

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 : 107 02 जून 2021

Vol.: 46 Issue : 107 02 June 2021



रक्षा विज्ञान पुस्तकालय
Defence Science Library
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CONTENTS

S. No.	TITLE	Page No.
DRDO News		1-12
DRDO Technology News		1-4
1.	Critical breakthrough brings India one step closer to building its own fighter jet engine	1
2.	DMRL makes high pressure compressor discs for aero-engines	3
3.	Army wants futuristic main-battle tanks in mega 'Make in India' project	4
COVID 19: DRDO's Contribution		5-12
4.	DRDO issues directions for usage of anti-Covid drug 2-DG on patients	5
5.	DRDO's 2DG drug approved for emergency use as an adjunct therapy for COVID-19 patients	6
6.	DRDO's COVID Hospital	7
7.	MP inspects DRDO Oxygen Plant site in K.R. Hospital premises	8
8.	DC Srinagar holds meeting for follow up of the directions of LG for completion of 500-bedded Covid Hospital at Khanmoh	9
9.	खुशखबरी: MP में भी मिलेगी DRDO की दवा 2-डीजी, इस तारीख तक आने वाली है पहली खेप	10
10.	'No use' debating over allopathy, ayurveda; both useful: NITI Aayog's VK Saraswat	11
Defence News		12-24
Defence Strategic: National/International		12-24
11.	Raksha Mantri Shri Rajnath Singh reviews bilateral defence cooperation in telephonic conversation with his Australian counterpart	12
12.	रक्षा मंत्री श्री राजनाथ सिंह ने अपने ऑस्ट्रेलियाई समकक्ष के साथ टेलीफोन पर की गई बातचीत में द्विपक्षीय रक्षा सहयोग की समीक्षा की	13
13.	Vice Admiral Ravneet Singh AVSM, NM assumes charge as Deputy Chief of Naval Staff	14
14.	वाइस एडमिरल रवनीत सिंह एवीएसएम, एलएम ने नौसेना स्टाफ के उप प्रमुख का कार्यभार संभाला	15
15.	Vice Admiral Sreekumar Nair, AVSM, NM takes over as DGNP, Visakhapatnam	16
16.	Lieutenant General Manoj Pande, AVSM, VSM takes over Eastern Command	17
17.	Lt Gen Ajai Singh takes over as 16th Commander-in-Chief, Andaman & Nicobar Command	18
18.	Vice Admiral Sandeep Naithani, AVSM, VSM, assumes charge as the Chief of Materiel	19
19.	Army's Western Command Chief visits Haryana to review preparedness of troops	20
20.	Indian Army deploys K-9 Vajra in Ladakh; Know all about its specifications & strengths	21
21.	Indian Army ने लद्दाख में तैनात किया K-9 वज्र, जानें क्या है इसकी खासियत और ताकत	22
22.	China creates combined air defence system along LAC	23
Science & Technology News		25-31
23.	Researchers model new method of generating gamma-ray combs	25
24.	Stimulated scattering in supermode microcavities: Single- or dual-mode lasing?	26
25.	Magnetic materials analysis has never been so comprehensible	27
COVID-19 Research News		29-31
26.	COVID-19 can infiltrate insulin-producing cells in the pancreas, study suggests	29



Wed, 02 June 2021

Critical breakthrough brings India one step closer to building its own fighter jet engine

The Indian DRDO has achieved a technological breakthrough in its efforts towards indigenizing aero engine manufacturing in the country

By Younis dar

“Defence Research and Development Organisation (DRDO) has established the near isothermal forging technology to produce all the five stages of high-pressure compressors (HPC) discs out of difficult-to-deform titanium alloy using its unique 2000 MT isothermal forge press,” the press release by the Indian ministry of defense said on Friday.

This is an important milestone in the development of indigenous technologies for the production and thermo-mechanical processing of high-temperature titanium alloys for aerospace applications, which DRDO is reaching along with MIDHANI and HAL.

Developed by the Defence Metallurgical Research Laboratory (DMRL) of DRDO, the statement said this is a crucial technology for establishing self-reliance in aero-engine technology.

With this development, India has joined the league of limited global engine developers to have the manufacturing capabilities of such critical aero-engine components, it added.

The HPC discs form a very important part of the jet engine, on which the compressor blades are mounted. These discs are mainly made from Titanium alloys which can withstand high temperature and pressure.

The discs must be very strong and free of even minute imperfections, which if present can develop into fractures under extreme stress during engine operation.

Isothermal forging is an advanced forging process employed to produce aerospace components with such properties. According to the defense ministry, DMRL developed this forging technology by integrating various science and knowledge-based tools.

“The methodology adopted by DMRL is generic in nature and can be tuned to develop other similar aero-engine components. The compressor discs produced using this methodology met all the requirements stipulated by the airworthiness agencies for the desired application. Accordingly, the technology was type certified and a letter of technical approval (LoTA) was accorded,” the ministry said.

DRDO’s Gas Turbine and Research Establishment (GTRE) has been working, in collaboration with other research labs, to design and develop India’s first fighter jet engine, Kaveri, but there has only been very limited success in the last three decades.



File Image: Tejas Jet

The country is yet to manufacture some of the most crucial components used in a jet engine and due to the lack of cooperation from foreign manufacturers, India's quest for an indigenous jet engine was indefinitely prolonged.

Despite having reached a development budget of Rs 2,839 crore by December 2009, Kaveri could only produce a thrust of around 65 Kilo Newtons (KN), while the rivals, the Eurojet EJ200 and the General Electric GE-F414 generate about 95 KN.

DRDO was widely criticized for choosing to continue expending billions of rupees on a technology it has been pursuing for more than 30 years.

India's indigenous fighter aircraft Tejas had to wait many years for a domestically-built engine and had to finally make do with the US-built General Electric GE-F404IN engine.

The latest technological breakthrough is a step closer for India to the development of a fighter jet engine, something which even China has been unable to do. China too has been dependent mainly on Russian engines to power its growing fighter jet fleets.

The discs have now been sent for bulk production by transferring the technology to M/s MIDHANI through a licensing agreement for technology transfer (LATO T).

"Using the isothermal forge press facility available at DMRL, Hyderabad, bulk quantity (200 numbers) of HPC disc forgings pertaining to various compressor stages have been jointly (DMRL & MIDHANI) produced and successfully supplied to HAL (E), Bengaluru for fitment into Adour Engine that powers the Jaguar/Hawk Aircrafts, the ministry statement said.

India had shelved the plans to integrate new engines into its fleet of around 116 Jaguar aircraft whose engines have lost thrust over the years. The proposal to install Honeywell F-125IN engines into 80 of these aircraft was canceled after the government realized the exercise wasn't worth the huge money since the jets too are to be retired soon.

The Adour engine powering the IAF jaguars has been developed by Rolls-Royce Turbomeca and the Mk 871 variant has been in licensed production with Hindustan Aeronautics Limited (HAL), used also for the new Hawk Advanced Jet Trainer.

The HPC Drum assembly needs frequent replacements in an aircraft after a specified number of operations or in case of damage. According to the statement, the annual requirements of these high-value HPC discs are quite large, warranting indigenization.

"The compressor discs produced using this methodology met all the requirements stipulated by the airworthiness agencies for the desired application. Accordingly, the technology was type certified and a letter of technical approval (LoTA) was accorded. Based on the exhaustive component level and performance evaluation test results, HAL (E) and Indian Air Force cleared the components for engine fitment," the statement added.

Experts say this milestone represents an important achievement for India, which has been working on its own fighter jet engine for decades. India's AMCA program, currently under development, could greatly benefit from the introduction of such technology.

<https://eurasianimes.com/critical-breakthrough-brings-india-one-step-closer-to-building-its-own-fighter-jet-engine/>

DMRL makes high pressure compressor discs for aero-engines

The annual requirements of these high value HPC discs are quite large, warranting indigenisation

Hyderabad: Defence Research and Development Organisation (DRDO) has established the near isothermal forging technology to produce all the five stages of High-Pressure Compressors (HPC) discs out of 'difficult-to-deform' titanium alloy using its unique 2000 MT isothermal forge press for use in aero-engine technology.

The technology was by Defence Metallurgical Research Laboratory (DMRL), DRDO's metallurgical laboratory here and with this development, India has joined the league of limited global engine developers to have the manufacturing capabilities of such critical aero-engine components.

The technology has been transferred to Mishra Dhatu Nigam Limited - MIDHANI to meet the bulk production requirements. About 200 HPC disc forgings pertaining to various compressor stages have been jointly (DMRL & MIDHANI) produced initially and were successfully supplied to Hindustan Aeronautics Limited (E), Bengaluru for fitment into Adour Engine powering the Jaguar/Hawk aircrafts, said an official release.

The Adour engine is overhauled by HAL (E), Bengaluru and like in any aero-engine, the HPC drum assembly has to be replaced after a specified number of operations or in case of damage. The annual requirements of these high value HPC discs are quite large, warranting indigenisation.

Apart from DMRL and HAL (E), various agencies such as MIDHANI, Centre for Military Airworthiness & Certification - CEMILAC and Directorate General of Aeronautical Quality Assurance - DGAQA worked in unison to establish this crucial technology.

<https://www.thehindu.com/news/cities/Hyderabad/dmrl-makes-high-pressure-compressor-discs-for-aero-engines/article34700159.ece>

Army wants futuristic main-battle tanks in mega 'Make in India' project

By Rajat Pasndit

New Delhi: The Army now wants advanced "shock and awe" capabilities in the shape of futuristic main-battle tanks, with a wide array of weapons, missiles and protection systems as well as "niche" technologies like "artificial intelligence" and "see-through armour" for the crew. The Army has sought the response of foreign armament companies or OEMs (original equipment manufacturers) for the proposed mega "Make in India" project for induction of 1,770 "future ready combat vehicles (FRCVs)" in a phased manner.

The global RFI (request for information) specifies the Army expects induction of the FRCVs by 2030 under the "strategic partnership" route with "comprehensive" technology transfer, including detailed design manufacturing know-how, to the Indian partner. The FRCVs will remain in service for the next 40-50 years as the Indian Army's main battle tank, it says.

In conformity with the "emerging future threat spectrum and technological advancements", the new "state-of-the art" and "technology-enabled" tank should be able to operate in varied terrains like high-altitude areas, plains, riverine and deserts, adds the RFI.

The RFI is sure to once again trigger the long-standing raging battle between the Army and DRDO over the indigenous Arjun tanks. The Army has for long resisted induction of the "extra heavy" Arjun tanks, which it contends has "maintenance and spares" issues.

The defence ministry in February had accorded the preliminary approval for the procurement of 118 improved Arjun Mark-1A tanks for Rs 8,379 crore.

The 118 Arjuns will add to the first 124 such tanks inducted by the Army well over a decade ago, even as the DRDO remains keen to go in for a Mark-II version.

At present, the mainstay of the Army's armoured regiments is the Russian-origin T-90S tanks. The force has so far inducted 1,200 of the 1,657 T-90S tanks being licensed produced by the Heavy Vehicles Factory (HVF) at Avadi.

"The FRCVs, in turn, are supposed to be a replacement for the Army's 2,400 older T-72 tanks. The plan is to induct them in phases to ensure upgrades can take place with technological advancements in warfare. The see-through armour, for instance, is for 360-degree situational awareness of the crew through cameras, sensors, digital mapping systems," said an Army officer.

The RFI states that while enemy tanks will continue to be the primary target, the FRCVs should incorporate systems to negate ISR (intelligence, surveillance and reconnaissance) systems as well as counter new "aerial" threats like UCAVs (unmanned combat aerial vehicles), loitering munitions and the like.

The FRCVs should have advanced "multipurpose smart munitions" both for main and secondary armaments, with gun tube-launched anti-tank guided missiles. The secondary armaments should include multiple weapons for anti-aircraft, counter-UAV and ground roles, with different calibers assisted with remote-control weapon stations, says the RFI.

<https://timesofindia.indiatimes.com/india/army-wants-futuristic-main-battle-tanks-in-mega-make-in-india-project/articleshow/83153341.cms>



An Arjun Mark-1A tank

DRDO issues directions for usage of anti-Covid drug 2-DG on patients

DRDO said 2-DG should be prescribed as early as possible for moderate to severe Covid patients and caution must be exercised while prescribing it to those with comorbidities

New Delhi: The DRDO on Tuesday issued directions on the usage of its 2-DG drug on COVID-19 patients, stating that caution should be exercised while prescribing this medicine to people who have comorbidities such as uncontrolled diabetes, severe cardiac problem and acute respiratory distress syndrome.

The Drugs Controller General of India (DCGI) approved the 2-deoxy-D-glucose (2-DG) drug for emergency use as an adjunct therapy in moderate to severe coronavirus patients in early May.

The first batch of this oral drug, developed by the Defence Research and Development Organisation (DRDO), was released on May 17 by Defence Minister Rajnath Singh and Health Minister Harsh Vardhan.

On Tuesday, the DRDO on Twitter issued "directions for usage of this drug for COVID-19 patients as per DCGI approval".

"Ideally, 2DG should be prescribed as early as possible by doctors for moderate to severe COVID-19 patients for maximum duration up to 10 days," it mentioned.

Uncontrolled diabetes, severe cardiac problem, acute respiratory distress syndrome, severe hepatic and renal impairment patients have not been studied yet with 2DG, hence caution should be exercised, it noted.

"2DG should not be given to pregnant and lactating women and patients below 18 years," it stated. Patients or their attendants are advised to request their hospital to contact Dr Reddy's Laboratories (DRL) for medicine supply.

The anti-COVID-19 therapeutic application of 2-DG drug has been developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), a leading laboratory of DRDO, in collaboration with DRL.

The DRDO said the drug is approved for emergency use as adjunct therapy to the standard treatment of COVID-19 patients in the hospital settings.

The defence ministry on May 8 said that the clinical trials of 2-DG showed that it helps in faster recovery of hospitalised patients and reduces supplemental oxygen dependence.

The approval of the drug has come at a time India has been grappling with a record-breaking wave of coronavirus pandemic that has stretched the country's healthcare infrastructure to its limit.

The drug comes in powder form in sachet and is taken orally by dissolving it in water.

In efficacy trends, the defence ministry said, patients treated with 2-DG showed faster symptomatic cure than the standard of care on various endpoints. -PTI

<https://theprint.in/india/drdo-issues-directions-for-usage-of-anti-covid-drug-2-dg-on-patients/669753/>



Defence Minister Rajnath Singh and Union Health Minister Harsh Vardhan released the first batch of Anti-Covid drug 2DG developed by DRDO, on 17 May 2021 | [Twitter/@drharshvardhan](https://twitter.com/drharshvardhan)

DRDO's 2DG drug approved for emergency use as an adjunct therapy for COVID-19 patients

The DRDO has informed that anti-COVID drug 2DG can now be given to the COVID-19 patients under the care and prescription of the doctors

By Shailaja Tripathi

The Defence Research and Development Organisation (DRDO) announced on June 1, 2021, that the anti-COVID drug 2DG has been approved for emergency use as an adjunct therapy to the standard of care in the treatment of COVID-19 patients in hospital settings.

The DRDO informed that anti-COVID drug 2DG can now be given to the COVID-19 patients under the care and prescription of the doctors.

The first batch of the drug was released on May 17, 2021, by the Union Defence Minister Rajnath Singh and the Health Minister Dr. Harsh Vardhan, after the DCGI approved the emergency use authorization of 2-deoxy-D-glucose (2-DG), an antiviral drug as an adjunct therapy for moderate to severe COVID-19 patients.

2DG: Guidelines by DRDO regarding its anti-COVID-19 drug

- As per DRDO, the 2DG drug, ideally, must be prescribed as early as possible by the doctors for moderate to severe COVID-19 patients for a maximum duration of up to 10 days.
- The severe cardiac problem, uncontrolled diabetes, severe hepatic, ARDS, and renal impairment patients have not been studied yet with 2DG and hence the caution must be exercised.
- The 2DG drug must not be given to pregnant and lactating women and patients below 18 years of age.
- The attendants and the patients are also advised to request the hospital to contact Dr. Reddy's Laboratories in Hyderabad for the medicine supply.

Development of 2DG Drug: Background

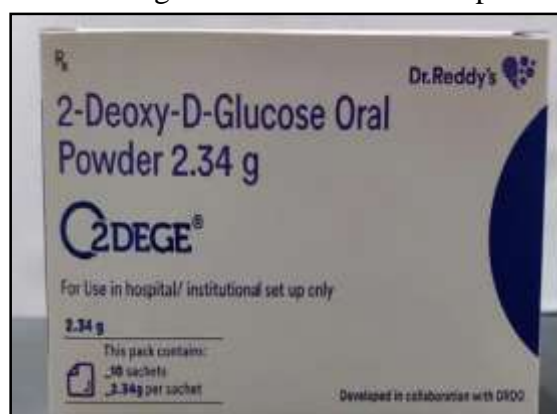
When the pandemic broke out in 2020, the scientists of the Institute of Nuclear Medicine and Allied Sciences, a DRDO's lab, conducted laboratory experiments with the help of Cellular and Molecular Biology in collaboration with DRL. They found that this molecule works effectively against the SARS-CoV-2 virus and also inhibits viral growth.

The drug comes in powder form in sachet and is taken orally by dissolving it in water.

The drug accumulates in the virus-infected cells and prevents the growth of the virus by stopping viral synthesis and energy production. Its selective accumulation in the virally infected cells makes the 2DG drug unique.

As per the Union Health Ministry, the drug reportedly reduces the average recovery time of the patient by two and a half days and oxygen demand by up to 40%.

https://www.jagranjosh.com/current-affairs/drdo-2dg-drug-approved-for-emergency-use-as-an-adjunct-therapy-for-covid-19-patients-1622549952-1?ref=list_ca



DRDO drug

DRDO's COVID Hospital

Existing healthcare infrastructure got a boost by addition of a 500 bedded COVID hospital built by the country's premier Defence Research and Development Organisation (DRDO) which was inaugurated by Lieutenant Governor Manoj Sinha thus dedicating the facility to Jammu. Apart from meeting the pressure load of virus infected people with its inbuilt facilities and better equipped medical infrastructure like 125 ICU beds and all others with much needed oxygen facility, notable thing about coming up of this hospital is within shortest span of time and the entire team looking after it working round the clock.

The team deserves all praises to let this hospital be ready in record time to keep pace with the demand for admission in hospitals of the COVID infected persons. Basically, looking after and promoting strategic multifarious defence related latest technologies and scientific developments through its network of laboratories, DRDO building a hospital like the one under reference only points out to the varied activities related to medicine and healthcare this organisation can take upon itself. It may be recalled that DRDO recently created a history of sorts by producing an effective anti COVID drug, known as 2-DG which is going to be available at affordable price, commercial launch of which was expected by the end of June this year.

Situated at Bhagwati Nagar, in the heart of Jammu, this hospital having come up while the second wave of the COVID pandemic was raging with all round pressure on hospital beds and allied facilities needed for treatment of COVID patients, would prove of immense help in treating the patients where under one roof, all prerequisites for timely treatment are existing in this hospital. Those are round the clock oxygen supply, ventilators, monitors, in-house pharmacy, diagnostic facilities, X-Ray and CT Scan facility and the like. In other words, quick and prompt treatment to admitted patients has been fully ensured.

We hope initiatives like the DRDO can go a long way in supplementing the efforts of the Government in improving upon the existing and adding new infrastructure in healthcare sector. It is noteworthy that any hospital coming up, as we may be needing more looking to the predictions of the medical experts about the "imminent" possibility of the third corona-virus wave hitting the country, that the hospital should be having all the facilities and testing, X-Ray, CT Scan and in-house pharmacy which not only would be increasingly useful to the patients but for attending Doctors as well in early diagnosing and treating the patients. We do not hesitate in saying that the importance required to be given to healthcare projects like the one under reference, has not been on preferential basis.

Experience and lessons drawn from the second wave vis-a-vis the official preparedness must now percolate in according top most priority to health infrastructure even if it meant postponing some in others sectors. Saving lives should be the aim and objects of the Government and its various agencies and if deficiency of funds are any stumbling block, raising the same by increasing revenues must be explored.

At the same time, we need to be alert and responsive to the healthcare needs of the rural and far flung areas and apart from the well devised Panchayat Covid Care Centres for such areas, nearest outreach of hospitals should be made possible for those patients needing to be shifted from the basic Panchayati Centres for which prompt and readily available ambulance services should be made available. While we hope the new hospital at Bhagwati Nagar which has started operating shall lighten the pressure on the other COVID care hospitals, yet without human resources being augmented and optimum use of the available strength and professional expertise made, mere opening of hospitals would not meet the desired ends.

<https://www.dailyexcelsior.com/drdo-covid-hospital/>

MP inspects DRDO Oxygen Plant site in K.R. Hospital premises

Mysore/Mysuru: With the DRDO (Defence Research and Development Organisation) all set to install a Pressure Swing Adsorption (PSA) Medical Oxygen-Generator Plant at K.R. Hospital premises, MP Pratap Simha inspected the reserved site in the Hospital premises this morning.

Speaking on the occasion, Simha said that Mysuru is among the seven cities in the State where DRDO Oxygen Plants will come up with funding by PM CARES Fund (Prime Minister's Citizen Assistance and Relief in Emergency Situations Fund).

Noting that the Plant can generate 1,000 litres of Oxygen per minute and can cater to 190 patients at a flow rate of 5 litres per minute and charge 195 cylinders per day, the MP said that the Plant will be installed by NHA (National Highways Authority of India), which is executing the 10-lane Mysuru-Bengaluru Highway.



Stating that the Plant, costing more than Rs. 1 crore, will come up on a 30'x40' site in the Hospital premises, the MP said that a separate power line will be drawn for the Plant.

Pointing out that the Plant is exclusively meant for K.R. Hospital, he said that the works on the installation will start soon and is expected to be completed by the end of this month.

"I have appealed to the State and Central Governments for Mini-Plants at Taluk level and am hopeful that such Plants will come up at all taluks. I will try my best to ensure that K.R. Hospital, which is one of the biggest State-run Hospitals in Karnataka, is upgraded and gets national recognition," MP Pratap Simha said.

Referring to Deputy Commissioner (DC) Rohini Sindhuri giving an account of the expenditure of Rs. 36 crore incurred so far out of the special funds (Rs. 41 crore) given by the State Government for COVID management, Pratap Simha said that he was not at all satisfied with the account given by the DC as he had sought the same with full details.

Asserting that he had sought an account of Government funds expenditure as a matter of transparency, he said that he had sought details under different heads in detail. But the DC has given a broad statement of accounts, which is not acceptable to him.

Contending that the necessity for seeking accounts from the previous DC, Abhiram G. Sankar, did not arise at all as everything was done in a fair and transparent manner, Simha said that he had sought detailed accounts only for the sake of transparency and not for any personal grudge.

Arguing that many donors had provided food and shelter to COVID-affected people ever since the pandemic broke out last year, he reiterated that, as a responsible MP, he had sought accounts on expenditure of Government funds with full details and supporting records.

Taking strong exception to the District Administration's action of serving a notice to the Forest Department for vaccination of some of its personnel on its own, Simha said that Forest staff too are frontline warriors and they should be vaccinated on priority.

"I have a plan on launching a massive vaccination and testing drive for all frontline warriors and priority groups. Also, the nature of the drive, triage and testing (both RAT and RT-PCR) is being worked out and I have taken personal interest for ensuring the success of this drive," the MP claimed.

NHAI Project Director B.T. Sridhar, Mysore Medical College and Research Institute (MMC&RI) Dean and Director Dr. C.P. Nanjaraj, Chief Administrative Officer (CAO) Devaraj,

K.R. Hospital Medical Superintendent Dr. B.L. Nanjundaswamy, Blood Bank Head Dr. B.S. Manjunath and others were present.

<https://starofmysore.com/mp-inspects-drdo-oxygen-plant-site-in-k-r-hospital-premises/>



Wed, 02 June 2021

DC Srinagar holds meeting for follow up of the directions of LG for completion of 500-bedded Covid Hospital at Khanmoh

Deputy Commissioner Srinagar, Mohammad Aijaz Asad today chaired a meeting of concerned officers to sort out all the issues to ensure completion of 500-bedded COVID CARE Hospital at Khonmoh within the deadline set by the Lieutenant Governor during his recent visit at the work site in Khonmoh.

Chief Engineer, KPDCL, Ajaz Ahmad Dar, Medical Superintendent of the Hospital, Chief Planning Officer, Srinagar, besides concerned Officers from DRDO, PHE, PDD, FCS&CA, Revenue were present in the meeting.

During the review the project Incharge from DRDO apprised the meeting that work is in full swing and expected to be completed shortly.

The DC asked the officers to take comprehensive measures to ensure that all requisite staff, medical supplies, equipment, diagnostic tools, and other logistics are ready within the timeline. The DC directed for taking all necessary measures with regard to Housekeeping, Laundry, disposal of Bio-medical and other wastes. He also directed for installation of fire fighting system at the hospital.

To ensure adequate water supply to the hospital, the DC asked the Ground Water Division to dig up a dedicated Bore Well in the hospital premises within two days.

The Deputy Commissioner also passed the directions that SMC would ensure Sanitation and Sanitization in and around the hospital.

The DC Srinagar reiterated that the operationalization of DRDO's Hospital at Khonmoh would further strengthen efforts against Covid pandemic,

On the occasion, the Chief Engineer KPDCL assured that all possible measures have been taken to ensure reliable and uninterrupted supply of power in the hospital round the clock. The Medical Superintendent of the hospital also put forth some suggestions for better functioning of the hospital.

Pertinent to mention that the Covid Hospital, Khonmoh has the capacity for 125 ICU beds and 375 beds with oxygen and substantially will increase the Covid dedicated bed capacity to ramp up the healthcare infrastructure to effectively deal with the Corona virus pandemic.

In the end DC enjoined upon all the Departments to work in double shifts to meet the deadline fixed by the Lieutenant Governor. He assured DRDO of all support to achieve the intended target.

<http://brighterkashmir.com/dc-srinagar-holds-meeting-for-follow-up-of-the-directions-of-lg-for-completion-of-500-bedded-covid-hospital-at-khanmoh->

खुशखबरी: MP में भी मिलेगी DRDO की दवा 2-डीजी, इस तारीख तक आने वाली है पहली खेप

मध्य प्रदेश में भी जल्द DRDO की दवा 2-डीजी आने वाली है। जिसका इस्तेमाल कोविड के मरीजों के इलाज में किया जाएगा।

भोपाल: कोरोना काल में मध्य प्रदेश के लोगों को अच्छी खबर मिलने जा रही है। कोविड के इलाज में कारगर मानी जा रही DRDO की दवा 2-डीजी (2डियोक्सी डी ग्लूकोज) अब जल्द ही मध्य प्रदेश में आने वाली है। जिसका इस्तेमाल कोविड के मरीजों को इलाज में किया जाएगा। प्रदेश सरकार ने दवा के 50 हजार डोज का आर्डर दवा उत्पादन करने वाली निजी फार्मा कंपनी को भेजा है।

10 जून तक आ जाएगी पहली खेप

प्रदेश के स्वास्थ्य सचिव आकाश त्रिपाठी ने बताया कि 10 जून तक DRDO-2 दवा 2-डीजी की पहली खेप मध्य प्रदेश आ जाएगी। उन्होंने बताया कि प्रदेश सरकार ने डीआरआडीओ दवा के अलावा मोनोक्लोनल एंटीबॉडी कॉकटेल के दवा के भी 500 डोज मध्य प्रदेश बुलाए हैं। ये दोनों दवाएं जल्द ही प्रदेश आ जाएगी। जिससे कोविड के मरीजों के इलाज में आसानी होगी।

कासिरिविमेब और इमडेविमेब इंजेक्शन का जबलपुर में चल रहा ट्रायल

अमेरिका के पूर्व राष्ट्रपति डोनाल्ड ट्रंप जब कोरोना से संक्रमित हुए थे, तो उनका इलाज एंटीबॉडी कॉकटेल इंजेक्शन से किया गया था। बता दें कि अब उसी कॉकटेल इंजेक्शन का जबलपुर में ट्रायल किया जाएगा। शहर के कई सरकारी और कुछ निजी अस्पतालों में इस दवाई का ट्रायल किया जाएगा। डोनाल्ड ट्रंप को यह इंजेक्शन दिए जाने से पहले अमेरिका की फूड एंड ड्रग्स इकाई ने मंजूरी दी, बाद में यूरोप ने। स्वास्थ्य विभाग के अधिकारियों का कहना है कि कोरोना संक्रमित व्यक्ति को शुरुआती तीन-चार दिन में दवा की दोनों डोज दी जा सकती है। इससे मरीज गंभीर स्थिति में जाने से बच जाता है। इसलिए इस इंजेक्शन का ट्रायल जबलपुर में किया जा रहा है।

एंटीबॉडी कॉकटेल इंजेक्शन की पहली खेप भी प्रदेश में बुला ली गई है। प्रदेश सरकार की तरफ से राजधानी भोपाल और इंदौर को 75-75 इंजेक्शन, जबलपुर और ग्वालियर को 50-50, जबकि सागर और रीवा को 25-25 इंजेक्शन दिए गए हैं। इसके अलावा भोपाल एम्स को 100 इंजेक्शन अलग से दिए गए हैं। प्रदेश सरकार की तरफ से बताया गया कि 600 इंजेक्शन की एक खेप और जल्द प्रदेश आएगी। फिलहाल एंटीबॉडी कॉकटेल को भारत में सिप्ला कंपनी बना रही है।

DRDO-2 की दवा से मरीजों के इलाज में होगी आसानी

प्रदेश सरकार का कहना है कि DRDO-2 की दवा से मरीजों के इलाज में होगी आसानी होगी। इसलिए कोशिश की जा रही है इस दवा के ज्यादा से ज्यादा डोज मध्य प्रदेश बुलाए जाए। माना जा रहा है कि 7 से 10 जून के बीच पहली खेप प्रदेश में आ जाएगी।

<https://zeenews.india.com/hindi/india/madhya-pradesh-chhattisgarh/trending-news/drdo-medicine-2dg-will-be-available-in-madhya-pradesh-from-10-june-effective-in-treating-corona-patient-mpap/911875>

'No use' debating over allopathy, ayurveda; both useful: NITI Aayog's VK Saraswat

Saraswat, who was associated in the development of an anti-COVID drug by DRDO, also made it clear that the drug does not have anything to do with Patanjali Ayurved,

There is actually "no use" in debating over allopathy and ayurveda as both are different and useful medicine systems, renowned scientist and Niti Aayog Member V K Saraswat said on Tuesday even as he emphasised that more research needs to be done in ayurveda to ensure it is more acceptable to the society.

Saraswat, who was associated in the development of an anti-COVID drug by DRDO, also made it clear that the drug does not have anything to do with Patanjali Ayurved, amid reports that the medicine is connected with the research done by Patanjali Ayurved.

The Niti Aayog Member's remarks on allopathy and ayurveda comes against the backdrop of the Indian Medical Association (IMA) raising strong objections to yoga guru Ramdev's comments that questioned the efficacy of allopathic medicines in treating COVID infections. Ramdev also steers Patanjali Ayurved.



Niti Aayog Member V K Saraswat

In an interview to , Saraswat said India has got traditional medicine systems for thousands of years and that ayurvedic medicine has been responsible for improving the immunity of people.

"I think ayurveda and allopathy, they are two streams of medicine and they survive together... one has a particular role and other has a different role," he said.

Amid the ongoing debate in certain quarters over allopathy and ayurveda, he said, the debate "is actually of no use", adding that both the streams are useful.

"My opinion is that the ayurvedic system of medicine should research more and more to bring (itself) at par in understanding of the scientific methods to become more acceptable by the society, which has been done in the allopathy," he emphasised.

Last month, Union Health Minister Harsh Vardhan had called Ramdev's statement on allopathic medicines "extremely unfortunate" and had asked him to withdraw the remarks, saying it disrespects 'corona warriors' and can break the morale of healthcare workers. Later, Ramdev withdrew the remarks.

When asked whether the anti-COVID drug 2-DG developed by the Defence and Research Development Organisation (DRDO) is connected with research done by Patanjali Ayurved, Saraswat replied in the negative.

"It (2-DG) has nothing to do with Patanjali. Patanjali does not know anything about it. It is not their work," he pointed out.

Saraswat, a former chief of DRDO, said he was the scientific advisor when that drug was developed.

"When the drug was developed, it was basically for supporting the treatment of patients who suffer from radiation-induced cancer... for doing that cancer treatment we do radiation therapy," he explained.

According to him, during a radiation process, not only the cancer cells die but also the healthy cells die, which results in collateral damage to the human body.

"So, we created this drug in such a manner because you know the cancer cells are hungry for energy, so they take energy from our body. Our body gives energy in the form of glucose. Instead of taking body sugar, we started injecting. This drug is like a glucose but actually it is not glucose, it does not have any energy," he said.

Elaborating further, Saraswat said cancerous cells would absorb the drug and then become weak. Once they become weak, lower doses of radiation can be given to kill the cancerous cells and that will not be harmful for healthy cells, he added.

According to Saraswat, the same theory is now being utilised for treating COVID infections.

DRDO's 2-DG has been approved by the Drugs Controller General of India (DGCI) as an oral drug for emergency use as an adjunct therapy in moderate to severe coronavirus patients.

<https://www.businesstoday.in/current/economy-politics/no-use-debating-over-allopathy-ayurveda-both-useful-niti-aayogs-vk-saraswat/story/440580.html>

Defence News

Defence Strategic: National/International



Press Information Bureau

Government of India

Ministry of Defence

Tue, 01 June 2021 1:38PM

Raksha Mantri Shri Rajnath Singh reviews bilateral defence cooperation in telephonic conversation with his Australian counterpart

Raksha Mantri Shri Rajnath Singh had a telephonic conversation with Australian Minister for Defence Mr Peter Dutton on June 01, 2021. During their interaction, both Ministers reviewed the defence cooperation between the two countries in the backdrop of the current regional situation. Both Ministers acknowledged the momentum that defence cooperation between India and Australia has achieved following the upgradation of the partnership to a Comprehensive Strategic Partnership in Jun 2020. The participation of Australia in Exercise MALABAR has been an important milestone in this enhanced partnership.

Both Ministers expressed satisfaction at the growing defence ties between the two countries. Both sides reviewed the progress on various bilateral defence cooperation initiatives and expressed commitment to further elevate engagements between the Armed Forces. During the dialogue, both Ministers expressed their intent to convene the 2+2 Ministerial Dialogue at the earliest.

Shri Rajnath Singh thanked Australia for their assistance to India in fight against COVID-19.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723359>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 01 June 2021 1:38PM

रक्षा मंत्री श्री राजनाथ सिंह ने अपने ऑस्ट्रेलियाई समकक्ष के साथ टेलीफोन पर की गई बातचीत में द्विपक्षीय रक्षा सहयोग की समीक्षा की

रक्षा मंत्री श्री राजनाथ सिंह ने 01 जून, 2021 को ऑस्ट्रेलिया के रक्षा मंत्री श्री पीटर डटन के साथ टेलीफोन पर बातचीत की। इस बातचीत के दौरान दोनों मंत्रियों ने मौजूदा क्षेत्रीय स्थिति की पृष्ठभूमि में दोनों देशों के बीच रक्षा सहयोग की समीक्षा की। दोनों मंत्रियों ने उस गतिशीलता को याद किया, जिसे भारत और ऑस्ट्रेलिया के बीच रक्षा सहयोग ने जून, 2020 में साझेदारी को उन्नत करके व्यापक रणनीतिक साझेदारी बनाने के दौरान प्राप्त किया है। वहीं इस आगे बढ़ती हुई साझेदारी में अभ्यास मालाबार में ऑस्ट्रेलिया की भागीदारी एक महत्वपूर्ण मील का पत्थर रही है।

दोनों मंत्रियों ने दोनों देशों के बीच बढ़ते रक्षा संबंधों पर संतोष व्यक्त किया है। दोनों पक्षों ने विभिन्न द्विपक्षीय रक्षा सहयोग पहलों की प्रगति की समीक्षा की और सशस्त्र बलों के बीच संबंधों को और बढ़ाने की प्रतिबद्धता व्यक्त की। इस बातचीत के दौरान, दोनों मंत्रियों ने 2+2 मंत्रिस्तरीय वार्ता जल्द से जल्द बुलाने की अपनी इच्छा व्यक्त की।

श्री राजनाथ सिंह ने कोविड-19 के खिलाफ लड़ाई में भारत की सहायता के लिए ऑस्ट्रेलिया को धन्यवाद दिया।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723359>



**Press Information Bureau
Government of India**

Ministry of Defence

Tue, 01 June 2021 2:26PM

Vice Admiral Ravneet Singh AVSM, NM assumes charge as Deputy Chief of Naval Staff

Vice Admiral Ravneet Singh, AVSM, NM assumed charge as Deputy Chief of Naval Staff on 01 Jun 2021. Vice Admiral Ravneet Singh was commissioned into the Indian Navy on 01 Jul 1983 and specialized in Aviation. The Flag Officer is a Qualified Flying Instructor with Master Green instrument rating. He has flown HT-2, Kiran HJT 16, TS 11 Iskra, Hunter, Harrier Gr 3, Jet Provost, Chetak, Gazelle, Hawk and Mig 29 KUB aircraft during his illustrious career.

The Admiral has held various challenging Staff, Command and Diplomatic assignments during his distinguished naval career and has had wide ranging experience onboard diverse platforms. He has commanded various frontline ships and Naval Air Squadrons including INS Himgiri, INS Ranvijay, INS Ranvir, INAS 551B, INAS 300 as well as the premier Air Base INS Hansa. Additionally he was also appointed Indian Defence Advisor (Kenya, Tanzania and Seychelles) from 2005 to 2008. On promotion to Flag rank, he has held key assignments of Assistant Controller Carrier Project & Assistant Controller Warship Production and Acquisition at IHQ MoD (N), Flag Officer Goa Area/ Flag Officer Naval Aviation at Goa and Flag Officer Commanding Western Fleet at Mumbai. In the rank of Vice Admiral, the Flag Officer has tenanted the appointments of Chief of Staff at Headquarters Western Naval Command, Mumbai, Director General Project Seabird and Chief of Personnel at IHQ MoD (N).



The Flag Officer has undergone various courses in India and abroad, which include the Flying Instructor Courses at Tambaram, Staff Courses at DSSC Wellington, Harrier Conversion Courses at Royal Air Force Base, Withering, UK and Project management Programme at IIM Ahmedabad.

Vice Admiral Ravneet Singh was awarded Commendation by the Chief of the Naval Staff in 2000 and has been decorated with the Nausena Medal (Gallantry) in 2004 and AtiVishishtSeva Medal in 2017.

The Admiral relieves Vice Admiral MS Pawar, PVSM, AVSM, VSM who superannuated on 31 May 21.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723375>



पत्र सूचना कार्यालय
भारत सरकार

रक्षा मंत्रालय

Tue, 01 June 2021 2:26PM

वाइस एडमिरल रवनीत सिंह एवीएसएम, एलएम ने नौसेना स्टाफ के उप प्रमुख का कार्यभार संभाला

वाइस, एडमिरल रवनीत सिंह एवीएसएम, एनएम ने 01 जून, 2021 को नौ सेना स्टाफ के उप प्रमुख के रूप में कार्यभार संभाल लिया। वाइस एडमिरल रवनीत सिंह 1 जुलाई 1983 को भारतीय नौ सेना में कमीशन किए गए और एविएशन में विशेषज्ञ हैं। फ्लैग ऑफिसर मास्टर ग्रीन इंस्ट्रुमेंट के साथ क्वालिफाइड फ्लाईंग इंस्ट्रक्टर हैं। अपने शानदार करियर के दौरान उन्होंने एचटी-2, किरण एचजेटी 16, टीएस 11 इस्क्रा, हंटर, हैरियर जीआर 3, जेट प्रोवोस्ट, चेतक, गज़ेल, हॉक और मिग 29 केयूबी विमान उड़ाए हैं।



एडमिरल ने अपने विशिष्ट नौसेना के करियर के दौरान विभिन्न चुनौतीपूर्ण स्टाफ, कमान और राजनयिक कार्यों को निभाया है और विभिन्न प्लेटफार्मों पर व्यापक अनुभव प्राप्त किया है। उन्होंने आईएनएस हिमगिरी, आईएनएस रणविजय, आईएनएस रणवीर, आईएनएस 551बी, आईएनएस 300 के साथ-साथ प्रमुख एयर बेस आईएनएस हंसा सहित विभिन्न फ्रंटलाइन जहाजों और नौसेना वायु स्क्वाड्रनों की कमान संभाली है। इसके अतिरिक्त उन्हें 2005 से 2008 तक भारतीय रक्षा सलाहकार (केन्या, तंजानिया और सेशेल्स) भी नियुक्त किया गया था। फ्लैग रैंक में पदोन्नत होने पर उन्होंने आईएचक्यू एमओडी (एन) में सहायक नियंत्रक वाहक परियोजना और सहायक नियंत्रक युद्धपोत उत्पादन और अधिग्रहण, गोवा में फ्लैग ऑफिसर गोवा क्षेत्र / फ्लैग ऑफिसर नेवल एविएशन और मुंबई में फ्लैग ऑफिसर कमांडिंग वेस्टर्न फ्लीट के प्रमुख दायित्वों को संभाला है। वाइस एडमिरल के रैंक में फ्लैग ऑफिसर की प्रमुख नियुक्तियों में मुख्यालय पश्चिमी नौसेना कमान, मुंबई में चीफ ऑफ स्टाफ, डायरेक्टर जनरल प्रोजेक्ट सीबर्ड और आईएचक्यू एमओडी (एन) में कार्मिक प्रमुख शामिल हैं।

फ्लैग ऑफिसर ने भारत और विदेशों में विभिन्न पाठ्यक्रमों में भाग लिया है। इन पाठ्यक्रमों में तांबरम में फ्लाईंग इंस्ट्रक्टर कोर्स, डीएसएससी वेलिंगटन में स्टाफ कोर्स, रॉयल एयर फोर्स बेस, विदरिंग, यूके में हैरियर कनवर्सन पाठ्यक्रम और आईआईएम अहमदाबाद में परियोजना प्रबंधन कार्यक्रम शामिल हैं।

वाइस एडमिरल रवनीत सिंह को 2000 में नौसेना प्रमुख द्वारा प्रशस्ति से सम्मानित किया गया था और 2004 में नौसेना पदक (शौर्य) और 2017 में अति विशिष्ट सेवा पदक से सम्मानित किया गया था।

एडमिरल ने वाइस एडमिरल एमएस पवार, पीवीएसएम, एवीएसएम, वीएसएम को कार्यमुक्त किया, जो 31 मई 2021 को सेवानिवृत्त हुए।

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723421>



Press Information Bureau
Government of India

Ministry of Defence

Tue, 01 June 2021 4:48PM

Vice Admiral Sreekumar Nair, AVSM, NM takes over as DGNP, Visakhapatnam

Vice Admiral Sreekumar Nair, AVSM, NM, took over as the Director General Naval Projects (DGNP), Visakhapatnam from Vice Admiral Kiran Deshmukh, AVSM, VSM. Vice Admiral Nair has earlier served as Admiral Superintendent, Naval Dockyard, Visakhapatnam and Assistant Chief of Materiel (Information Technology and Systems), at Integrated Headquarters, Ministry of Defence (Navy).



The Flag officer was commissioned as an Electrical Officer into the Indian Navy on 17 Aug 1987 and is an alumnus of erstwhile Regional Engineering College (now NIT), Tiruchrapalli and IIT Delhi. The Flag Officer has held various important appointments in the Indian Navy including Operational, Staff and Dockyard. He has served onboard Indian Naval Ships Ranvir, Rana, Delhi and Mumbai. He has commanded the premier training establishment INS Valsura at Jamnagar. His other major ashore appointments include Chief Staff Officer (Technical), Headquarters Southern Naval Command, Principal Director Ship Production, Principal Director Weapon Equipment and Director of Personnel at Integrated Headquarters, Ministry of Defence (Navy), New Delhi.

The Admiral has received Nao Sena Medal (NM) in 2010 and Ati Vishisht Seva Medal (AVSM) in 2021 for his meritorious service.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723423>



Press Information Bureau
Government of India

Ministry of Defence

Tue, 01 June 2021 1:36PM

Lieutenant General Manoj Pande, AVSM, VSM takes over Eastern Command

Lieutenant General Manoj Pande, AtiVishishtSeva Medal, VishishtSeva Medal, took over the reins of Eastern Command as its General Officer Commanding-in-Chief on 01 June 2021. Prior to this, he was Commander-in-Chief Andaman & Nicobar Command, the only Tri-services Operational Command in India from 01 Jun 2020 to 31 May 2021.

The General was commissioned in the Bombay Sappers in December 1982. In his distinguished service career, he has held several prestigious command and staff assignments in Conventional as well as Counter Insurgency Operations in all types of terrain. He commanded an Engineer Regiment along Line of Control during Operation PARAKRAM in J&K, an Engineer Brigade in Western Sector, Infantry Brigade along Line of Control in J&K, Mountain Division in High Altitude Area of Western Ladakh & a Corps in North East. The General is a graduate of Staff College Camberley(UK) and has varied experience in staff appointments which include the Military Secretary & Military Operations Branches at Army Headquarters, Operations Branch in a Brigade Headquarters in the North East and Headquarters Eastern Command at Kolkata.



The Army Commander conveys his warm greetings to the people and wishes them peace, prosperity, health & happiness in times ahead.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723358>



Press Information Bureau
Government of India

Ministry of Defence

Tue, 01 June 2021 12:54PM

Lt Gen Ajai Singh takes over as 16th Commander-in-Chief, Andaman & Nicobar Command

Lt Gen Ajai Singh assumed charge as the 16th Commander-in-Chief of the Andaman & Nicobar Command (CINCAN) on June 01, 2021. The Andaman and Nicobar Command (ANC) is the only tri-service theatre command of the Armed Forces, based at Port Blair. A fifth generation Army as well as Cavalry/Armoured Corps officer, with family service of over 162 years since September 13, 1858, Lt Gen Ajai Singh is an alumnus of The Lawrence School, Sanawar and NDA & IMA. He was commissioned in December 1983 into 81 Armoured Regiment, a Regiment raised by his late father.

The General officer has had the privilege of tenantry various appointments across all six of the Army's geographical Commands as well as at the Army Training Command. He was an Instructor of Tank Gunnery & Tactics at the Armoured Corps Centre & School and served at important assignments at the Army HQ, HQ Integrated Defence Staff (IDS) as well as with the United Nations as a Military Observer at Angola.

Lt Gen Ajai Singh also undertook volunteer tenures for counter-insurgency operations in the Kashmir Valley and in the North East, where he was posted at a Mountain Division on the border. As a Major with over 16 years of service, the General officer had volunteered for a tenure on the Siachen Glacier and was posted to a Battalion of the Maratha Light Infantry, with whom he commanded a Rifle Company in Operations VIJAY (Kargil) and MEGHDOOT (Siachen Glacier) and received the Army Chief's Commendation for gallantry.

The General officer also held sensitive posts at the Army HQ as the Additional DG at the Military Operations Directorate and was DG, Financial Planning and DG, Military Training. Other than a Rifle Company in active operations, Lt Gen Ajai Singh commanded an Armoured Regiment, Brigade & Division and a Corps deployed on the border in Punjab and Rajasthan. He has attended numerous prestigious military courses as well as mountaineering courses at the High-Altitude Warfare School and tank gunnery & technology courses. Lt Gen Ajai Singh was also selected to attend a UN Senior Mission Leader Course at Indonesia as well as the Royal College of Defence Studies (RCDS) Course at the UK.

Lt Gen Ajai Singh was an active part of flood relief efforts in Uttarakhand in 2013, Uttar Pradesh & Bihar in 2017 and Kerala in 2018 as well as the of Government's Covid amelioration efforts.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723352>





Press Information Bureau
Government of India

Ministry of Defence

Tue, 01 June 2021 11:27AM

Vice Admiral Sandeep Naithani, AVSM, VSM, assumes charge as the Chief of Materiel

Vice Admiral Sandeep Naithani, AVSM, VSM, has assumed charge as the *Chief of Materiel*, of the Indian Navy on 01 June 2021.

A graduate of the National Defence Academy, Khadakwasla, Pune. He was commissioned into the Electrical Branch of the Indian Navy on 01 Jan 1985. The Admiral is a Post Graduate in Radar and Communication Engineering from IIT Delhi and a distinguished alumnus of the Defence Services Staff College (DSSC) and the National Defence College (NDC).

The Admiral has held various challenging appointments during his illustrious naval career spanning over three and a half decades. The officer has served on board the Aircraft Carrier Viraat in various capacities. He has tenanted important appointments in Naval Dockyards at Mumbai and Visakhapatnam and in the Staff, Personnel and Materiel Branches of Naval Headquarters. The Admiral has also commanded the premier electrical training establishment of the Navy, INS Valsura.

As a Flag Officer, the Admiral has served as the Assistant Chief of Materiel (Modernisation) in Naval Headquarters, Chief Staff Officer (Technical), HQ WNC, Admiral Superintendent of Naval Dockyard Mumbai, Director General Naval Project at Mumbai, Programme Director, HQ ATVP, and as Controller of Warship Production and Acquisition in Naval Headquarters.

In recognition of his distinguished services, the Admiral has been awarded the Ati Vishisht Seva Medal and Vishisht Seva Model.

As a Principal Staff Officer and the Senior most Technical Officer in the Indian Navy, the Admiral would be in charge of all aspects related to maintenance management and life-cycle product support of all Engineering, Electrical, Electronics, Weapons, Sensors and IT related equipment and systems for ships and submarines, issues related to indigenisation of naval equipment and creation of major marine and technical infrastructure.

The Admiral relieves Vice Admiral SR Sarma, PVSM, AVSM, VSM who superannuated on 31 May 21.

<https://pib.gov.in/PressReleasePage.aspx?PRID=1723332>



Army's Western Command Chief visits Haryana to review preparedness of troops

During the visit, the army commander was briefed on the formation's operational capabilities and mission readiness. He was also briefed on the achievement of the formation by commander Kharga Sappers

The Indian Army's western command chief Lieutenant General RP Singh visited the Kharga Sappers at Zirakpur on Tuesday and reviewed the operational preparedness of troops.

During the visit, the army commander was briefed on the formation's operational capabilities and mission readiness. He was also briefed on the achievement of the formation by commander Kharga Sappers in the presence of Lieutenant General NS Raja Subramani, GOC Kharga Corps, a statement informed.

Two personnel of the formation were awarded the Western Army Commanders Commendation for achievements in the field of engineering.

Army commanders lauded the formation for their sustained efforts towards achieving excellence and their contribution towards force preservation during the Covid-19 pandemic. He exhorted the formation to remain prepared for future operational challenges.



Lieutenant General RP Singh reviewing operational preparedness at Kharga Sappers. (ANI)al RP Singh reviewing operational preparedness at Kharga Sappers. (ANI)

<https://www.hindustantimes.com/cities/chandigarh-news/armys-western-command-chief-visits-haryana-to-review-preparedness-of-troops-101622598552999.html>

Indian Army deploys K-9 Vajra in Ladakh; Know all about its specifications & strengths

The K-9 Vajra Self-Propelled Artillery is an effective weapon that was inducted into the Indian Army in 2018. It has been deployed for the first time in Ladakh

By Shiwani Sharma

The K-9 Vajra Self-Propelled Artillery is a very effective weapon that was inducted into the Indian Army in 2018. K-9 Vajra has been deployed for the first time in Ladakh. The K-9 Vajra Self-Propelled Artillery is now ready for action in the plains of Ladakh.

The Indian Army has been on an alert ever since the action of Chinese troops last year on the Line of Actual Control (LAC) of eastern Ladakh. Now the Indian Army has made special preparations and has deployed K-9 Vajra Selfpropelled Artillery to respond to any attack by the Chinese Army in the Ladakh plains.



Indian Army

What is the speciality of K-9 Vajra Self-propelled Artillery?

K-9 has been inducted into the Indian Army in 2018 and has been deployed for the first time in Ladakh. The K-9 Vajra Self-Propelled Artillery is a very effective weapon for action in the plains of Ladakh. It has a 155 mm cannon, which ranges from 18 to 52 km. It has tracks like tanks so that it can move on any kind of ground. Its powerful engine gives it a speed of 67 kmph. It consists of a crew of 5 soldiers, which is completely protected by strong armour.

Features of both tank and cannon are present in K-9 Vajra

The Indian Army started testing it in the Ladakh plains in February. The K-9 Vajra has the characteristics of both a tank and a cannon. Its armor like a tank keeps it completely safe from enemy fire and the track helps it to run fast in all kinds of fields. At the same time, it can fire heavy fire for a long distance like a cannon.

India-China face to face from May 2020

India and China are face to face in Ladakh since May 2020. China has deployed a large number of its tanks and armoured vehicles here since tensions began. According to sources, the fourth and sixth motorized divisions of China are stationed here. The Indian Army has also retaliated by deploying a sufficient number of tanks and armoured vehicles.

India has captured many important peaks

The Indian Army has also deployed its T-90 tanks in Ladakh. Since August 30 last year, India had captured several important peaks while operating on the southern bank of Pangong Lake. After this, India had deployed its tanks at an altitude of up to 15000 feet on the Rezang La, Rechin La and Mukhpri peaks in the Chushul region. After the agreement between the two countries in February this year, both the armies had retreated in many places in South Ladakh, but still soldiers are face to face in many places including Daulat Beg Oldi.

<https://www.republicworld.com/india-news/general-news/indian-army-deploys-k-9-vajra-in-ladakh-know-all-about-its-specifications-and-strengths.html>

Indian Army ने लद्दाख में तैनात किया K-9 वज्र, जानें क्या है इसकी खासियत और ताकत

K-9 को 2018 में भारतीय सेना में शामिल किया गया है और लद्दाख में पहली बार इनकी तैनाती की गई है। K-9 वज्र सेल्फ प्रोपेल्ड आर्टिलरी लद्दाख के मैदानों में कार्रवाई के लिए बहुत कारगर हथियार है।

By कृष्णमोहन मिश्रा

खास बातें

1. भारतीय सेना ने लद्दाख में K-9 वज्र सेल्फप्रोपेल्ड आर्टिलरी को तैनात किया है
2. K-9 वज्र में 155 मिमी की तोप लगी है, जिसकी रेंज 18 से 52 किमी है
3. इसका ताकतवर इंजन इसे 67 किमी प्रति घंटे की रफ्तार देता है

नई दिल्ली: पूर्वी लद्दाख की वास्तविक नियंत्रण रेखा (LAC) पर पिछले साल चीनी सैनिकों के हरकत के बाद से ही भारतीय सेना (Indian Army) अलर्ट पर है। अब भारतीय सेना ने लद्दाख (Ladakh) के मैदानों में चीनी सेना के किसी भी हमले का जवाब देने के लिए खास तैयारी की है और K-9 वज्र सेल्फप्रोपेल्ड आर्टिलरी को तैनात किया है।

क्या है K-9 वज्र सेल्फप्रोपेल्ड आर्टिलरी की खासियत

K-9 को 2018 में भारतीय सेना में शामिल किया गया है और लद्दाख में पहली बार इनकी तैनाती की गई है। K-9 वज्र सेल्फ प्रोपेल्ड आर्टिलरी लद्दाख के मैदानों में कार्रवाई के लिए बहुत कारगर हथियार है। इसमें 155 मिमी की तोप लगी है, जिसकी रेंज 18 से 52 किमी है। इसमें टैंकों की तरह ट्रैक लगे हुए हैं, जिससे ये किसी भी तरह के मैदान में चल सकती है। इसका ताकतवर इंजन इसे 67 किमी प्रति घंटे की रफ्तार देता है। इसमें 5 सैनिकों का क्रू होता है, जो किसी टैंक की तरह मजबूत बख्तर से पूरी तरह सुरक्षित होता है।



K-9 को 2018 में भारतीय सेना में शामिल किया गया था. (फाइल फोटो)

टैंक और तोप दोनों की खासियत K-9 वज्र में मौजूद

भारतीय सेना ने फरवरी में लद्दाख के मैदानों इसका परीक्षण शुरू कर दिया था। K-9 वज्र में टैंक और तोप दोनों की ही खासियत हैं। किसी टैंक की तरह इसका बख्तर दुश्मन की गोलाबारी से इसे पूरी तरह सुरक्षित रखता है और ट्रैक इसे हर तरह के मैदान में तेजी से चलने में मदद करता है। वहीं ये किसी तोप की तरह लंबी दूरी तक भारी गोलाबारी कर सकती है।

मई 2020 से आमने-सामने है भारत-चीन

लद्दाख में मई 2020 से भारत और चीन आमने-सामने हैं। चीन ने तनाव शुरू होने के बाद से ही बड़ी तादाद में अपने टैंकों और बख्तरबंद गाड़ियों को यहां तैनात किया है। सूत्रों के मुताबिक चीन की चौथी और छठवीं मोटराइज्ड डिवीजन यहां तैनात हैं। भारतीय सेना ने भी जवाबी कार्रवाई करते हुए पर्याप्त संख्या में टैंकों और बख्तरबंद गाड़ियों की तैनाती की है।

भारत ने कई महत्वपूर्ण चोटियों पर कर लिया है कब्जा

भारतीय सेना ने अपने टी 90 टैंकों को भी लद्दाख में तैनात कर दिया है। पिछले साल 30 अगस्त से पेंगोंग झील के दक्षिणी किनारे पर कार्रवाई करते हुए भारत ने कई महत्वपूर्ण चोटियों पर कब्जा कर लिया था। इसके बाद भारत ने चुशूल क्षेत्र में रेजांग ला, रेचिन ला और मुखपरी चोटियों पर 15000 फीट तक की ऊंचाई पर अपने टैंकों को तैनात कर दिया था। इस साल फरवरी में दोनों देशों के बीच हुए समझौते के बाद दोनों ही सेनाएं दक्षिण लद्दाख के कई जगहों पर कुछ पीछे हट गई थीं, लेकिन अभी भी दौलत बेग ओल्डी सहित कई जगहों पर सैनिक आमने-सामने हैं।

<https://zeenews.india.com/hindi/india/indian-army-deployed-k9-vajra-in-ladakh-along-lac-know-specification-and-features-of-k9-vajra/911522>



Wed, 02 June 2021

China creates combined air defence system along LAC

The move follows numerous reports of China moving in new military equipment and formations into Tibet and Xinjiang and bolstering air defence and missile positions and airports on its side of the LAC amid a border standoff with India that began more than a year ago

By Rezaul H Laskar

New Delhi: China's People Liberation Army (PLA) has integrated elements of the air force and army to create a combined air defence system for its western theatre command that is responsible for operations along the Line of Actual Control (LAC), the latest in a series of moves indicating a strengthening of its positions in the region.

The move follows numerous reports of China moving in new military equipment and formations into Tibet and Xinjiang, and bolstering air defence and missile positions and airports on its side of the LAC amid a border standoff with India that began more than a year ago.

People familiar with developments said on condition of anonymity that PLA had, for the first time, integrated army air defence units in the air force's chain of command in the western theatre command to create a combined air defence control system.

This new system was put through its paces during a recent exercise at an unknown location under the western theatre command, which saw army elements jointly training with the air force while command and control was exercised by the air force, the people said.

"At least 10 PLA army units under the western theatre command are believed to have been integrated in the reporting chain for sharing inputs on early warning, combined readiness status and exercise participation as part of this new joint air defence set up," one of the people cited above said.

"It appears that PLA air force is controlling all the air defence network assets along the LAC, and it appears the Chinese side has felt an urgent need to put all such assets of the army and air force under a central control to avoid any fratricide and to ensure their optimum use," the person added.

Air Vice Marshal (retired) Manmohan Bahadur, a defence commentator who closely tracks developments on the LAC, said such a development in normal times would be seen as part of routine steps by a country to ensure military preparedness. "But since we have a confrontation, we must view it in that context and make plans accordingly," he said.

The Chinese side appears to be bringing all air defence assets into one grid and plugging gaps that can be exploited by the Indian Air Force (IAF), he said. "There have been reports of additional

radar stations and other set-ups being created and the Chinese side seems to be in for the long run. Their aim would be to blunt the strike potential of the IAF, which they know will spearhead any Indian response,” he added.

Disengagement of Indian and Chinese frontline troops along the LAC stalled following a drawdown of forces and armoured units on the north and south banks of Pangong Lake in February. Diplomatic and military talks have not led to a breakthrough at other friction points on the LAC such as Depsang Plains, Gogra and Hot Springs.

Tie between the two sides plunged to an all-time low following a deadly clash in Galwan Valley in June last year that resulted in the death of 20 Indian soldiers and several Chinese troops – the first fatalities on the LAC since 1975. External affairs minister S Jaishankar has made it clear that restoration of peace and tranquillity on the LAC through disengagement and de-escalation alone can be the basis for restoring normal ties in other areas such as trade and investment.

Satellite imagery from last month showed that after withdrawing its forces from around Pangong Lake, China relocated a large section of troops and equipment to nearby Rutog County, where new military barracks have been built since 2019.

The open-source intelligence analyst who uses the name @detresfa on Twitter said the new structures at Rutog include a large motor pool that includes support and offensive units, troop accommodation including prefabricated heated units and tents, camouflaged positions believed to hold supplies and weapons, and munitions storage facilities.

The scale and proximity of the deployment in Rutog suggests the PLA is continuing to hold itself in depth areas near the LAC, experts said.

A steady stream of satellite imagery and reports in recent months have shown that China is strengthening its position all along the LAC, building villages in previously uninhabited areas and building and reinforcing highways and airports to facilitate the speedy deployment of troops.

A report issued by Stratfor, a leading security and intelligence consultancy, last September had said China has more than doubled the number of airbases, air defence positions and heliports near the LAC since 2017. China began building at least 13 new military facilities near the LAC after the 2017 standoff at Doklam, and work on four heliports began after tensions erupted in Ladakh, the report said.

<https://www.hindustantimes.com/india-news/china-creates-combined-air-defence-system-along-lac-101622544473501.html>



Wed, 02 June 2021

Researchers model new method of generating gamma-ray combs

Skoltech researchers used the resources of the university's Zhores supercomputer to study a new method of generating gamma-ray combs for nuclear and X-ray photonics and spectroscopy of new materials. The paper was published in the journal *Physical Review Letters*.

A gamma-ray comb is a series of short bursts that, when plotted as intensity versus frequency, look like sharp and equally spaced teeth of a comb. Generating these combs at high brightness in the gamma-ray domain has been challenging because of something called ponderomotive spectral broadening—an effect that destroys the monochromaticity that allows gamma-ray sources to be used in nuclear spectroscopy, medicine, and other applications.



Credit: CCO Public Domain

Sergey Rykovanov and Maksim Valialshchikov from the Skoltech High Performance Computing and Big Data Laboratory as well as Vasily Kharin from Genity LLC offered a way to avoid this effect. To obtain the calculations needed to support this result, they used the Zhores supercomputing cluster at Skoltech.

"Our idea relies on a method that is very well known in the attosecond community—to use laser pulses with temporally varying polarization (with circular polarization in the wings and linear polarization only in the middle of the pulse) to gate emission of harmonics only to the part of the pulse where the polarization is linear," the authors write.

"Polarization gated pulses limit harmonics emission only to the region around the center of the pulse, where intensity gradients are smaller and harmonics emission efficiency is higher. Both of these lead to smaller ponderomotive broadening," Rykovanov says.

Maksim Valialshchikov adds that, to run the tests necessary to confirm their results, the scientists needed a simulation with large number of particles. "Zhores provides a large number of CPUs, and using part of them allows completing a single simulation orders of magnitude faster than using a single laptop," he notes.

According to Rykovanov, the authors plan to conduct additional research regarding the impact of radiation friction and quantum effects on the visibility of gamma comb. "This will allow us to move towards the experimental observation of the proposed effect in the nearest future," he says.

The authors say their proposed method can be used in photonuclear experiments as well as nonlinear quantum electrodynamics experiments planned at DESY, the German particle accelerator research center, and SLAC National Accelerator Laboratory in the US.

More information: M. A. Valialshchikov et al, Narrow Bandwidth Gamma Comb from Nonlinear Compton Scattering Using the Polarization Gating Technique, *Physical Review Letters* (2021). DOI: [10.1103/PhysRevLett.126.194801](https://doi.org/10.1103/PhysRevLett.126.194801)

Journal information: [Physical Review Letters](https://phys.org/news/2021-06-method-gamma-ray.html)
<https://phys.org/news/2021-06-method-gamma-ray.html>

Stimulated scattering in supermode microcavities: Single- or dual-mode lasing?

By Huang Weijian

Stimulated scattering in supermode microcavities, such as Raman or Brillouin lasers, has shown unprecedented merit for precision measurements by exploiting the beat note in their lasing spectra. This beat note corresponds to the energy splitting of supermodes and is highly sensitive to any external perturbations. However, a pivotal question has puzzled the researchers for two decades: are these supermode microcavity lasers single or dual modes? Now, a research team led by Professor Xiao Yunfeng at Peking University has revealed the lasing dynamics of a stimulated scattering laser in a supermode microcavity, and experimentally demonstrated its single-mode nature. This work has been published online in *PNAS*.

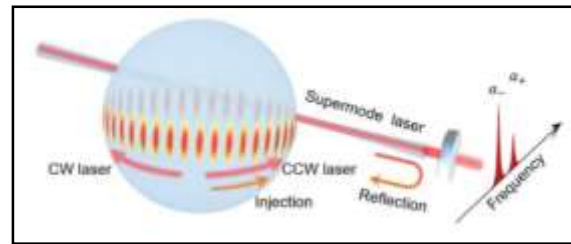


Fig.1 Generation and manipulation of supermode Raman laser in a microcavity. Credit: Peking University

The paradox arises from the contradiction between the laser theory and experimental observations. On the one hand, due to the homogeneous gain, the pump field should always be clamped after the laser emits, leading to a single-mode laser. On the other hand, however, the widely observed beat notes provided evidences for dual-mode lasing. "This beating phenomenon really contradicts what we have learnt from the textbook, but it does exist," said Cao Qitao, a Boya postdoctoral researcher at Peking university, "so we think there must be some physics hidden." The researchers used surface scattering to construct a pair of supermodes in a whispering-gallery microcavity (Fig.1), and generated an ultralow-threshold Raman laser. Then, they adopted an add-drop coupling structure to directly acquire the intracavity pump power, by which the clamping effect of the pump field is observed for the first time (Fig.2). Moreover, with the help of a heterodyne method, the measured side mode suppression ratio (SMSR) is characterized to be over 30 dB, so that the single-mode characteristic of the Raman laser in supermode microcavity is unambiguously demonstrated.

"To reveal the underlying physics of the previously observed beating phenomenon, we utilized the self-injection method to modulate the mode losses of the two supermodes," said Zhang Peiji, a Ph.D. student at Peking University. Experimentally, self-injection was introduced by a weak reflectance on the output laser, and part of the output laser is injected back into cavity to interfere with the intracavity laser field. With the self-injection method, the previously observed periodic beating phenomenon emerged in the time domain (Fig.2). Further theoretical analysis reveals that the previously reported beatnote arises from the transient interference during the switching process between the supermode lasers, rather than the simultaneous lasing of the two supermodes. Application-wise, this self-injection method may contribute to the selective generation of near-degenerate lasers and the improvement of their SMSR.

"Our results have clearly elucidated the long-existing debate on the lasing spectrum paradox of stimulated scattering in supermode microcavities," said Professor Xiao. "Besides, this work provides an insightful guidance for microlaser-based precision measurements and paves the way to reconfigurable light sources and low-power-consumption optical memories."

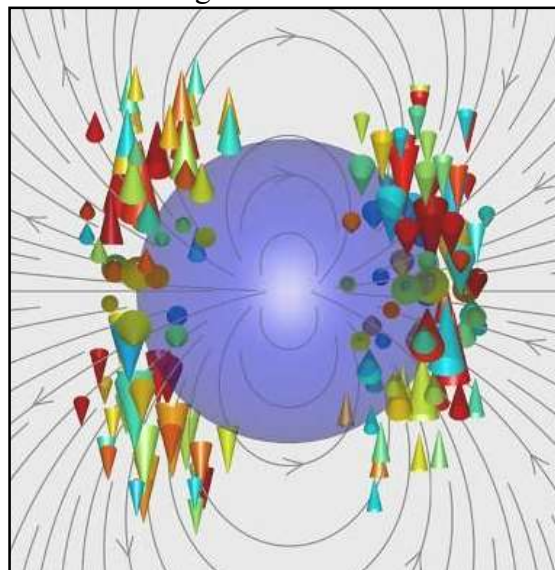
More information: Pei-Ji Zhang et al, Single-mode characteristic of a supermode microcavity Raman laser, *Proceedings of the National Academy of Sciences* (2021). DOI: [10.1073/pnas.2101605118](https://doi.org/10.1073/pnas.2101605118)

Journal information: [Proceedings of the National Academy of Sciences](https://phys.org/news/2021-06-supermode-microcavities-single-dual-mode-lasing.html)
<https://phys.org/news/2021-06-supermode-microcavities-single-dual-mode-lasing.html>

Magnetic materials analysis has never been so comprehensible

Professor Andreas Michels, physicist at the University of Luxembourg, explores the complex world of magnetic materials by shooting neutrons on them. He has now published his insights in a 380-page monograph titled "Magnetic Small-Angle Neutron Scattering – A Probe for Mesoscale Magnetism Analysis." The book is published by Oxford University Press.

Being the result of more than two decades of experimental, theoretical, and simulation research, Prof. Andreas Michels has now written the first book dedicated exclusively to the specific neutron technique of magnetic small-angle neutron scattering (SANS). "Whenever you want to know where magnetic atoms are located in a material and how they move, you have to use neutron scattering," says Prof. Andreas Michels. The neutron is an elementary particle which carries a magnetic moment or spin. As such, one can think of the neutron as a tiny compass needle, which, when deflected or scattered by a magnet, yields information on the structure and dynamics of the atoms composing the material. The quantity of interest in a neutron-scattering experiment, the so-called scattering cross section, depends on the distribution of spins of the studied material and its analysis provides important information on the magnetic properties.



Spin structure (thick arrows) around a spherical nanosized hole or pore (in blue) in a magnetic matrix (in light grey). Magnetic SANS can detect and analyse such structures. Credit: University of Luxembourg

Prof. Michels continues "The magnetic SANS method is indispensable in the study of magnetic materials; one can use it to investigate everything from permanent magnets, magnetic steels, complex oxides and alloys, ferrofluids, magnetic nanoparticles, to superconductors and the recently discovered skyrmion crystals." The reason for its importance in condensed-matter and materials physics resides in the fact that magnetic SANS provides, quite uniquely, access to the so-called mesoscopic length scale, i.e., the scale between a few nanometers and a few hundred of nanometers—roughly between the size of a strand of human DNA to about one hundredth of the width of a human hair. This is a very important size regime on which many macroscopic material properties are realised. The SANS method is particularly useful for materials scientists to help them understand the magnets they produce in their labs.

"For example, one can use the magnetic SANS technique to decide whether a particular material is composed of homogeneous or inhomogeneous magnetic domains; these are regions inside the magnet where the spins point into a certain direction," explains Prof. Michels. This question is of relevance for improving the characteristic parameters such as the coercivity or the maximum energy product of rare-earth-free permanent magnets, a class of magnetic energy materials which is currently in the focus of many researchers worldwide. Another example relates to the mechanical properties of steel, which is probably one of the oldest and most important functional magnetic materials. The mechanical hardness of reactor pressure vessel steel, used in nuclear power plants, is decisively determined by the presence of voids (pores). The figure below depicts the numerically computed spin structure around a spherical nanopore; the formalism of the book allows one to detect their signature in the neutron scattering cross section.

The book has emerged by "marrying" two relatively old fields in physics—the theory of micromagnetics on the one hand side and neutron-scattering formalism on the other hand side. Micromagnetics is commonly used to analyze the magnetization distribution or hysteresis loop of magnetic materials, while neutron scattering is employed to obtain microscopic information on the structure and dynamics of materials. "Before, micromagnetics and neutron scattering were two disjunct communities who did not talk much to each other," adds Michels. With the publication of the book, and through the organization of international workshops such as the one at the European Spallation Source in Lund, it is hoped that the combined micromagnetics & SANS methodology is becoming more widespread, so that research on magnetic materials can further progress.

Looking forward, what are the challenges for the years to come? Clearly, much research needs to be carried out on so-called complex systems, which are materials exhibiting a multitude of interactions on different length scales; examples are ferrofluids, magnetic steels, spin glasses or amorphous magnets. It is this subfield where major progress is expected to be made in the coming years; mainly via the increased usage of large-scale numerical micromagnetic simulations, which is a very promising approach for the understanding of the magnetic SANS from systems exhibiting nanoscale spin inhomogeneity.

The book's target audience consists of graduate students as well as postdocs and senior researchers working in the field of magnetism and magnetic materials. The formalism and concepts that are laid out in the book will hopefully enable them to analyze and interpret their SANS experiments." explains Professor Andreas Michels. "It took me about three years to write the book, and I am now more than happy to see its publication," says Michels. The monograph is available as a hardcover edition and as e-book, and can be ordered in bookstores around the world.

More information: [Magnetic Small-Angle Neutron Scattering – A Probe for Mesoscale Magnetism Analysis](#)

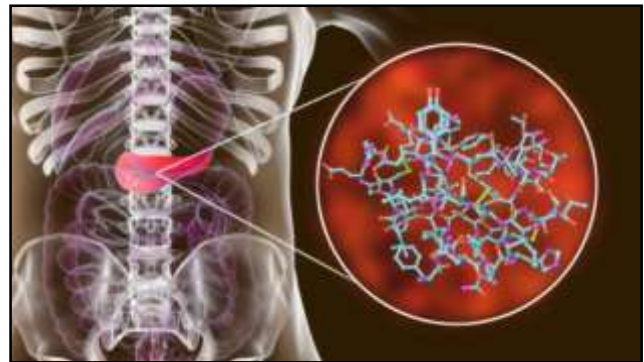
<https://phys.org/news/2021-06-magnetic-materials-analysis-comprehensible.html>

COVID-19 can infiltrate insulin-producing cells in the pancreas, study suggests

By Nicoletta Lanese

The coronavirus that causes COVID-19 can infect insulin-producing cells in the pancreas, reducing their ability to secrete insulin and sometimes causing cell death, a new study suggests.

Damaging these insulin-producing cells, known as beta cells, can potentially worsen symptoms of diabetes, particularly type 1 diabetes, wherein the pancreas already makes little to no insulin, according to the study authors. "If you imagine that there are some patients who already have diabetes, if the virus comes in and nails the remaining beta cells you have, that's not good," said co-senior author Peter Jackson, a professor in the department of microbiology and immunology at Stanford University School of Medicine.



(Image credit: Getty/KATERYNA KON/SCIENCE PHOTO LIBRARY)

In addition, some studies suggest that severe COVID-19 may trigger diabetes in people with no previous history of the condition, again raising the possibility that the virus infects beta cells, Live Science previously reported. This trend is still being investigated, but given the new data, Jackson said that he thinks the virus may sometimes induce diabetes by injuring beta cells; this would be most likely to occur when people with prediabetes, or other health conditions that raise the risk of diabetes, develop a severe case of COVID-19.

People with either type 1 or type 2 diabetes — where the body makes some insulin but the tissue can't take it up due to insulin resistance — face a greater risk of developing severe COVID-19 symptoms than the general population, according to the Centers for Disease Control and Prevention (CDC). In general, people with diabetes are more likely than those without the disease to experience complications when infected with any virus, since the condition can impair immune function.

That said, no one knew whether SARS-CoV-2, the virus that causes COVID-19, can directly attack the pancreas, Jackson said.

To probe this question, Jackson and his colleagues ran experiments on pancreatic tissue from organ donors, nine of whom had died from severe COVID-19 infections and 18 who died of other causes and tested negative for the virus. In the first group, they found SARS-CoV-2 had directly infected the beta cells of some individuals, and in several lab dish experiments, they found that the virus could infect, damage and kill beta cells drawn from the other donors who died from non-COVID-19 causes, according to a report published May 18 in the journal *Cell Metabolism*.

However, even with this new evidence, the central question of whether SARS-CoV-2 directly infects beta cells *in vivo* remains unsettled, said Dr. Alvin Powers, director of the Vanderbilt Diabetes Center in Nashville, who was not involved in the study. The new study shows that pancreatic cells can be infected in a lab dish, but the same has not been definitively shown in

humans, he said; to reach a solid conclusion, scientists will need to examine many more pancreas samples from patients who died of COVID-19.

In regards to the reports of COVID-19 triggering diabetes, "we know that people who have borderline diabetes, or prediabetes, when they get [critically] ill with anything, with pneumonia, with a heart attack, with a stroke ... diabetes sometimes appears," Powers told Live Science. So it's possible that there may be uptick in diabetes cases, "not because of direct toxicity from the SARS-CoV-2 virus," but because critically ill people sometimes develop diabetes. In general, reports of COVID-19-related diabetes have been conflicting and still warrant further investigation, Powers wrote in a recent commentary, published April 7 in *The Lancet*.

How the virus might break into beta cells

To determine whether SARS-CoV-2 infects beta cells, the first step is to figure out how the virus would infiltrate those cells in the first place.

The virus primarily uses a receptor protein called ACE2 to sneak into cells, but several other proteins on the cell surface appear to help prime the virus to plug into ACE2, Powers said. For a recent study, published Dec. 1, 2020, in *Cell Metabolism*, Powers and his colleagues went hunting for ACE2 and one of these proteins, called transmembrane serine protease 2 (TMPRSS2), in beta cells, but found little of either. In another independent study, published in the same journal, researchers reached the same conclusion, making it seem like SARS-CoV-2 had few doorways into beta cells.

"The controversy comes from, 'Hey there's not so much receptor here, so it must not be that the virus infects beta cells,'" said co-senior author Raul Andino, a professor in the department of microbiology and immunology at the University of California, San Francisco. However, there's a question as to how much ACE2 the virus needs to break into cells, and still other proteins may help boost its ability to latch onto the ACE2 receptor, Andino said.

For instance, receptor proteins called neuropilin 1 (NRP1) and transferrin receptor (TRFC) have both been linked to SARS-CoV-2 infection; normally, the former binds to various growth factors and the latter helps import iron into cells, but studies have found that both receptors may be exploited by the coronavirus. The team looked for these proteins, as well as ACE2 and TMPRSS2, in beta cells from five COVID-negative organ donors.

"We isolate islets [groups of pancreatic cells] from human cadavers as they come in," Jackson said, noting that the tissue must be collected and used quickly to be useful for experiments.

As in previous studies, they found low levels of ACE2 and TMPRSS2 in beta cells from the donors, but interestingly, they found an abundance of NRP1 and TRFC. Compared with alpha cells, another kind of pancreatic cell, beta cells expressed far more NRP1 and TRFC, hinting that the virus might show a selectivity for the beta cell if it does infect the pancreas.

The team then isolated more islets from COVID-negative donors and exposed the tissue to SARS-CoV-2 in the lab. After several days, they exposed the cells to antibodies that latch onto part of the coronavirus, to see which cells had been infected, and found evidence of SARS-CoV-2 mostly in beta cells. They found that they could somewhat block this infection by blocking the NRP1 receptor with a small molecule called EG00229. This fact hints that NRP1 may be key to the coronavirus entering beta cells, Jackson said.

"Imagine you're trying to catch a basketball: A one-handed catch is tricky and ... you flub the ball a lot of the time. A two-hand catch is a much more accurate and efficient event," he said. To infect cells, a structure on the coronavirus called the spike must plug into ACE2; in this analogy, NRP1 may be helping to "catch" the coronavirus and insert the spike, despite there being relatively few of ACE2 receptors available, he explained. Some studies suggest that NRP1 grabs onto a specific fragment of the spike, and that blocking this interaction somewhat hobbles the virus's ability to infect cells in culture, according to a November report in the journal *Science*.

The team also found that infected beta cells produced significantly less insulin than uninfected cells when exposed to a meal's worth of glucose; and in infected cells, molecular signals related to

cell death began to spike. These effects could again be blocked with EG00229, underscoring the potential importance of NRP1 to infection.

After seeing that the virus could infect beta cells from COVID-negative donors, the team wanted to see if the virus cropped up in people who had died of COVID-19. They found coronavirus genetic material in seven out of the nine donors' pancreases. Using antibodies, as in the previous experiments, the team confirmed that SARS-CoV-2 appeared in four out of the seven donors' beta cells; inside those beta cells, they also found genetic instructions coding for the spike protein.

The other three donors' pancreases showed extensive damage, resulting from digestive enzymes that quickly eat away at the organ after death, the authors noted in their report. So it may be that the antibody test came back negative for three donors due to the severity of that damage, Jackson suggested. On the other hand, the negative tests could be accurate, as not all patients with severe COVID-19 necessarily have infected beta cells.

"We would really need to power a much larger study to get a real number as to the infection rate in pancreatic beta cells for patients with severe COVID," Jackson said.

The study raises other questions. Assuming the virus attacks beta cells in living people as it does in lab dishes, how does the virus first reach the pancreas? The onset of pneumonia may help the virus escape the airways and trigger secondary infection elsewhere, such as in the pancreas, but for now that's unclear, Jackson said. The study also only included people with severe disease, so it's unclear whether pancreatic infection ever takes place in mild COVID-19 infections.

And if and when the virus pervades the pancreas, "how does infection of the pancreas correlate with ... decreases in insulin?" Andino said. The team observed that in the lab dish, beta cells produced less insulin after infection, but the extent of that decrease may be different in a living person. "I think that's a critical question, obviously ... and that's something to me that the paper does not address."

In addition, more research will be needed to understand the role of the immune system in pancreatic infection, he noted. In theory, direct infection could trigger extensive inflammation in the pancreas, causing extra damage, and in people susceptible to type 1 diabetes, this could trigger or worsen the autoimmune attack on the the organ. But for now, that's all speculation, Andino said.

Given the limitations of the lab dish study, researchers need large studies of well-preserved pancreases from people who died COVID-19 to confirm the organ is directly infected, Powers said. "Whether or not their approach to infecting cells mimics what happens when a person has SARS-CoV-2 infection is not clear."

<https://www.livescience.com/coronavirus-infects-pancreas-beta-cells.html>

