its efficient charge-to-spin conversion," says Johansson. The team also factored the orbital moment into the calculation of the Edelstein effect and found that its contribution to the Edelstein effect is at least one order of magnitude greater than that of spin. These findings could help to increase the efficiency of spintronic components.

More information: Annika Johansson et al, Spin and orbital Edelstein effects in a two-dimensional electron gas: Theory and application to SrTiO₃ interfaces, *Physical Review Research* (2021). DOI: [10.1103/PhysRevResearch.3.013275](https://doi.org/10.1103/PhysRevResearch.3.013275)

<https://phys.org/news/2021-06-important-contribution-spintronics-consideration.html>

Thu, 10 June 2021

Researchers create quantum microscope that can see the impossible

In a major scientific leap, University of Queensland researchers have created a quantum microscope that can reveal biological structures that would otherwise be impossible to see.

This paves the way for applications in biotechnology, and could extend far beyond this into areas ranging from navigation to medical imaging.

The microscope is powered by the science of quantum entanglement, an effect Einstein described as "spooky interactions at a distance".

Professor Warwick Bowen, from UQ's Quantum Optics Lab and the ARC Centre of Excellence for Engineered Quantum Systems (EQUS), said it was the first entanglement-based sensor with performance beyond the best possible existing technology.

"This breakthrough will spark all sorts of new technologies—from better navigation systems to better MRI machines, you name it," Professor Bowen said.

"Entanglement is thought to lie at the heart of a quantum revolution.

"We've finally demonstrated that sensors that use it can supersede existing, non-quantum technology.

"This is exciting—it's the first proof of the paradigm-changing potential of entanglement for sensing."

Australia's Quantum Technologies Roadmap sees quantum sensors spurring a new wave of technological innovation in healthcare, engineering, transport and resources.

A major success of the team's quantum microscope was its ability to catapult over a 'hard barrier' in traditional light-based microscopy.

UQ team researchers (counter-clockwise from bottom-left) Caxtere Casacio, Warwick Bowen, Lars Madsen and Waleed Muhammad aligning the quantum microscope.

"The best light microscopes use bright lasers that are billions of times brighter than the sun," Professor Bowen said.

"Fragile biological systems like a human cell can only survive a short time in them and this is a major roadblock.

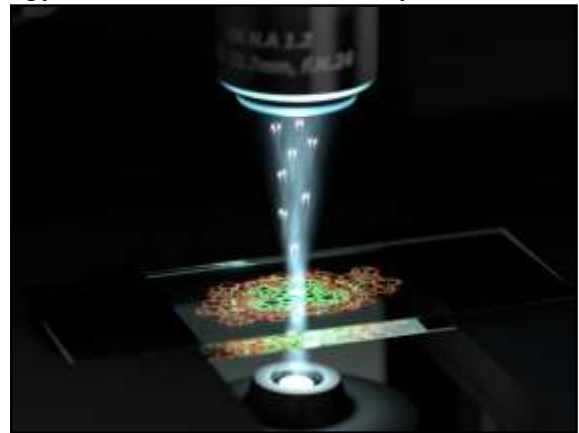
"The quantum entanglement in our microscope provides 35 percent improved clarity without destroying the cell, allowing us to see minute biological structures that would otherwise be invisible.

"The benefits are obvious—from a better understanding of living systems, to improved diagnostic technologies."

Professor Bowen said there were potentially boundless opportunities for quantum entanglement in technology.

"Entanglement is set to revolutionize computing, communication and sensing," he said.

"Absolutely secure communication was demonstrated some decades ago as the first demonstration of absolute quantum advantage over conventional technologies.



Artist's impression of UQ's new quantum microscope in action. Credit: The University of Queensland

"Computing faster than any possible conventional computer was demonstrated by Google two years ago, as the first demonstration of absolute advantage in computing.

"The last piece in the puzzle was sensing, and we've now closed that gap.

"This opens the door for some wide-ranging technological revolutions."

The research is published in *Nature*.

More information: Quantum-enhanced nonlinear microscopy, *Nature* (2021). [DOI: 10.1038/s41586-021-03528-w](https://doi.org/10.1038/s41586-021-03528-w), www.nature.com/articles/s41586-021-03528-w

Journal information: [Nature](https://www.nature.com)

<https://phys.org/news/2021-06-quantum-microscope-impossible.html>

COVID-19 Research News



Thu, 10 June 2021

Warmer conditions are not enough to prevent COVID-19 transmission, research shows

By Emily Henderson

New research shows transmission of the virus behind COVID-19 varies seasonally, but warmer conditions are not enough to prevent transmission.

The study, led by Imperial College London researchers and published today in *Proceedings of the National Academy of Sciences*, is the first to incorporate environmental data into epidemiological models of the transmission of SARS-CoV-2, the virus behind COVID-19.

The team show that temperature and population density are the most important factors determining how easily the virus spreads, but only in the absence of mobility-restricting measures, such as lockdowns.

"Our results show that temperature changes have a much smaller effect on transmission than policy interventions, so while people remain unvaccinated, governments mustn't drop policies like lockdowns and social distancing just because a seasonal change means the weather is warming up.

However, our work also suggests that lower autumn and winter temperatures may lead to the virus spreading more easily in the absence of policy interventions or behavioral changes."

Dr Tom Smith, First Author, Department of Life Sciences, Imperial College London

Seasonal variation has been a source of uncertainty in forecasts of SARS-CoV-2 transmission. Other viruses, like flu viruses and other coronaviruses, are known to be affected by environmental factors. For example, high temperatures and low humidity reduce the transmission of respiratory droplets, preventing the spread of flu. High temperatures are also known to inactivate other coronaviruses in the air and on surfaces.

However, quantifying the effects of environmental factors including temperature, humidity, and UV radiation (sunshine) on SARS-CoV-2 transmission has been difficult during the pandemic, since human factors like population density and behaviour have been the main drivers of transmission.

The differences in interventions and case-counting between countries and regions also makes comparing environmental factors on a global scale difficult, especially as some countries, like Brazil, India and Iran, have high transmission despite having warmer climates.

As a result, few epidemiological models have included environmental data, and those that do assume the response of SARS-CoV-2 is identical to other coronaviruses, as there is a lack of SARS-CoV-2-specific data.

To fill this gap, the team, from the Departments of Life Sciences and Mathematics at Imperial, as well as Imperial's MRC Centre for Global Infectious Disease Analysis, and Utah State University, compared transmission across the USA. The country has a large range of climates with comparable policies and case numbers, allowing the impact of environmental factors to be teased out.

They found strong evidence that lower temperature and higher population density are both associated with higher SARS-CoV-2 transmission.

Lead researcher Dr Will Pearce, from the Department of Life Sciences at Imperial, said: "While temperature and population density do influence SARS-CoV-2 transmission, our findings re-confirm that the most important drivers are public policy and individual behaviour. For example, during lockdowns, there was no meaningful signature of temperature influencing transmission.

"This means, for example, that warmer regions should not expect to ease mobility restrictions before colder regions. This is especially true as warmer regions tend to have higher population densities - for example, the population in Florida is more densely packed than in Minnesota."

The researchers are now extending their study to new variants, and say their environmental results should be incorporated into future forecasts to enhance predictions of disease spread.

Study co-author Dr Ilaria Dorigatti, from the MRC Centre for Global Infectious Disease Analysis at Imperial, said: "We found evidence that, in the early phases of the pandemic, places with colder temperatures were associated with higher SARS-CoV-2 transmission intensities. However, the effect of climatic seasonality on SARS-CoV-2 transmission is weaker than the effect of population density and in turn, of policy interventions.

"This implies that, as we move towards summer in the Northern Hemisphere, public health policy decisions remain of critical importance for epidemic control and adherence to recommendations will continue to play a key role against SARS-CoV-2 transmission."

Source:

[Imperial College London](#)

Journal reference:

Smith, T.P., *et al.* (2021) Temperature and population density influence SARS-CoV-2 transmission in the absence of nonpharmaceutical interventions. *PNAS*. doi.org/10.1073/pnas.2019284118.

<https://www.news-medical.net/news/20210609/Warmer-conditions-are-not-enough-to-prevent-COVID-19-transmission-research-shows.aspx>

