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DRDO Technology News

The EurAsian Times

Wed, 12 May 2021

Indian Navy's new ALH Mk-III helicopters ready for anti-submarine warfare with indigenous technology – Reports

Some of the Indian Navy's advanced light helicopters (ALH) Mk-III will be equipped with an indigenous low-frequency dunking sonar, capable of conducting anti-submarine warfare, reports suggest

By Ayush Jain

The ALH Mk-III choppers that were handed over to the Navy and the Coast Guard last month are the latest variant of the highly successful ALH Dhruv helicopter outfitted with modern sensors.

The list of features the helicopter's maker HAL (Hindustan Aeronautics Limited) is offering in the ALH Mk-III is exhaustive.

With the local development and production, the integration of sensors and equipment has become easier for the Indian defense industry – including the IFF MKXII & ATC Xpdr with ADS-B Out, V/UHF communication system, traffic alert and collision avoidance (TCAS-I), SAR Homer system and automatic deployable emergency locator transmitter (ADELT).

A Loud hailer, radio altimeter, rescue basket, medical intensive care unit (MICU), IADS system, AFCS, digital video recording system (SSDVR), automatic identification system (AIS), high-intensity searchlight (HISL), pressure refueling system, control grip, EO POD Rev III, surveillance radar system and 12.7 mm gun system, and a lot more are also being provided for the Indian Navy, making this platform a truly versatile utility helicopter.

And according to reports, 6 out of 16 helicopters ordered by the service are also getting more teeth with the addition of a Low-Frequency Dunking Sonar (LFDS), aiding in anti-submarine warfare abilities.

This LFDS is developed by the Kochi-based Naval Physical & Oceanographic Laboratory (NPOL), and can be deployed by rotary-wing platforms especially the ALH Mk-III, acting as a force multiplier for surface vessels. It provides the advantages of lower frequency combined with higher source level for range advantage in littoral ASW.

It enables the deployment of sensors to deeper depths for the detection of submarines. LFDS is an integrated system using indigenous technology capable of simultaneously processing inputs from sonobuoys and operating the dunking sonar for establishing exact range and bearing values with active low-frequency transmission, according to NavyRecognition.

Interestingly, in other photos, the helicopter is also seen armed with torpedoes, however, not much information available is available on the prototype.

It is still unclear if the Naval Dhruv Mk III can carry munitions or not, but is certainly an idea too lucrative for the Indian industry to ignore and if the photos are true, testings are already underway.

The Indian Navy has been looking for a new utility helicopter to replace its Sea King fleet, for which the service placed an order for 24 MH-60R helicopters from the United States built by Lockheed Martin.

According to an Indian news website LiveMint, this acquisition of two dozen MH-60R maritime utility helicopters come under a $2.6 billion deal inked in February last year. The first three out of 24 MH-60R Seahawks are expected to be delivered between June and September 2021.

The MH-60R, along with the Naval ALH Mk-III will probably form the Indian Navy's primary utility helicopter fleet, if things go smooth for the state-owned Hindustan Aeronautics Limited.

The Indian helicopter had faced several roadblocks in its acceptance, especially due to issues like complications in the blade folding mechanism. The Indian Navy also operates Russian Made Kamov Ka-28 and Ka-31 helicopters for anti-submarine warfare.

https://eurasiantimes.com/indian-navys-new-alh-mk-iii-helicopters-to-be-equipped-with-homegrown-anti-submarine-sonar-reports/

COVID 19: DRDO's Contribution

INDIA TODAY

Wed, 12 May 2021

New anti-Covid-19 drug 2-DG in market in three weeks: DRDO Chief

From drugs to setting up medical oxygen plants, DRDO Chairman Dr G. Satheesh Reddy outlines his organisation's role in the fight against Covid-19 in this interview with Executive Editor Sandeep Unnithan

By sandeep Unnithan

Q. Tell us about the new drug DRDO has developed to fight Covid-19.

A. It is called 2-DG or 2-deoxy-D-glucose. It's a generic molecule on which our laboratories--DRDE Gwalior and INMAS in Gwalior--have been working. They have synthesised and patented it. It was originally part of our studies on the effects of radiation but scientists told me last year that they were sure that it could be very effective against the virus. We went ahead and tested this molecule against the virus in CCMB Hyderabad and it showed excellent results. We used it to approach the DCGI and got the clearance for Phase-2 trials. We did Phase 2A, then Phase 2B, adding to the quantity of the drug. After the Phase 2 results, we got permission for Phase 3 trials. In this phase, we have given the drug to 220 patients across 27 hospitals in the country, and the results have been good. It has shown efficacy and

DRDO Chairman Dr G. Satheesh Reddy

patients have recovered fast. Our partner, Dr Reddy's Laboratories, have been all along with us and we did the trials together while getting them to produce this drug.

Q. How soon can we expect this drug in the market?

A. We are working with them (Dr Reddy's) on the timelines. The first lot should be coming into the market in two-three days, but in limited quantity. A larger quantity will take probably about three weeks' time.

Q. How did OBOGS or Onboard Oxygen Generation System, a fighter aircraft technology, came to be deployed in the fight against Covid?

A. As you know, when the LCA Tejas goes up to 35,000-40,000 feet, the pilot needs oxygen. You can either carry the oxygen onboard or generate it. This is where the Onboard Oxygen Generation System comes in. We thought why not extend it to ensure a continuous supply of a large volume of oxygen. We worked on it, developed it along with our industry partner and, in fact, have installed it sometime back at a hospital in Tawang. The plants generate 960 litres per minute. Industries are being roped in, the PMCares Fund has provided the finances and industry has started production.

Q. What numbers are we talking about here?

A. Right now, PMCares has given funds for 500 such plants, of which industry will produce 120 with the Council of Scientific and Industrial Research (CSIR), while 380 will come from DRDO factories—primarily the original technology partner, Trident Pneumatics, Coimbatore. The remaining units will be provided by Tata Advanced Systems Ltd. We want to deliver these units as fast as possible. Four days back, the first two units were installed, one at RML and the other at AIIMS. The rollout will start slowly and then pick up. We expect all 500 plants to be fully operational by July 31.

Q. Are you saying you will have 500 oxygen-generating plants in hospitals across the country in the next three months? What is DRDO's role in this project?

A. The money from PMCares has come to DRDO and we have to place the orders. As the technology provider, we have to provide the complete technical hand-holding to industry, as they are new to this game. We also have to see that the first technical partner provides all the necessary support and meets integration and assembly requirements. We have to ensure overall procurement, process, delivery, quality, timelines, schedules, ensuring the supply chain of materials, compressors, as well as monitoring to see that it is all delivered to all the sites identified by the health ministry and other departments.

Q. What are the other weapons in the DRDO's arsenal against Covid-19?

A. We are in the process of introducing a mobile electronic oxygen regulating system using small cylinders with regulators and SPO2 meters. This system automatically regulates the oxygen based on the SPO2 levels and ensures that oxygen is optimally utilised. We have developed this system and given it to industry. It will soon be rolled out. It's cost-effective and portable and so people can use it at home, at care centres and in quarantine centres. The load on medical practitioners and staff will be much less.

https://www.indiatoday.in/india-today-insight/story/new-anti-covid-19-drug-2-dg-in-market-in-three-weeks-drdo-chief-1801459-2021-05-11

ZEENEWS

Wed, 12 May 2021

2-deoxy-D-glucose: DRDO's anti-COVID-19 drug is safe, will help patients recover faster, says INMAS Scientist

Anti-COVID-19 drug 2-deoxy-D-glucose (2-DG) has been developed by INMAS, a lab of Defence Research and Development Organisation (DRDO), in collaboration with Dr Reddy`s Laboratories (DRL), Hyderabad

Edited By Pushkar Tiwari

New Delhi: Dr Sudhir Chandna, Institute of Nuclear Medicine and Allied Sciences (INMAS) scientist has said the recently approved anti-COVID-19 drug 2-deoxy-D-glucose (2-DG) is completely safe and will help patients recover faster.

File Photo (ANI)

2-DG has been developed by INMAS, a lab of Defence Research and Development Organisation (DRDO), in collaboration with Dr Reddy`s Laboratories (DRL), Hyderabad.

"During clinical trials, it has yielded an effective result in curing patients infected with COVID-19. The medicine has gone through clinical trials on around 110 patients in the second phase. In the third phase, it was tried on 220 patients. It has shown better efficacy in phase two itself as compared to the standard care," Dr Chandna said.

"Recovery was two to three days faster for COVID-19 patients," he added.

He pointed out that in phase 3, the freedom from oxygen dependence has been seen in 42 per cent of the patients by the third day as compared to 31 per cent in standard care.

"This data has indicated that oxygen dependence reduced in a better way when we use this medicine along with standard care," Dr Chandna explained.

"The DRDO, along with its industry partner DRL, Hyderabad, started the clinical trials in April last year. The Phase 2 trials conducted from May to October 2020 on 110 patients. Based on successful results, DCGI further permitted the Phase 3 clinical trials. The Phase 3 clinical trial was conducted on 220 patients between December 2020 to March 2021," he added.

On being asked about the price, he said, "It will depend on the production and those factors are with Dr Reddy`s Laboratories who are our industry partners. As per our information and understanding, Dr. Reddy`s is trying that it comes out in a few days."

https://zeenews.india.com/india/2-deoxy-d-glucose-drdos-anti-covid-19-drug-is-safe-will-help-patients-recover-faster-says-inmas-scientist-2361355.html

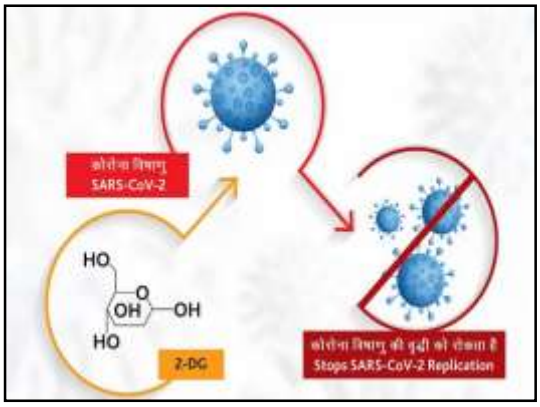
Wed, 12 May 2021

Explained: What is DRDO's anti-COVID drug 2-deoxy-D-glucose (2-DG) and how it works?

The Drug Controller General of India (DCGI) has approved the emergency use of 2-deoxy-D-glucose (2-DG) as additive therapy for moderate to severe COVID-19 patients

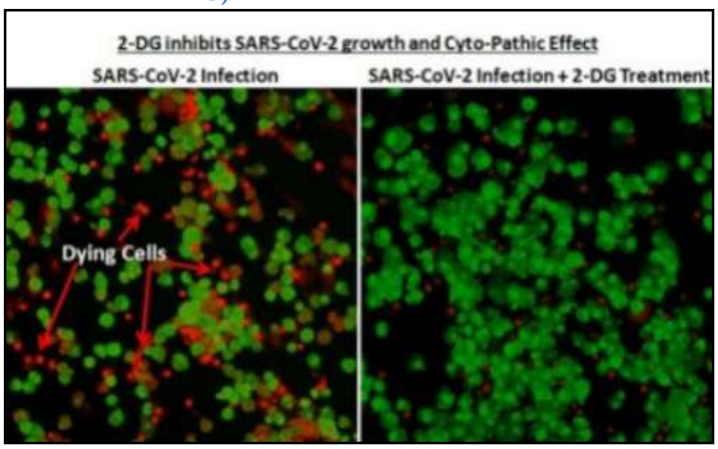
By Arfa Javaid

The Drug Controller General of India (DCGI) has approved the emergency use of 2-DG as additive therapy for moderate to severe COVID-19 patients. Being a generic molecule and analogue of glucose, it can be easily produced and made available in India. The anti-COVID-19 drug has been developed by the Institute of Nuclear Medicine and Allied Sciences (INMAS), a lab of Defence Research and Development Organisation (DRDO), in collaboration with Dr Reddy's Laboratories (DRL), Hyderabad.



DRDO's anti-COVID drug 2-deoxy-D-glucose (2-DG)

The clinical trials have shown that 2-deoxy-D-glucose (2-DG) helps in faster recovery of hospitalised patients and reduces dependency on supplemental oxygen. Patients treated with the aforementioned drug showed RT-PCR negative conversion in COVID patients. As per the experts on the subject, the drug will be beneficial in treating patients suffering from COVID-19.



Clinical trials and their results

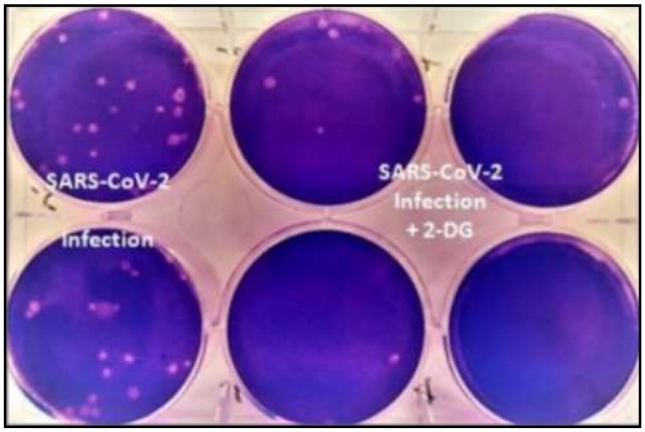
In April 2020, the scientists at INMAS-DRDO and CCMB, Hyderabad jointly conducted laboratory experiments and concluded that the molecule works effectively against the SARS-CoV-2 virus and inhibits viral growth. On the basis of these results, DRDO's CDSCO permitted phase-II clinical trials on COVID-19 infected patients in May 2020.

DRDO and its industry partner DRL, Hyderabad jointly started clinical trials to test the safety and efficacy of the drug in COVID-19 patients. The drug was found to be safe and showed significant improvements in the recovery of COVID-19 patients. Phase-IIa was conducted in six hospitals while Phase-IIb was (dose-ranging trial) conducted at 11 hospitals pan India.

The phase-II trial was conducted on 110 COVID-19 patients between May to October 2020. In terms of efficacy, the patients treated with 2-DG showed faster symptomatic recovery than Standard of Care (SoC) on various endpoints.

The Phase-III clinical trials were carried after the approval from DCGI. It was conducted on 220 patients from December 2020 to March 2021 at 27 COVID-19 hospitals located in Delhi, Uttar Pradesh, West Bengal, Gujarat, Rajasthan, Maharashtra, Andhra Pradesh, Telangana, Karnataka and Tamil Nadu.

The data reveals that a significant number of patients improved symptomatically and became free from supplemental oxygen dependence (42% vs 31%) by Day-3 in comparison to SoC, indicating an early relief from Oxygen therapy or dependence. A similar trend was observed in patients above the age of 65 years.



How 2-deoxy-D-glucose (2-DG) works?

The 2-deoxy-D-glucose (2-DG) comes in sachet in powder form and has to be taken orally by dissolving it in water. The drug accumulates in the virus-infected cells and prevents its growth by stopping viral synthesis and energy production. The USP of the drug is its selective accumulation in virally infected cells.

In the ongoing second wave of the COVID-19 pandemic, patients are facing severe oxygen dependency and need hospitalisation. In such a scenario, the anti-COVID drug is expected to save lives due to the mechanism of operation of the drug in infected cells, thereby reducing hospital stay of the COVID-19 infected patients.

https://www.jagranjosh.com/general-knowledge/anti-covid-19-drug-2-deoxy-d-glucose-2-dg-and-its-working-1620642648-1

जागरण

Wed, 12 May 2021

चार-पांच दिन में ही कोरोना को निष्प्रभावी करेगी डीआरडीओ की दवा, बच्चों को भी संजीवनी देगी 2डीजी

दावा है कि 2डीजी (2 डीआक्सी-डी ग्लूकोज) दवा चार-पांच दिन में ही कोरोना के दुष्प्रभाव पर कारगर साबित होगी। प्री-क्लीनिकल ट्रायल और क्लीनिकल ट्रायल में पाया गया कि गंभीर और मध्यम रूप से कोरोना पीड़ितों की रिपोर्ट दवा सेवन के चार से पांच दिन में निगेटिव आ गई।

By Saurabh Chakravarty, हिमांशु अस्थाना

वाराणसी: कोरोना की दवा बनाने वाले रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) के सहयोगी संस्थान इंस्टीट्यूट आफ न्यूक्लियर मेडिसिन एंड एलाइड साइंसेज (आइएनएमएएस) का दावा है कि 2डीजी (2 डीआक्सी-डी ग्लूकोज) दवा चार-पांच दिन में ही कोरोना के दुष्प्रभाव पर कारगर साबित होगी। आइएनएमएस के निदेशक डा. अनिल मिश्र के अनुसार हैदराबाद के सेंटर फार सेल्युलर एंड मालिक्यूलर बायोलाजी (सीसीएमबी) स्थित डा. रेड्डी लैब के प्री-क्लीनिकल ट्रायल और क्लीनिकल ट्रायल में पाया गया कि गंभीर और मध्यम रूप से कोरोना पीड़ितों की रिपोर्ट दवा सेवन के चार से पांच दिन में निगेटिव आ गई, जबकि रेमडेसिविर इंजेक्शन से रिकवरी में आठ दिन लगते हैं। बच्चों पर इस दवा का ट्रायल नहीं हुआ है, मगर यह दवा मानव शरीर में मौजूद वायरस को तेजी से निष्प्रभावी करती है। ऐसे में विशेषज्ञों का मानना है कि वयस्क हो या बच्चा, दोनों पर दवा काम करेगी।

कैंसर की दवा हुई कोरोना में सफल

सबसे खास बात यह है कि कैंसर के इलाज के लिए इस दवा पर दुनियाभर में 1940 से काम हो रहा है, मगर भारत ने इसे कोरोना को हराने का प्रमुख हथियार बना दिया है। 2डीजी पर 1972 से काम कर रहे

प्रो. विनय जैन के कुल 20 शोधपत्र अंतरराष्ट्रीय जर्नलों में प्रकाशित हो चुके हैं। वहीं कैंसर को लेकर भारत में दो बार सफल क्लीनिकल ट्रायल भी किया जा चुका है। प्रोफेसर जैन बताते हैं कि यह दवा ग्लूकोज की तरह होती है, मगर इसके रासायनिक सूत्र में एक आक्सीजन की कमी होती है।ऐसा देखा गया है कि कोरोना वायरस से प्रभावित कोशिकाओं में ग्लूकोज की खपत काफी बढ़ जाती है। इससे वायरस कैंसर कोशिकाओं या ट्यूमर की तरह ही बहुत तेजी से रेप्लीकेट (दोहराना) कर अपनी संख्या बढ़ाता है।

इस दवा का उपयोग वायरस धोखे से ग्लूकोज समझकर करता है और वहीं मात खा जाता है। दरअसल, दवा की वजह से मानव कोशिकाओं का ग्लाइको प्रोटीन कोट या रिसेप्टर बदल जाता है और वायरस कोशिकाओं के अंदर प्रवेश नहीं कर पाता। ग्लूकोज की आपूर्ति जब वायरस को नहीं होती तब उसकी एटीपी यानी ऊर्जा का प्रवाह रुक जाता है और वृद्धि ठहर जाती है। यह प्रक्रिया चार से पांच दिन के अंदर अपना असर दिखा देती है। इसका कोई साइड इफेक्ट भी नहीं है। प्रो. जैन ने कहा कि बच्चों को यह दवा देने में कोई समस्या नहीं आएगी, मगर जल्द ही उन पर ट्रायल किया जाएगा।

पिछले साल अप्रैल में मिली मंजूरी

डीआरडीओ के प्रो.जी सतीश रेड्डी ने दवा को तैयार कराने और मंजूरी आदि कार्यो में व्यक्तिगत रुचि लेकर सबको प्रोत्साहित किया। क्लीनिकल ट्रायल में डा. अनंत नारायण भट्ट और डा. सुधीर चांदना ने अहम भूमिका निभाई है। डा. रेड्डी व अन्य विज्ञानियों के साथ उच्चस्तरीय मीटिंग हुई। इसके बाद पिछले साल अप्रैल में इंडियन काउंसिल आफ मेडिकल रिसर्च (आइसीएमआर) में क्लीनिकल ट्रयल के लिए आवेदन डाला गया था। डा. जैन दिल्ली एम्स और नेशनल इंस्टीट्यूट आफ मेंटल हेल्थ एंड न्यूरो साइंसेज (निम्स) में अपनी सेवा दे चुके हैं। उन्होंने जर्मनी में लंबे समय तक रिसर्च किया है। यह दवा जल्द ही बाजार में आएगी।

https://www.jagran.com/uttar-pradesh/varanasi-city-drdo-drug-will-neutralize-corona-in-four-five-days-jagran-special-21635650.html

Wed, 12 May 2021

कोरोना महामारी से लड़ेगी DRDO की रामबाण दवा, मेडिसिन से कम होगी मेडिकल ऑक्सीजन की जरूरत

क्लीनिकल ट्रायल में इस दवा से अस्पताल में भर्ती मरीजों में तेज रिकवरी देखने को मिली है और साथ ही ये भी सामने आया है कि इस दवा से मरीज़ को बाहर से ऑक्सीजन सपोर्ट की कम ज़रूरत पड़ती है।

Edited By: दीपक पोखरिया

महामारी से जूझ रही मानवता के लिए एक दवाई उम्मीद बनकर आई है। डीआरडीओ की ओर से विकसित इस दवा के इस्तेमाल की अनुमति मिल गई है। दवा का इस्तेमाल बेहद आसान है। इसे पानी में घोलकर पीया जा सकता है और सबसे खास बात ये कि इसके जरिए ऑक्सीजन की समस्या भी दूर होती है। कोरोना की दूसरी लहर में जो लोग ऑक्सीजन की कमी से जूझ रहे हैं, उनके लिए एक ऐसी दवा तैयार हुई है जो वायरस के खिलाफ इस युद्ध में रामबाण साबित हो सकती है।

ड्रग कंट्रोलर जनरल ऑफ इंडिया ने कोविड 19 **के खिलाफ एक नई दवा को इमरजेंसी उपयोग की मंजूरी दी है। डीआरडीओ के परमाणु चिकित्सा और संबद्ध विज्ञान संस्थान** (Institute of Nuclear Medicine and Allied Sciences **यानी** INMAS) **ने हैदराबाद स्थित डॉ रेड्डी लेबोरेटरीज** (Dr Reddy's Laboratories) **के साथ मिलकर कोविड के खिलाफ** 2-deoxy-D-glucose **दवा विकसित की है, जिसे** 2-DG **कहते हैं।**

क्लीनिकल ट्रायल में इस दवा से अस्पताल में भर्ती मरीजों में तेज रिकवरी देखने को मिली है और साथ ही ये भी सामने आया है कि इस दवा से मरीज़ को बाहर से ऑक्सीजन सपोर्ट की कम ज़रूरत पड़ती है। इस दवा से इलाज में बड़ी संख्या में मरीज आरटी-पीसीआर नेगेटिव हुए। अप्रैल 2020 **में कोरोना की पहली लहर में वैज्ञानिकों ने इसका परीक्षण किया और पाया कि ये कोरोना वायरस के खिलाफ ये प्रभावी है और वायरस की वृद्धि को रोकता है।**

इसके आधार पर मई 2020 **में कोविड मरीजों को फेज-**2 **क्लीनिकल ट्रायल की अनुमति मिली थी। ये ट्रायल अक्टूबर** 2020 **तक चला और सुरक्षित पाया गया। फेस** 2 **ट्रायल का एक भाग देश भर के** 6 **अस्पतालों और दूसरा भाग** 11 **अस्पतालों में किया गया। ये ट्रायल कुल** 110 **मरीजों पर किया गया। फेज** 2 **की सफलता के बाद नवंबर** 2020 **में वैज्ञानिकों ने फेज** 3 **क्लीनिकल ट्रायल को मंजूरी दी।**

दिसंबर 2020 **से लेकर मार्च** 2021 **के दौरान दिल्ली, उत्तर प्रदेश, पश्चिम बंगाल, गुजरात, राजस्थान, महाराष्ट्र, आंध्र प्रदेश, तेलंगाना, कर्नाटक और तमिल नाडु में** 27 **कोविड अस्पतालों में** 220 **मरीजों पर फेज** 3 **का ट्रायल किया गया। इस दवा की सफलता** 65 **साल से ऊपर के मरीजों में भी देखी गई। ट्रायल की कामयाबी के बाद डीसीजीआई ने** 1 **मई** 2021 **को इस दवा को मंजूरी दे दी। खास बात है कि ये दवा पाउडर के रूप में आती है और इसे पानी के साथ आसानी से लिया जा सकता है।**

https://www.tv9hindi.com/india/drdo-drug-to-fight-corona-epidemic-medical-oxygen-needs-will-be-reduced-651278.html

अमर उजाला

Wed, 12 May 2021

डीआरडीओ की 2-डीजी औषधि नई कोशिकाओं कोरोना वायरस का संक्रमण रोकने में कारगर

लखनऊ। डीआरडीओ की कोविड रोधी औषधि 2-डीजी में शरीर में वायरल संक्रमण का गुणन कम करने की क्षमता है। इस औषधि से वायरस आसपास की अन्य कोशिकाओं को फिर से संक्रमित करने की क्षमता भी खो देता है। इसका मतलब है कि वायरस नई कोशिकाओं में प्रवेश नहीं कर पाता है। यह जानकारी डीआरडीओ के वरिष्ठ वैज्ञानिक डॉ. अनंत नारायण भट्ट ने दी। वह मंगलवार को राष्ट्रीय प्रौद्योगिकी दिवस पर एनबीआरआई और आईआईटीआर, लखनऊ द्वारा आयोजित वेबिनार को संबोधित कर रहे थे।

डॉ. भट्ट उस टीम के मुख्य सदस्य है, जिसने कोरोना के विरुद्ध कारगर स्वदेशी दवा '2-डीजी' को हाल ही में विकसित किया है। उन्होंने बताया कि वायरस जनित बीमारी की तीन प्रमुख अवस्थाएं होती हैं। वायरस का गुणन, उच्च प्रतिरोधक प्रतिक्रिया और श्वसन तंत्र का नष्ट होना। 2डीजी दवा इनमें से पहली दो अवस्थाओं के दौरान ही वायरस पर प्रभाव डाल कर उसे बेअसर करने में कारगर है। यह दवा वायरस के गुणन के द्वारा नए वायरस के जन्म के समय उनके प्रोटीन आवरण की संरचना को प्रभावित करती है। इससे नए उत्पन्न वायरस आसपास की नई कोशिकाओं को संक्रमित करने में असमर्थ हो जाते हैं। इस दवा को मनुष्यों पर आगे परीक्षण के लिए ड्रग जनरल कंट्रोल ऑफ इंडिया से क्लीनिकल परीक्षण की मंजूरी मिल चुकी हैं। इस औषधि में कैंसर रोधी गुण होने के कारण भविष्य में कैंसर के उपचार में भी इसका उपयोग संभव है। प्रो. एसके बारिक ने कहा कि देश के विभिन्न वैज्ञानिक संगठन कोविड-19 महामारी से लड़ने के लिए विभिन्न स्तरों पर साझा प्रयास कर रहे हैं। उन्होंने डिफेंस रिसर्च डवलपमेंट ऑर्गनाइजेशन के चेयरमैन को इस औषधि के लिए बधाई दी और कहा कि यह औषधि देश को महामारी से निकालने में कारगर सिद्ध होगी। अंत में मुख्य वैज्ञानिक डॉ. पीए शिर्के ने धन्यवाद ज्ञापित किया।

https://www.amarujala.com/lucknow/drdo-drug-2-dg-is-capable-to-stop-corona-infection-in-new-cells-lucknow-news-lko577758826

Wed, 12 May 2021

ATMAN AI by DRDO: All you need to know about COVID-19 detection software using chest X-rays

DRDO's Centre for Artificial Intelligence and Robotics (CAIR) has developed an Artificial Intelligence (AI) based COVID-19 detection application software ATMAN using the chest X-rays

By Arfa Javaid

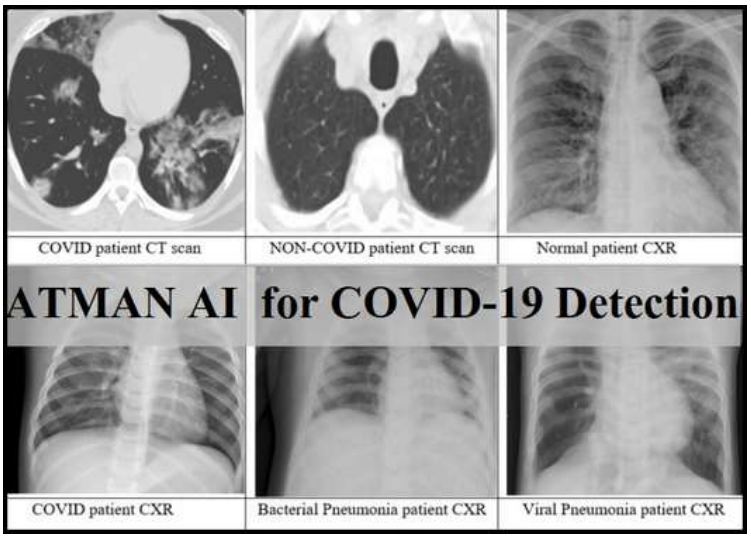
In order to accelerate the diagnosis and effectively treat COVID-19 patients, DRDO's Centre for Artificial Intelligence and Robotics (CAIR) has developed an Artificial Intelligence (AI) based COVID-19 detection application software ATMAN using the chest X-rays.

CAIR, Director, Dr. U.K. Singh was quoted as saying that the development of the diagnostic tool was part of DRDO's effort to help clinicians and partners on the frontline to help rapidly diagnose and effectively treat COVID-19 patients. He explained that with the limited testing facilities for coronavirus, there is a rush to develop AI tools for quick analysis using X-rays. The tool will help in automatically detecting radiological findings indicative of Covid-19 in seconds, enabling physicians and radiologists to more effectively triage the cases, especially in an emergency environment.

He further added that the tool can be of great use especially in smaller towns in India owing to the lack of easy access to CT scans. It will also reduce the existing burden on radiologists and make CT machines which are being used for COVID be used for other diseases and illness owing to overload for CT scans.

The AI-Based Intelligent COVID-19 Detector Technology For Medical Assistance (ATMAN) can classify the images into Normal, Covid-19 and Pneumonia classes using a limited number (few hundreds) of sample images with an accuracy rate of 96.73%.

With this development, it is expected that the existing burden on radiologists will reduce significantly. Additionally, it will also make CT machines available for CT scans of other diseases and illness apart from COVID-19.



ATMAN AI by DRDO for COVID-19 detection in chest X-rays

The back end of the software has been built with a Deep Convolution Neural Network which is tuned to accurately detect COVID-19 irrespective of the limited availability of its X-ray images for the system to learn. The software automatically pre-processes the images before passing them to the Neural net to take care of the variant illuminations levels of the X-ray images. The software is easy to navigate and can be easily accessed over the Internet through a variety of devices such as mobiles, tablets, laptops, and computers.

It is well established that the SARS-CoV-2 affects the lungs even before the patient starts showing significant symptoms. Therefore, in comparison to RT-PCR tests, an X-ray based diagnostic tool can detect the infection in the early stages with processing time in seconds.

The Software developed by DRDO's CAIR has been tested and validated by the doctors from HCG Centre for Academics and Research, Bengaluru and Ankh Life Care, Bengaluru, and have also provided data and relevant medical domain knowledge.

https://www.jagranjosh.com/general-knowledge/atman-ai-covid-19-detection-software-using-chest-x-raysby-drdo-1620722907-1

THE TIMES OF INDIA

Wed, 12 May 2021

ICU wing of DRDO's Covid hospital becomes functional

Varanasi: The Intensive Care Unit (ICU) wing of Pandit Rajan Mishra Covid Hospital, the temporary hospital set up by Defence Research and Development Organisation (DRDO) at the amphitheater ground of Banaras Hindu University started operation on Monday with critical patients from government hospitals being admitted for specialized treatment.

District magistrate Kaushal Raj Sharma said, "In the initial phase, the 250-bed ICU wing of this 750-bed Covid facility set up by DRO has become functional from today. Patients admitted at SPG divisional hospital, DDU district hospital, LBS government hospital, ESIC, BLW hospital and Homi Bhabha Cancer Hospital, who needed ICU facilities, were referred to the facility. A list of such patients was finalized and then their shifting was started."

In the initial phase, the 250-bed ICU wing of this 750-bed Covid facility set up by DRO has become functional from today.

No patients will be directly admitted. All admissions will be done through the Integrated Covid Command and Control Centre (ICCC) Varanasi under the district administration, said Sharma.

The modalities for admitting patients in the two wings with 500 oxygenated beds likely to become operational in three-four days, will also be finalized by Army doctors on the basis of experience of running the ICU wing.

The DM praised the Ministry of Defence, DRDO and Army Medical Corps for setting up the temporary facility to tackle shortage of beds and health care.

The Armed Forces Medical Services (AFMS) specialists, doctors, nursing and other medical staff from across the country started treating the patients.

The medical staff has been trained in Covid protocols and all equipment checked, said officials.

All the beds in the hospital have oxygen support and we have 40 KL oxygen stored in three tanks, they added.

The state government has ensured supply of all essentials, including oxygen, dedicated power and water supply besides bio-medical and other waste management.

Medicines and food will be provided free of charge to all patients and phones have been arranged to ensure interaction of patients with their attendants, the DM said.

The facility for stay of patients' attendants is already available in BHU besides food free of cost. After the second wave of Covid-19 started wreaking havoc, the Ministry of Defence came forward and is setting up temporary hospitals across the country and is manning their operations. After Delhi, Ahmedabad and Lucknow, the DRDO's Covid facility has become functional in Varanasi.

https://timesofindia.indiatimes.com/city/varanasi/icu-wing-of-drdos-covid-hospital-becomes-functional/articleshow/82534614.cms

THE TIMES OF INDIA

Wed, 12 May 2021

'DRDO's temp hosp set up for 3 months, to continue if needed'

Varanasi: Taking lessons from the difficulties faced by it in the second wave of the pandemic, the district administration has decided to augment the health infrastructure and resources and is preparing to face the third wave.

District magistrate Kaushal Raj Sharma said on Monday, "DRDO's temporary facility, Pandit Rajan Mishra Covid Hospital has been set up three months and can be extended for six months."

Sharma said, "The German hangar tent and auxiliary items used for installing the structure of the temporary hospital have been taken on rent while equipment, beds and all necessary medical items have been purchased by the state government. So, we will be fully prepared to tackle the predicted third wave if it does hit. We will be vigilant and depending on the trends, analysis and guidance from the Central and state governments will estimate whether paying rent for long or purchasing it would be viable."

The officials of district administration and health department are thinking of a long term plan to be prepared in case the third wave hits.

Sharma said, "Even after beginning of the DRDO's facility, we are augmenting the capacity of super specialty hospital and Trauma Centre at BHU, which is Level-3 facility since the beginning of the pandemic and have been treating critical patients of Varanasi and surrounding districts of east UP region."

He said the possibility of continuing the temporary hospital set up on the amphitheater ground of BHU will be mulled after holding discussions with university authorities and government.

BHU will also provide its specialist doctors at DRDO's Covid hospital to handle patients requiring treatment for other complications and ailments of heart, kidney and others.

Once the critical patients are treated at DRDO's Covid hospital and are cured of Covid, they will be shifted to wards of the department concerned of BHU hospital.

https://timesofindia.indiatimes.com/city/varanasi/drdos-temp-hosp-set-up-for3-months-to-continue-if-needed/articleshowprint/82534875.cms

THE TIMES OF INDIA

Wed, 12 May 2021

DRDO Covid hospital brings respite, improves bed statistics in other hosps

Varanasi: With the Pandit Rajan Mishra Covid-19 hospital set up by the DRDO becoming operational at the Amphitheatre ground of Banaras Hindu University on Monday evening, pressure on many hospitals, especially those running Level-2 Covid-19 facilities in the city, has reduced tremendously.

While compulsion of referral for admission in divisional and district hospitals was ended, hue and cry for ICU beds also reduced massively.

Critical Covid patients, who needed ventilator and other ICU facilities, are being admitted to DRDO's hospital on being referred from government and private hospitals

As per the the morning report on bed availability at L-3 and L-2 facilities of the government and private hospitals, a total of 33 patients were admitted to DRDO's hospital by Tuesday morning. Talking to TOI, the district magistrate Kaushal Raj Sharma said that critical Covid patients, who needed ventilator and other ICU facilities, are being admitted to DRDO's hospital on being referred from government and private hospitals of Varanasi and adjoining districts.

Apart from carrying their prescription and referral letter of hospital, the patients or their attendants are required to get confirmation for admission from Integrated Covid Command and Control Centre and also DRDO hospital by forwarding details on their WhatsApp numbers-7307413510 and 7307015441 respectively. The patients should get discharged from the hospital, where he or she is admitted, only after getting confirmation for admission from DRDO hospital.

Beginning of DRDO's facility has changed the statics of vacant and occupied beds in L-3 and L-2 facilities of eight government and 51 private hospitals. Of 441 beds in L-3 facilities of BHU's super speciality hospital and DRDO hospital 230 were vacant on Tuesday morning while of 592 L-2 beds as many as 183 were vacant. In private hospitals 80 of 313 in L-3 facility and 574 of 1,665 beds in L-2 facility were vacant.

While the pressure had started reducing on the hospitals, especially, with L-2 facilities is past one week with the decrease in the new Covid-19 positive cases, the DRDO facility has brought respite mainly to the government hospitals, said the officials.

Now, the compulsion of referral from any doctor or hospital for admission at L-2 facilities of SPG divisional and DDU district hospitals has been ended, said the DM adding that now patients can directly go to these facilities to get admitted and treatment. Similar facility will be available for non-Covid patients, he added.

More relief was announced by the UP minister Neelkanth Tiwari that now patients can also reach these two hospitals for admission even in the night hours.

https://timesofindia.indiatimes.com/city/varanasi/drdo-covid-hospital-brings-respite-improves-bed-statistics-in-other-hosps/articleshow/82560300.cms

Hindustan Times

Wed, 12 May 2021

Covid-19: DRDO to set up 7 medical oxygen plants in Odisha

The plants will come up at Boudh, Cuttack, Bhadrak, Gajapati, Jharsuguda, Nayagarh and Koraput districts, CGM of National Highways Authority of India (NHAI), Odisha, Ram Prasad Panda, said

Bhubaneswar: To ensure the availability of medical oxygen for treatment of Covid-19 patients, the Defence Research and Development Organization (DRDO) has decided to set up seven medical oxygen plants in Odisha.

The plants will come up at Boudh, Cuttack, Bhadrak, Gajapati, Jharsuguda, Nayagarh and Koraput districts, CGM of National Highways Authority of India (NHAI), Odisha, Ram Prasad Panda, said.

The civil and electrical works of the plants will be done by the NHAI while the DRDO will look after the technical aspect, he said.

The civil and electrical works of the plants will be done by the NHAI while the DRDO will look after the technical aspect, Panda said.(Sakib Ali/HT file photo. Representative image)

The DRDO's move is a part of its massive drive under which it has decided to set up 500 medical oxygen plants in the country within three months with the help of its indigenous developed technology. Construction of the plants has already started in Boudh and Cuttack, Panda said.

Once completed, each plant will generate 1,000 litres per minute (LPM) of oxygen and the life-saving gas will be supplied to hospitals through pipelines.

https://www.hindustantimes.com/india-news/covid19-drdo-to-set-up-7-medical-oxygen-plants-in-odisha-101620747387905.html

Wed, 12 May 2021

ओडिशा में सात मेडिकल ऑक्सीजन प्लांट की शुरुआत करेगा DRDO, इन स्थानों पर लगाए जाएंगे

By Akarsh Shukla

भुवनेश्वर: कोरोना वायरस की दूसरी लहर पूरे देश में सुनामी बनकर कहर ढा रही है। कई राज्यों में मरीजों के लिए अस्पतालों में बेड और ऑक्सीजन नहीं है। महामारी से निपटने के लिए ओडिशा सरकार ने कई उचित कदम उठाएं हैं लेकिन ऑक्सीजन की किल्लत के लिए केंद्र सरकार से मदद मांगी थी। ओडिशा में ऑक्सीजन की किल्लत दूर करने के लिए अब रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) आगे आया है। गौरतलब है कि देशभर में ऑक्सीजन की कमी से निपटने के लिए डीआरडीओ और एचएलएल इंफ्राटेक सर्विसेज एलटीडी द्वारा देशभर में मेडिकल ऑक्सीजन जनरेशन प्लांट्स की स्थापना की जा रही है।

सार्वजनिक स्वास्थ्य सुविधाओं अंतरगत स्थापित किए जा रहे मेडिकल ऑक्सीजन प्लांट देशभर के कई राज्यों में किया जा रहा है। इसी के तहत अब डीआरडीओ और एचआईटीईएस ने कोरोना मरीजों की ऑक्सीजन की जरूरत को पूरा करने के लिए ओडिशा में सात ऑक्सीजन प्लांट लगाने करने का निर्णय लिया है। यह प्लांट कटक में आचार्य हरिहर क्षेत्रीय कैंसर अनुसंधान केंद्र और झारसुगुड़ा, बौध, कोरापुट, गजपति और नयागढ़ में राष्ट्रीय राजमार्ग प्राधिकरण (NHAI) के मुख्य महाप्रबंधक (CGM) के परिसर में लगाएं जाएंगे।

गौरतलब है कि देशभर में 400 साइटों को डीआरडीओ और 181 ऑक्सीजन प्लांटों को एचआईटीईएस द्वारा शुरू किया जाना है। केंद्र सरकार ने राज्यों से अनुरोध किया गया है कि वे मेडिकल ऑक्सीजन प्लांटों की स्थापना और कार्य में लाने के लिए संबंधित एजेंसियों के साथ समन्वय में तत्काल उचित कार्रवाई करें। आपको बता दें कि ओडिशा में कोरोना वायरस के मामले लगातार बढ़ रहे हैं, बीते सोमवार राज्य में 10,031 नए मामले सामने आए थे और 17 लोगों की मौत हुई थी। इस दौरान 6 हजार से अधिक मरीज ठीक हुए हैं।

https://hindi.oneindia.com/news/bhubaneswar/drdo-to-start-seven-medical-oxygen-plants-in-odisha-to-be-set-up-at-these-places-617381.html?story=2

abp न्यूज़

Wed, 12 May 2021

जम्मू: कोरोना के बढ़ते मामलों के बीच एक्शन में सरकार, DRDO की मदद से बनवा रही दो बड़े कोविड अस्पताल

डीआरडीओ की मदद से जम्मू के भगवती नगर और श्रीनगर में एयरपोर्ट के पास 500-500 बेड के 2 अस्पताल बनाए जा रहे हैं।

By अजय बाचलू

जम्मू: जम्मू में लगातार बढ़ रहे करोना मामलों से निपटने के लिए अब प्रदेश सरकार एक्शन मोड में है। जम्मू कश्मीर में डीआरडीओ की मदद से सरकार 500-500 बेड के दो करोना अस्पताल बना रही है, जिन्हें महीने के अंत तक पूरे किए जाएंगे।

जम्मू कश्मीर में जहां एक तरफ कोरोना तेजी से फैल रहा है, वहीं दूसरी तरफ सरकार भी इस महामारी को रोकने के लिए अपने प्रयासों को युद्ध स्तर पर कर रही है। जम्मू में लगातार बढ़ रहे कोरोना संक्रमण में इस महामारी से पीड़ित लोगों को बेड्स की कमी ना हो, इसके लिए अब प्रदेश सरकार ने डीआरडीओ की मदद ली है। डीआरडीओ की मदद से जम्मू के भगवती नगर और श्रीनगर में एयरपोर्ट के पास 500-500 बेड के 2 अस्पताल बनाए जा रहे हैं।

जम्मू- कोरोना अस्पताल

जम्मू कश्मीर स्वास्थ्य विभाग के फाइनेंशियल कमिश्नर अटल ढुल्लू के मुताबिक डीआरडीओ की मदद से इन दोनों अस्पतालों का काम युद्ध स्तर पर जारी है। उनके मुताबिक यह दोनों अस्पताल प्रदेश में कोरोना पीड़ितों के लिए बेड की कमी को पूरा करेंगे। अटल ढुल्लू ने बताया कि जम्मू में बनाया जा रहा अस्पताल इसी महीने की 25 तारीख तक पूरा हो जाएगा, जबकि श्रीनगर में बनाया जा रहा अस्पताल अगले महीने की 1 तारीख के आसपास पूरा होगा।

जम्मू में इस अस्पताल को बना रहे ठेकेदार के मुताबिक इस अस्पताल में काम युद्धस्तर पर जारी है और करीब 100 मजदूर दिन-रात इस अस्पताल को पूरा करने में लगे हैं। उन्होंने कहा कि अस्पताल में सारा सामान दिल्ली से आ रहा है और जिसे डीआरडीओ के अधिकारियों की देखरेख में पूरा किया जा रहा है। कॉन्ट्रैक्टर के मुताबिक उन्हें जम्मू में अस्पताल को पूरा करने के लिए 25 मई की मोहलत दी गई है और तब तक इस अस्पताल को पूरा कर लिया जाएगा।

https://www.abplive.com/news/india/jammu-government-in-action-amid-rising-cases-of-corona-two-big-covid-hospitals-being-built-with-the-help-of-drdo-ann-1912704

जागरण

Wed, 12 May 2021

जिलाधिकारी डॉ. आशीष श्रीवास्तव ने कहा- डीआरडीओ के अस्पताल का संचालन 18 मई से कराएं

सोमवार को जिलाधिकारी डॉ. आशीष श्रीवास्तव ने सोमवार को वर्चअल माध्यम से बैठक कर कोरोना संक्रमण की रोकथाम संबंधी कायरें की समीक्षा की। उन्होंने उप जिलाधिकारी ऋषिकेश से डीआरडीओ के माध्यम से बन रहे अस्पताल की प्रगति जानी।

By Sunil Negi

देहरादून: जिलाधिकारी डॉ. आशीष श्रीवास्तव ने सोमवार को वर्चअल माध्यम से बैठक कर कोरोना संक्रमण की रोकथाम संबंधी कायरें की समीक्षा की। उन्होंने उपजिलाधिकारी ऋषिकेश से डीआरडीओ के माध्यम से बन रहे अस्पताल की प्रगति जानी। जिलाधिकारी डॉ. श्रीवास्तव ने कहा कि डीआरडीओ के माध्यम से बन रहे अस्पताल के लिए सड़क, बिजली, पानी आदि सुविधाओं का शीघ्र विकास कर दिया जाए। ताकि 18 मई से अस्पताल का संचालन शुरू कराया जा सके। जिलाधिकारी ने कहा कि कोरोना की जांच कर रही लैब जांच का डाटा लंबित रख रही हैं और फिर अचानक से उसे पोर्टल पर अपलोड कर रही हैं।

इससे आंकड़ों व वास्तविक स्थिति में भिन्नता दिख रही है। यह ठीक नहीं है। उन्होंने मुख्य चिकित्सा अधिकारी को निर्देश दिए कि लैब स्तर पर कोई भी एंट्री लंबित न रहे। जो लैब इस पर मनमानी कर रहे हैं, उनके खिलाफ कार्रवाई की जाए। उधर, जिलाधिकारी ने कम्युनिटी सर्विलांस की दैनिक प्रगति तलब की। पता चला कि सोमवार को 53 हजार, 400 व्यक्तियों का सर्विलांस किया गया। इनमें से 318 में कोरोना जैसे लक्षण पाए गए और इनकी जांच के लिए मुख्य चिकित्सा अधिकारी को अवगत कराया गया है। जिलाधिकारी यह भी निर्देश दिए कि कोरोना किट के वितरण में किसी भी तरह की ढील न बरती जाए।

दैनिक परीक्षण में यह मिली जानकारी

सोमवार को अस्पतालों को ऑक्सीजन के 2032 सिलिंडर व आमजन को 38 सिलिंडर उपलब्ध कराए गए। जिला प्रशासन ने 750 कोरोना किट व एसडीआरएफ ने 476 किट बांटी।

ग्रामीणों को जागरूक करे प्रदेश सरकार

चिह्नित राज्य आंदोलनकारी संयुक्त समिति ने पहाड़ में कोरोना संक्रमण बढ़ने पर चिंता जताते हुए सरकार से इस दिशा में सख्त कदम उठाने की मांग की है। समिति के केंद्रीय प्रवक्ता महेश जोशी ने कहा कि अब पहाड़ के गांवों में भी बड़ी संख्या में लोग संक्रमित हो रहे हैं। पहले ही स्वास्थ्य सुविधाओं से वंचित पहाड़ में ऐसे समय में संक्रमितों को समुचित इलाज उपलब्ध कराना सरकार के लिए किसी चुनौती से कम नहीं है। उन्होंने कहा कि इसके लिए ब्लॉक स्तर पर स्वास्थ्य कर्मियों की टीम गठित कर उसे गांवों में भेजकर ग्रामीणों को कोरोना संक्रमण के लक्षणों और इससे बचाव के लिए जरूरी सावधानियों के प्रति जागरूक किया जाए। कोरोना की दूसरी लहर में अधिकतर मरीजों में ऑक्सीजन लेवल कम हो रहा है, ऐसे में सरकार को ऑक्सीजन की व्यवस्था पर भी जोर देना होगा। बेरोजगार हो गए लोग के लिए पैकेज की घोषणा करनी चाहिए।

https://www.jagran.com/uttarakhand/dehradun-city-dm-dr-ashish-srivastava-said-drdo-hospital-should-be-operated-from-18-may-21633970.html

Defence News

Defence Strategic: National/International

ETTelecom.com
From The Economic Times

Wed, 12 May 2021

Tech evolution like SatCom may pose security challenges: India's Defence Ministry

New business models and technological evolutions such as the satellite-based communications or SatCom may pose national security challenges, and there is a need for a regular scrutiny and taking suitable actions, a senior government official said

By Muntazir Abbas

New Delhi: New business models and technological evolutions such as the satellite-based communications or SatCom may pose national security challenges, and there is a need for a regular scrutiny and taking suitable actions, a senior government official said.

"Space-based Internet is increasingly becoming a reality. New models of business and technology evolution may pose new security challenges and there will be a continuous need to examine these challenges and take appropriate actions," Ajay Kumar, Secretary, Ministry of Defence told ETTelecom.

Comments from the top bureaucrat have come following the increased activity in the satellite communications or SatCom space with billionaire Elon Musk-headed Starlink's aggressive plans to offer space Internet services worldwide, and Bharti Global's stake buy in the UK's OneWeb.

SpaceX-owned Starlink's low latency broadband offering is touted to be based on a range of small Internet low-earth orbit or LEO satellites closer to the earth's surface.

The US-based company has also offered Indian users pre-book service plans at a refundable fee of $99 (nearly Rs 7,300), and is likely to foray into the Indian market by 2022.

Sunil Mittal-driven Bharti Global has too made a headway in bringing satellite-based data services after acquiring a 45% stake in OneWeb, a UK-based firm that brings a constellation of low-earth orbit (LEO) satellites to deliver affordable Internet services.

Bharti's telecom arm that fiercely competes with Reliance Jio, aims to use OneWeb's platform to bridge the digital divide by providing low latency, high-speed broadband access to India's rural and remote regions.

Early this year, Bharti Airtel in its ambitious satellite broadband initiative, through its wholly-owned subsidiary Nettle Infrastructure Investments, acquired 100% stake in OneWeb India Communications, for an undisclosed sum.

Last year, Boris Johnson-headed UK government too strategically invested $500 million in OneWeb, a consortium led by Bharti Global.

"UK's acquisition of OneWeb is an example of how the space industry can be expected to move in future," Kumar said.

The move by one of the India's top telecom player that has a presence in Africa, Bangladesh and Sri Lanka markets, has been closely followed by French Eutelsat Communications' investment of $550 million in OneWeb last month after Japanese conglomerate SoftBank and Hughes Network Systems in January spent $400 million in the UK-based company.

Experts, however, caution against payloads carried by foreign-origin satellites and stressed upon the need for a close watch.

Back in 2018, India had created a Defence Space Agency (DSA) which, according to Kumar, acts as a dedicated organisation to look into space-related national security aspects, and added that that the mandate for tri-service organisation is clearly defined.

"It (DSA) is in process of enhancing India's space capabilities including the payloads and other capabilities that Indian armed forces need to meet defence capabilities of the country," the top official added.

In March 2019, India has successfully conducted an anti-satellite weapon (ASAT) test on a target satellite present in a low-earth orbit to demonstrate the country's anti-satellite preparedness.

https://telecom.economictimes.indiatimes.com/news/new-business-models-may-pose-security-challenges-defence-ministry/82545979

THE TIMES OF INDIA

Wed, 12 May 2021

Cash crunch forces military to take equipment on lease

By Rajat Pandit

New Delhi: From mid-air refuelling aircraft and trainer planes to drones, light utility helicopters and minesweepers, the armed forces are increasingly looking to lease military equipment and platforms to plug urgent operational gaps amidst the prevailing fund crunch.

The Army, for instance, is now finalising the lease of four advanced Heron Mark-II medium-altitude long endurance UAVs (unmanned aerial vehicles) from Israel while the upgrade of its existing drone fleet takes place, say sources.

The IAF has made repeated attempts to buy six new flight refuelling aircraft to extend the reach of its fighter jets, but with no success

The Navy is already extensively using two MQ-9B Sea Guardian drones for long-range surveillance missions over the Indian Ocean after leasing them from a US firm last November.

The maritime force also recently issued a request for information (RFI) to foreign companies for the lease of 24 twin-engine armed light utility helicopters for a period of five years. The move has come due to the continuing delay in even launching the long-delayed Rs 21,000 crore 'Make in India' project for 111 naval utility helicopters with foreign collaboration to replace the existing fleet of obsolete single-engine Chetak choppers.

"The aim is to mitigate short-term capability gaps. Leasing cut time delays and initial capital costs," said an officer. IAF, in turn, is now finalising the "wet lease" of one A-330 multi-role tanker transport (MRTT) aircraft from France for training purposes.

This comes after the force's repeated attempts to buy six new flight refuelling aircraft (FRA), to extend the strategic reach of its fighter jets, have come to naught.

Though IAF overall needs 18 such "force-multipliers", it is currently making do with just six IL-78 aircraft inducted in 2003-2004. The Navy is also looking to lease operational and auxiliary support vessels, ranging from desperately-needed minesweepers to tankers, barges and tugs.

https://timesofindia.indiatimes.com/india/cash-crunch-forces-military-to-take-equipment-on-lease/articleshow/82563292.cms

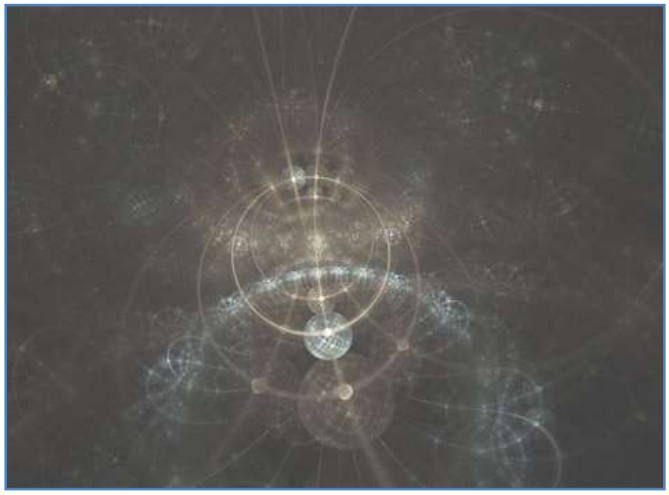
Science & Technology News

PHYS.ORG

Wed, 12 May 2021

World's fastest information-fueled engine designed by university researchers

Simon Fraser University researchers have designed a remarkably fast engine that taps into a new kind of fuel—information.



Credit: CC0 Public Domain

The development of this engine, which converts the random jiggling of a microscopic particle into stored energy, is outlined in research published this week in the *Proceedings of the National Academy of Sciences (PNAS)* and could lead to significant advances in the speed and cost of computers and bio-nanotechnologies.

SFU physics professor and senior author John Bechhoefer says researchers' understanding of how to rapidly and efficiently convert information into "work" may inform the design and creation of real-world information engines.

"We wanted to find out how fast an information engine can go and how much energy it can extract, so we made one," says Bechhoefer, whose experimental group collaborated with theorists led by SFU physics professor David Sivak.

Engines of this type were first proposed over 150 years ago, but actually making them has only recently become possible.

"By systematically studying this engine, and choosing the right system characteristics, we have pushed its capabilities over ten times farther than other similar implementations, thus making it the current best-in-class," says Sivak.

The information engine designed by SFU researchers consists of a microscopic particle immersed in water and attached to a spring which, itself, is fixed to a movable stage. Researchers then observe the particle bouncing up and down due to thermal motion.

"When we see an upward bounce, we move the stage up in response," explains lead author and Ph.D. student Tushar Saha. "When we see a downward bounce, we wait. This ends up lifting the entire system using only information about the particle's position."

Repeating this procedure, they raise the particle "a great height, and thus store a significant amount of gravitational energy," without having to directly pull on the particle.

Saha further explains that "in the lab, we implement this engine with an instrument known as an optical trap, which uses a laser to create a force on the particle that mimics that of the spring and stage."

Joseph Lucero, a Master of Science student, adds, "In our theoretical analysis, we find an interesting trade-off between the particle mass and the average time for the particle to bounce up. While heavier particles can store more gravitational energy, they generally also take longer to move up."

"Guided by this insight, we picked the particle mass and other engine properties to maximize how fast the engine extracts energy, outperforming previous designs and achieving power comparable to molecular machinery in living cells, and speeds comparable to fast-swimming bacteria," says postdoctoral fellow Jannik Ehrich.

More information: Tushar K. Saha et al, Maximizing power and velocity of an information engine, *Proceedings of the National Academy of Sciences* (2021). DOI: 10.1073/pnas.2023356118

Journal information: *Proceedings of the National Academy of Sciences*

https://phys.org/news/2021-05-world-fastest-information-fueled-university.html

PHYS.ORG

Wed, 12 May 2021

Electromagnetic levitation whips nanomaterials into shape

In order for metal nanomaterials to deliver on their promise to energy and electronics, they need to shape up—literally.

To deliver reliable mechanical and electric properties, nanomaterials must have consistent, predictable shapes and surfaces, as well as scalable production techniques. UC Riverside engineers are solving this problem by vaporizing metals within a magnetic field to direct the reassembly of metal atoms into predictable shapes. The research is published in the *Journal of Physical Chemistry Letters*.

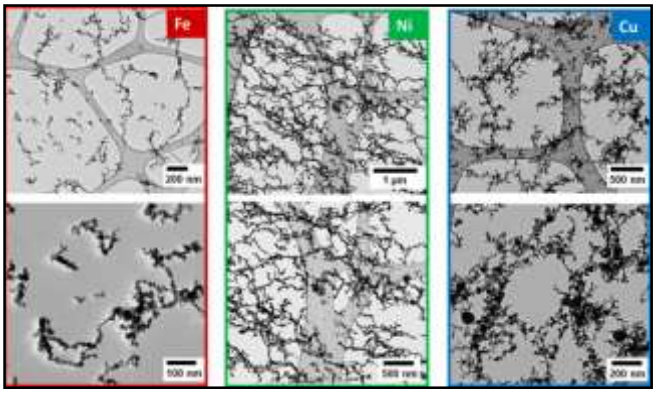


Image showing the stringlike particles formed by iron and nickel and the more globular clusters formed by copper. Credit: Abbaschian, Zachariah, et. al. 2021

Nanomaterials, which are made of particles measuring 1-100 nanometers, are typically created within a liquid matrix, which is expensive for bulk production applications, and in many cases cannot make pure metals, such as aluminum or magnesium. More economical production techniquess typically involve vapor phase approaches to create a cloud of particles condensing from the vapor. These suffer from a lack of control.

Reza Abbaschian, a distinguished professor of mechanical engineering; and Michael Zachariah, a distinguished professor of chemical and environmental engineering at UC Riverside's Marlan and Rosemary Bourns College of Engineering; joined forces to create nanomaterials from iron, copper, and nickel in a gas phase. They placed solid metal within a powerful electromagnetic levitation coil to heat the metal beyond its melting point, vaporizing it. The metal droplets levitated in the gas within the coil and moved in directions determined by their inherent reactions to magnetic forces.

When the droplets bonded, they did so in an orderly fashion that the researchers learned they could predict based on the type of metal and how and where they applied the magnetic fields.

Iron and nickel nanoparticles formed string-like aggregates while copper nanoparticles formed globular clusters. When deposited on a carbon film, iron and nickel aggregates gave the film a porous surface, while carbon aggregates gave it a more compact, solid surface. The qualities of the materials on the carbon film mirrored at larger scale the properties of each type of nanoparticle.

Because the field can be thought of as an "add-on," this approach could be applied to any vapor-phase nanoparticle generation source where the structure is important, such as fillers used in polymer composites for magnetic shielding, or to improve electrical or mechanical properties.

"This 'field directed' approach enables one to manipulate the assembly process and change the architecture of the resulting particles from high fractal dimension objects to lower dimension string-like structures. The field strength can be used to manipulate the extent of this arrangement," Zachariah said.

More information: Pankaj Ghildiyal et al. Magnetic-Field Directed Vapor-Phase Assembly of Low Fractal Dimension Metal Nanostructures: Experiment and Theory, *The Journal of Physical Chemistry Letters* (2021). DOI: 10.1021/acs.jpclett.0c03463

Journal information: *Journal of Physical Chemistry Letters*

https://phys.org/news/2021-05-electromagnetic-levitation-nanomaterials.html

PHYS.ORG

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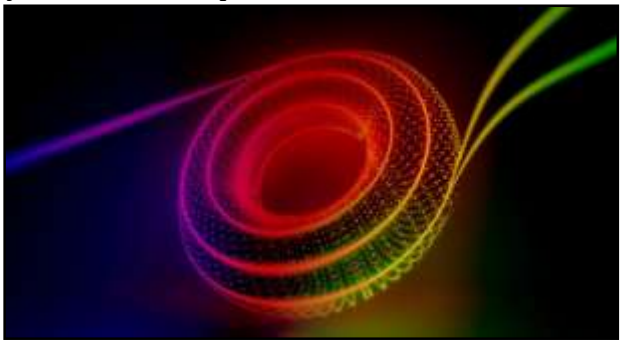
Researchers generate tunable twin particles of light

Byy Bailey Bedford

Identical twins might seem 'indistinguishable,' but in the quantum world the word takes on a new level of meaning. While identical twins share many traits, the universe treats two indistinguishable quantum particles as intrinsically interchangeable. This opens the door for indistinguishable particles to interact in unique ways—such as in quantum interference—that are needed for quantum computers.



A new technique sees two distinct particles of light enter a chip and two identical twin particles of light leave it. The image artistically combines the journey of twin particles of light along the outer edge of a checkerboard of rings with the abstract shape of its topological underpinnings. Credit: Kaveh Haerian

While generating a crowd of photons—particles of light—is as easy as flipping a light switch, it's trickier to make a pair of indistinguishable photons. And it takes yet more work to endow that pair with a quantum mechanical link known as entanglement. In a paper published May 10, 2021 in the journal *Nature Photonics*, JQI researchers and their colleagues describe a new way to make entangled twin particles of light and to tune their properties using a method conveniently housed on a chip, a potential boon for quantum technologies that require a reliable source of well-tailored photon pairs.

The researchers, led by JQI fellow Mohammad Hafezi, designed the method to harness the advantages of topological physics. Topological physics explores previously untapped physical phenomena using the mathematical field of topology, which describes common traits shared by different shapes. (Where geometry concerns angles and sizes, topology is more about holes and

punctures—all-encompassing characteristics that don't depend on local details.) Researchers have made several major discoveries by applying this approach, which describes how quantum particles—like electrons or, in this case, photons—can move in a particular material or device by analyzing its broad characteristics through the lens of topological features that correspond to abstract shapes (such as the donut in the image above). The topological phenomena that have been revealed are directly tied to the general nature of the material; they must exist even in the presence of material impurities that would upset the smooth movement of photons or electrons in most other circumstances.

Their new method builds on previous work, including the generation of a series of distinguishable photon pairs. In both the new and old experiments, the team created a checkerboard of rings on a silicon chip. Each ring is a resonator that acts like a tiny race track designed to keep certain photons traveling round and round for a long time. But since individual photons in a resonator live by quantum rules, the race cars (photons) can sometimes just pass unchanged through an intervening wall and proceed to speed along a neighboring track.

The repeating grid of rings mimics the repeating grid of atoms that electrons travel through in a solid, allowing the researchers to design situations for light that mirror well known topological effects in electronics. By creating and exploring different topological environments, the team has developed new ways to manipulate photons.

"It's exactly the same mathematics that applies to electrons and photons," says Sunil Mittal, a JQI postdoctoral researcher and the first author of the paper. "So you get more or less all the same topological features. All the mathematics that you do with electrons, you can simply carry to photonic systems."

In the current work, they recreated an electronic phenomenon called the anomalous quantum Hall effect that opens up paths for electrons on the edge of a material. These edge paths, which are called topological edge states, exist because of topological effects, and they can reliably transport electrons while leaving routes through the interior easily disrupted and impassable. Achieving this particular topological effect requires that localized magnetic fields push on electrons and that the total magnetic field when averaged over larger sections of the material cancels out to zero.

But photons lack the electrical charge that makes electrons susceptible to magnetic shoves, so the team had to recreate the magnetic push in some other way. To achieve this, they laid out the tracks so that it is easier for the photons to quantum mechanically jump between rings in certain directions. This simulates the missing magnetic influence and creates an environment with a photonic version of the anomalous quantum Hall effect and its stable edge paths.

For this experiment, the team sent two laser beams of two different colors (frequencies) of light into this carefully designed environment. Inside a resonator, a photon from each of the beams spontaneously combine. The researchers then observed how the photons reformed into two indistinguishable photons, traveled through the topological edge paths and were eventually ejected from the chip.

Since the new photons formed inside a resonator ring, they took on the traits (polarization and spatial mode) of the photons that the resonators are designed to hold. The only trait left that the team needed to worry about was their frequencies.

The researchers matched the frequencies of the photons by selecting the appropriate input frequencies for the two lasers based on how they would combine inside the silicon resonators. With the appropriate theoretical understanding of the experiment, they can produce photons that are quantum mechanically indistinguishable.

The nature of the formation of the new photons provides the desired quantum characteristics. The photons are quantum mechanically entangled due to the way they were generated as pairs; their combined properties—like the total energy of the pair—are constrained by what the original photons brought into the mix, so observing the property of one instantly reveals the equivalent fact about the other. Until they are observed—that is, detected by the researchers—they don't exist as two individual particles with distinct quantum states for their frequencies. Rather, they are identical

mixtures of possible frequency states called a superposition. The two photons being indistinguishable means they can quantum mechanically interfere with each other

The resulting combination of being indistinguishable and entangled is essential for many potential uses of photons in quantum technologies. An additional lucky side effect of the researcher's topological approach is that it gives them a greater ability to adjust the frequencies of the twin photons based on the frequencies they pump into the chip and how well the frequencies match with the topological states on the edge of the device.

"This is not the only way to generate entangled photon pairs—there are many other devices—but they are not tunable," Mittal says. "So once you fabricate your device, it is what it is. If you want to change the bandwidth of the photons or do something else, it's not possible. But in our case, we don't have to design a new device. We showed that, just by tuning the pump frequencies, we could tune the interference properties. So, that was very exciting."

The combination of the devices being tunable and robust against manufacturing imperfections make them an appealing option for practical applications, the authors say. The team plans to continue exploring the potential of this technique and related topological devices and possible ways to further improve the devices such as using other materials to make them.

More information: Mittal, S., Orre, V.V., Goldschmidt, E.A. et al. Tunable quantum interference using a topological source of indistinguishable photon pairs. *Nat. Photonics* (2021). doi.org/10.1038/s41566-021-00810-1

Journal information: *Nature Photonics*

https://phys.org/news/2021-05-tunable-twin-particles.html

COVID-19 Research News

Business Standard

Wed, 12 May 2021

Indian double mutant variant of Covid-19 less severe for vaccinated: Study

The B.1.617 variant first emerged in Maharashtra towards the end of 2020 and has spread throughout India and to at least 40 countries

By Ruchika Chitravanshi

New Delhi: The Indian double mutant variant of coronavirus — B.1.617 — that has been termed as a variant of concern by the World Health Organization is moderately resistant to antibodies and is highly transmissible but has low severity among those who are vaccinated, a molecular study has said.

The study published by Indian SARS-CoV-2 Genomic Consortia along with the scientists of the Cambridge University in the UK in the bioRxiv, an open access preprint server, “Extensive vaccination will likely protect against moderate to severe disease and will reduce the transmission of B.1.617 given the in vitro neutralisation data we and others have presented.”

The B.1.617 variant first emerged in Maharashtra towards the end of 2020 and has spread throughout India and to at least 40 countries. The Indian mutation, the study says, has contributed to the epidemic wave in India. It found that the progression to severe disease and death was low in all studies.

The study titled SARS-CoV-2 B.1.617 emergence and sensitivity to vaccine-elicited antibodies said that in absence of published data on transmissibility, it is predicted that the variant would have increased transmissibility even among those who are vaccinated or have pre-existing immunity. “It is unclear whether B.1.617 variants will prove more transmissible than B.1.1.7, also circulating in India and now globally dominant.”

“This spike confers modestly reduced sensitivity to BNT162b2 mRNA vaccine-elicited antibodies,” the study said referring to the Pfizer vaccine.

The study found that health workers at a single tertiary hospital vaccinated with the ChAdOx-1 vaccine (the Oxford-Astra Zeneca vaccine) had breakthrough infections, which were predominantly the Indian variant. Scientists said this could be because of the prevalence of the variant in the community or it might simply reflect transmission between health care workers. “The data nonetheless raises the possibility of a transmission advantage of B.1.617 in vaccinated individuals,” the study said.

The research group has also studied a sub-lineage of the variant, which has three strains - L452R, E484Q, and P681R. The last one of these (P681R), virologists said can lead to increased tissue damage and more pathogens.

The scientists also noted in their findings that this particular variant was found increasingly more frequently during the ongoing outbreak in Delhi.

The study has been authored by Ravindra K. Gupta of the Cambridge Institute for Therapeutic Immunology and Infectious Diseases along with researchers from the National Centre for Disease Control, India; CSIR Institute of Genomics and Integrative Biology in India, University of Tokyo, Japan among others.

https://www.business-standard.com/article/current-affairs/indian-double-mutant-variant-of-covid-19-less-severe-for-vaccinated-study-121051200011_1.html