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COVID-19: DRDO's Contribution

THE NEW INDIAN EXPRESS

Sat, 01 Aug 2020

India-Israel joint cooperation starts trial for rapid testing, result in less than 30 secs if successful

These trials are a part of a multi-pronged mission visiting India from Israel to cooperate on COVID-19 research and development, further cementing the strategic relationship between the two nations

New Delhi: In joint cooperation between Israel and India, rapid tests are being developed which will provide results in less than 30 seconds if successful.

Trials started three days ago at a special testing site at Dr Ram Manohar Lohia (RML) Hospital. It has been developed jointly in cooperation with DRDD Ministry of Defence Israel and DRDO, CSIR and PSA, India and coordinated by the Ministry of Foreign Affairs Israel and India.

Medics collect swab samples at Indo-Israel Non-Invasive Rapid COVID -19 test study camp as part of Operation Open Skies, at Delhi's Dr Ram Manohar Lohia Hospital. (Photo | Shekhar Yadav, EPS)

Four different kinds of simple, non-invasive technologies have been used in the trials, which includes a voice test (that uses artificial intelligence to identify changes in the patient's voice), a breath analyser test (which requires patient to blow into a tube and detects virus using terra-hertz waves), isothermal testing (that enables identification of the virus in a saliva sample), and a test using Polyamino acids (that seeks to isolate proteins related to COVID-19).

While speaking with ANI, Ron Malka, Ambassador of Israel to India said, "With the outbreak of the pandemic, our two Prime Ministers had some conversations and decided to corporate into joint research and find a solution for Covid-19. This scientific cooperation will give results within a few seconds, and if successful this research will be a revolution."

"Other than a cooperating and joint venture, other initiatives are also there such as agriculture water science technology. Just two weeks ago, we signed an MoU in cybersecurity," Malka added.

The special flights that came from Israel three days ago had a delegation of scientists who bought with them medical equipment with cutting edge technologies to fight Covid-19. 83 advance respirators were also bought with a special waiver.

"When this pandemic broke out India helped Israel to evacuate thousands of Israelis stranded all over. India supplied Israel medicines, the raw material for medicine and whatever was needed. This is how good friendship is," added Malka.

K. Vijay Raghavan, Principal Scientific Advisor from the Prime Minister of India's office (PMO) told, "Science and technology have come to public level as it should. The speed with which science and technology have come for public health is amazing. The collaboration between Israel and India is stunning."

Raghava, in addition, stated, "Israel and India share collaborations in every area of science. The friendship and trust our countries have developed over the years have improved the ongoing

studies' speed and quality. I am sure that some of these will be successful and result in great value to our countries and humanity."

These trials are a part of a multi-pronged mission visiting India from Israel to cooperate on COVID-19 research and development, further cementing the strategic relationship between the two nations.

Results are expected to be available within two weeks.

https://www.newindianexpress.com/nation/2020/jul/31/india-israel-joint-cooperation-starts-trial-for-rapid-testing-result-in-less-than-30-secs-if-succes-2177405.html

hindustantimes

Sat, 01 Aug 2020

Four Israeli technologies to detect Covid-19 in 30 seconds to be tested in Delhi

About 10,000 people will be tested twice; once using the gold standard molecular RT-PCR test and then the four Israeli technologies to evaluate whether these innovations will work in a field setting

By Anonna Dutt

New Delhi: Four technologies to detect coronavirus disease (Covid-19) in 30 seconds developed by scientists from Israel are being evaluated at Delhi's Dr Ram Manohar Lohia hospital.

About 10,000 people will be tested twice; once using the gold standard molecular RT-PCR test and then the four Israeli technologies to evaluate whether these innovations will work in a field setting. Unlike the swab sample collection method, for this test, people will have to blow into or speak in front of a breathalyser sort of an instrument which will collect a sample for testing.

If successful, these technologies can pave the way for the safe opening of businesses and people will be able to coexist with the virus till a vaccine is developed, researchers said. (Samir Jana / Hindustan Times)

If successful, these technologies can pave the way for the safe opening of businesses and people will be able to coexist with the virus till a vaccine is developed, researchers said.

"The diagnostics are being tested in a collaboration between the Israeli Defence R&D, the Defence Research and Development Organisation (DRDO), and Council of Scientific and Industrial Research (CSIR). The first technology attempts to detect the virus by a technique called terahertz spectroscopy. In this, a sample is taken, deposited on a chip and then examined in a manner that specifically detects SARS-CoV-2 virus that causes Covid-19. This does not involve any chemistry or reagents as it does in the current standard tests. The results will come in less than a minute," said professor K Vijay Raghavan, principal scientific advisor to Prime Minister Narendra Modi.

Raghavan said the second approach is called an isothermal test, and it amplifies the genetic material of the virus rapidly. "The third approach detects what are called poly amino acids specific to the virus. The fourth approach is to study speech samples from asymptomatic and presymptomatic patients, compare them with others and see if the tools of artificial intelligence can be used to identify those who are Covid-19 positive. All these approaches are working well in the laboratory setting, but the challenge is to see how they will work in a field setting," he said.

The final product can be a combination of two or more technologies as well. "We will see which of the four technologies works better at detecting Covid-19 afflicted people. It could be a

combination of two of these technologies as well. We hope to see a very robust diagnostic test finally," said Israeli ambassador to India Ron Malka.

India's manufacturing capacity, the ambassador said, made India a natural fit for these trials. "We are a small country and do not have the manufacturing capability like India. By combining advanced Israeli and Indian technology and India's manufacturing prowess, we can find a way to resume our lives and exist alongside the virus till a vaccine is developed," he said.

Prof Raghavan said, "What was yesterday considered esoteric research in now being tested for implementation. Science is about such rigorous tests. If the technologies pass the test, the collaborators will roll them out in India and elsewhere."

Apart from the extremely rapid tests that the countries are collaborating on, the Israeli delegation has shared with the All India Institute of Medical Sciences some of the most innovative technologies that were developed in Israel to combat Covid-19.

"The flight also carried on-board 83 hi-tech respirators for those with severe disease. The export of respirators is banned in Israel, which is now experiencing a second wave of Covid-19 infections, but these were brought to India on a special waiver," Malka said.

https://www.hindustantimes.com/delhi-news/four-israeli-technologies-to-detect-covid-19-in-30-seconds-to-be-tested-in-delhi/story-2RCpya8Pix6PViPAd1YfUL.html

DD डीडी न्यूज़ NEWS DD NEWS

Sat, 01 Aug 2020

India-Israel join hands to develop Covid testing kit

By Abhishek Jha

Trials begin for under-30 seconds COVID-19 tests in Delhi's Ram Manohar Lohiya Hospital. A special testing site has been created at the Hospital and trials of the rapid COVID-19 testing kits are ongoing for the last three days. These trials are part of medical research collaboration between India and Israel.

The medical research team from Israel has arrived last week to work with scientists from DRDO and they aim to bring down the time for testing COVID to few seconds only. Israeli ambassador Ron Malka and Principal scientific advisor Vijay Raghvan both reached to Ram Manohar Lohiya Hospital to witness the first trials of the testing which is being jointly developed in cooperation with DRDD Ministry of Defence Israel and DRDO, CSIR and PSA, India.

RML hospital is one of the testing sites which have started trials of four different kinds of technologies that have the potential to detect coronavirus in as less as 30 seconds. These simple, non-invasive technologies include a voice test that uses artificial intelligence to identify changes in the patient's voice, a breath analyser test which requires the patient to blow into a tube and detects the virus using terra-hertz waves, isothermal testing that enables identification of the virus in a saliva sample, and a test using Polyamino acids that seeks to isolate proteins related to COVID-19. These trials are being conducted on a large sample of patients in India.

Israeli Ambassador Ron Malka said, "If even one of these tests is successful in detecting the virus in as less as half a minute, it will be the biggest breakthrough in COVID-19 identification that the world has been waiting for. By combining advanced Israeli and Indian technology and India's manufacturing prowess we can find a way to resume our lives and exist alongside the virus until a vaccine is developed."

As per the agreements between India and Israel, If the results validate the effectiveness of the tests, they would be mass manufactured in India and marketed to the world by Israel and India jointly.

Talking About the India Israel Collaboration, Principal Scientific Advisor Professor K. Vijay Raghavan said that the translation of cutting-edge basic science and technology to society is seen happening in this deep collaboration. "What was yesterday considered esoteric research is now being tested for implementation. Such robust tests are the touchstone of science. Israel and India share collaborations in every area of science" he added.

The finality of the testing kits will be ascertained by the end of August. These trials are a part of a multi-pronged mission visiting India from Israel to cooperate on COVID-19 research and development, further cementing the strategic relationship between the two nations.

Echoing the same sentiments Raghavan said "The friendship and trust between our countries that have developed over the years have made the ongoing studies happen with speed and quality. I am sure that some of these will be successful and result in great value to our countries and to humanity".

Earlier this week, arriving on a special plane from Tel Aviv, the Israeli medical research delegation also brought effective treatment and monitoring equipment that reduces the exposure of healthcare workers to the virus. Israel has also sent 83 advance respirators while making a special waiver for exporting them to India.

http://www.ddinews.gov.in/international/india-israel-join-hands-develop-covid-testing-kit

Live हिन्दुस्तान .com

Sat, 01 Aug 2020

अब 30 सेकेंड में होगा कोरोना टेस्ट? दिल्ली में इजराइल की 4 तकनीक का ट्रायल जारी, जांच में आएगी और तेजी

नई दिल्ली: कोरोना वायरस की जांच में और तेजी लाने के लिए भारत और इजराइल साथ मिलकर एक खास तरह की रैपिड टेस्टिंग किट विकसित करने पर काम कर रहे हैं। राम मनोहर लोहिया अस्पताल (आरएमएल) में एक ट्रायल किया जा रहा है, अगर यह ट्रायल सफल रहा है तो महज 30 सेकेंड में कोरोना की रिपोर्ट हासिल की जा सकती है। दरअसल, इजराइल के वैज्ञानिकों द्वारा विकसित 30 सेकंड में कोरोना वायरस यानी कोविड-19 का पता लगाने वाले चार तकनीकों का मूल्यांकन दिल्ली के डॉ. राम मनोहर लोहिया अस्पताल में किया जा रहा है।

इस नई तकनीक के ट्रायल में करीब 10,000 लोगों का दो बार टेस्ट किया जाएगा; एक बार गोल्ड स्टैंडर्ड मॉलिक्युलर आरटी-पीसीआर टेस्ट और फिर चार इजराइली तकनीकों का उपयोग करके ये जांचा जाएगा कि क्या ये नवाचार सही से काम करेंगे। स्वैब सैंपल संग्रह विधि के विपरीत इस टेस्ट में लोगों को एक श्वासनली जैसे उपकरण के सामने झटका देना या बोलना होगा जो टेस्ट के लिए नमूना एकत्र करेगा।

शोधकर्ताओं का मानना है कि अगर यह ट्रायल सफल होता है तो न सिर्फ लोगों को महज तीस सेकेंड में कोरोना का रिजल्ट मिल जाएगा, बल्कि ये प्रौद्योगिकियां व्यवसायों के भी सुरक्षित मार्ग प्रशस्त कर सकती हैं और लोग वैक्सीन विकसित होने तक कोरोना वायरस के साथ जीने में सक्षम भी हो सकेंगे। बता दें आरएमएल अस्पताल में इसका ट्रायल शुरू हो चुका है। उम्मीद की जा रही है कि आने वाले कुछ दिनों में इसके नतीजे आ सकते हैं।

इजराइल और भारत चार अलग-अलग तरह की तकनीकों के लिए परीक्षण कर रहे हैं, जिसमें लगभग 30 सेकंड में कोविड-19 का पता लगाने की क्षमता है। इसमें एक श्वास विश्लेषक और आवाज परीक्षण (वॉयस टेस्ट) शामिल हैं।

एक इजराइली बयान में यह जानकारी दी गई है। इनमें से दो टेस्ट लार नमूनों की जांच के बाद मिनटों में परिणाम देंगे। तीसरे तरीके में किसी के आवाज से ही बताया जा सकता है कि वह कोरोना संक्रमित है या नहीं। चौथे तरीके में सांस नमूने के रेडियो वेव से संक्रमण का पता लगाया जा सकेगा।

इजराइली विज्ञप्ति के अनुसार, भारत में इजराइली राजदूत रोन माल्का ने शुक्रवार को डा.राम मनोहर लोहिया (आरएमएल) अस्पताल में बनाये गए विशेष परीक्षण स्थल का दौरा किया, जहां उन्होंने पिछले तीन दिन से तीव्र कोविड-19 जांच के लिए किये जा रहे परीक्षणों को देखा।

इजराइल के रक्षा मंत्रालय के रक्षा अनुसंधान और विकास निदेशालय, भारत के रक्षा अनुसंधान और विकास संगठन, वैज्ञानिक और औद्योगिक अनुसंधान परिषद और प्रमुख वैज्ञानिक सलाहकार, भारत के सहयोग और इजराइल एवं भारत के विदेश मंत्रालयों के समन्वय से संयुक्त रूप से तीव्र जांच विकसित की जा रही है। माल्का के साथ प्रो. के विजयराघवन भी थे, जो प्रधानमंत्री के प्रमुख वैज्ञानिक सलाहकार हैं।

बयान में कहा गया है, 'आरएमएल अस्पताल परीक्षण स्थलों में से एक है, जिसने चार अलग-अलग प्रकार की तकनीकों का परीक्षण शुरू किया है, जिसमें कोरोना वायरस का पता लगाने की क्षमता 30 सेकंड से कम है।' बता दें कि भारत की आबादी के लिहाज से कोरोना टेस्ट भी एक बड़ी समस्या है। अगर यह प्रयोग सफल होता है तो कोरोना की जांच सुलभ हो जाएगी और कोरोना के साथ लोगों का जीना भी आसान हो जाएगा।

https://www.livehindustan.com/national/story-coronavirus-updates-four-israeli-technologies-to-detect-covid-19-in-30-seconds-to-be-tested-in-delhi-3389750.html

DRDO Technology News

AIR FORCE TECHNOLOGY

Sat, 01 Aug 2020

India's HAL expects LCA Tejas Mark 1A jets confirmation by end of 2020

Hindustan Aeronautics Limited reportedly expects the order for 83 Tejas Mark 1A variant jets by Indian Air Force (IAF) to be confirmed before the end of this year.

Following months of talks, HAL and IAF agreed on a price of Rs390bn ($5.2bn) for the 83 Light Combat Aircraft (LCA), reported India Today.

Of the 83 jets, 73 are fighter jets and ten are two-seat trainer variants.

The delay on the order has been attributed to a number of issues, in particular 'additional requirements through contract'.

A HAL official said: "All queries have now been answered and the case is under approval."

India's national security decision-making body Cabinet Committee on Security (CCS) will have to approve this contract following which a formal contract will be signed by HAL and IAF.

Delivery of the Mark 1A variant is expected to commence within three years of the signing of the contract. All aircraft are expected to be delivered within five years.

The IAF invested Rs590bn ($7.8bn) for the acquisition of the 36 Rafale fighter jets.

Larsen & Toubro, VEM Technologies, Alpha Tocol, Tata Advanced Materials and Dynamatic Technologies will manufacture the fuselages, wings, tail fins and rudders for the LCAs.

HAL would assemble these components at its twin production lines in Bengaluru.

Currently, IAF operates one squadron of the 16 'Mark 1' baseline Tejas type at Coimbatore airbase.

HAL is developing a third production line for Tejas, which will be established in November. This line will produce the two-seat trainer variant.

https://www.airforce-technology.com/news/indias-hal-expects-lca-tejas-mark-1a-jets-confirmation-by-end-of-2020/

The EurAsian Times

Sat, 01 Aug 2020

After Rafales, upgraded LCA Tejas will be next addition to the Indian Air Force

HAL is building a third Tejas production line, to be set up this November, and this will roll out the two-seat trainer variants of the jet. The line will build a total of 18 LCA trainers that will commence deliveries from November 2021 onwards

Just days after India received its first batch of Rafale jets from France, the Indian Air Force (IAF) is all set to order Light Combat Aircraft (LCA) Tejas. The LCA Tejas will replenish the IAF's fighter fleet, restart India Inc's paralysed supply chains and create a multi-tiered defence industrial ecosystem.

According to reports, order for 83 Tejas Mark 1A variants is likely to be confirmed before December 2020. Earlier this year, after months of negotiations, HAL and the IAF finally agreed on a price tag of Rs 39,000 crore for the 83 aircraft (73 fighter jets and 10 two-seat trainer variants).

Hindustan Aeronautics Limited (HAL) officials attributed the delay to several outstanding issues, particularly a number of queries related to 'additional requirements through contract.'

The next phase in the contract would be approved by the Cabinet Committee on Security (CCS), India's topmost national security decision making body. This will be followed by a formal inking of the contract between HAL and the IAF.

Delivery of the Mark 1As will start within three years of the contract being signed and will conclude with all aircraft delivered in five years.

Compared to the Rafales, the indigenous Tejas will have a bigger force multiplier effect on the Indian industry reeling under the impact of the lockdown and economic downturn. More importantly, it is a huge step towards creating a multi-tiered defence industrial ecosystem.

"A Rs 39,000 crore order will have a force multiplier effect of nearly seven or eight times on the economy–jobs will be created, work will be outsourced, there is going to be a tremendous downstream effect on Tier 2 and Tier 3 manufacturing in the high-tech defence aviation sector," a HAL official said.

Five major private sector players—Larsen & Toubro, VEM Technologies, Alpha Tocol, Tata Advanced Materials and Dynamatic Technologies–are manufacturing the fuselages, wings, tail fins and rudders of the LCAs. These are being assembled by HAL at its twin production lines in Bengaluru.

The IAF currently operates one squadron of the 16 'Mark 1' baseline Tejas variants at its airbase in Sulur, Coimbatore. On May 27, the IAF operationalised the second squadron of the LCA Tejas.

HAL is building a third Tejas production line, to be set up this November, and this will roll out the two-seat trainer variants of the jet. The line will build a total of 18 LCA trainers that will commence deliveries from November 2021 onwards.

https://eurasiantimes.com/after-rafales-indian-air-force-keen-to-induct-indigenous-lca-tejas-aircraft/

hindustantimes

Sat, 01 Aug 2020

Army won't take eyes off Ladakh, preps to shop for Siachen-like gear for troops

Top government officials confirmed that the Indian Army has asked its defence attaches posted in embassies in the US, Russia and Europe to identify warm clothes and snow tent manufacturers in case there is a need for emergency purchases

By Shishir Gupta

New Delhi: With Chinese People's Liberation Army (PLA) dragging its feet on restoring the status quo ante along the 1,597km Line of Actual Control (LAC) in the Ladakh sector, the Indian Army has started preparing for a long winter as it does not want a repeat of April 2020 next year.

Top government officials confirmed that the Indian Army has asked its defence attaches posted in embassies in the US, Russia and Europe to identify warm clothes and snow tent manufacturers in case there is a need for emergency purchases.

After Operation Meghdoot in Siachen in 1984, the Indian Army gets all its requirements fulfilled by local manufacturers with regard to igloos, semi-hemispherical domes, Down parkas, snow goggles, boots and gloves for troops guarding the heights in the western sector.

After Operation Meghdoot in Siachen in 1984, the Indian Army gets all its requirements fulfilled by local manufacturers with regard to igloos, semi-hemispherical domes, Down parkas, snow goggles, boots and gloves for troops guarding the heights in the western sector.(Twitter/@ADGPI)

While the Indian Army has matched the Chinese PLA in terms of troop strength and support elements in the Ladakh sector, its commanders totally dismiss reports of induction of over 35,000 troops recently. However, the military commanders are clear that they will have to man positions along the LAC in specific areas to prevent any PLA aggression next year. "After the PLA aggression, we don't trust the Chinese and fear that they will come back again north of Pangong Tso as summer arrives in 2021," said a military commander.

Although the PLA has disengaged from patrolling points 14 (Galwan), 15-16 (Hot Springs), a smattering of adversary troops are still on forward location at patrolling point 17 A (Gogra) and withdrawal from all contested finger features is a distance away at the Pangong Tso.

With the cold and arid claimate of Ladakh, not much snow is expected in the general area of patrolling points 15, 16 or 17, but the over 17,000 feet Chang La (pass) gets filled with snow and lies en route to defences at Pangong Tso. "In order to cater for winter clothing requirements, we have not only placed orders with domestic manufacturers but also asked troops other than those stationed on Saltoro ridge and Siachen glacier to give up extreme snow clothing. For instance, even troops at Partapur and Thoise are allowed Siachen clothing but the height of the two bases is same as Leh. So in the worst case scenario we will ask Partapur and Thoise troops to give up their down

jackets, trousers, gloves, boots and goggles to their fellow jawans being posted up on the occupied Aksai Chin front," said a second Army commander.

The PLA aggression in the Ladakh sector has created so much of mistrust between the two armies that both will keep troops on select locations all along the 3488 km LAC. "The Chinese aggression came despite all talks of peace and tranquility. It is very important on part of both sides to settle the border issue soon as the number of friction points are increasing on the LAC and even a small spark can cause a flare-up, as unlike in the past, the Indian Army is regularly mounting patrols to earmark Indian territory and defend it to the last inch," said a former Army Chief.

https://www.hindustantimes.com/india-news/army-won-t-take-eyes-off-ladakh-preps-to-shop-for-siachen-like-gear-for-troops/story-Nzb7XPJWsJ2dRqax1A7CQN.html

hindustantimes

Sat, 01 Aug 2020

Rafale vs J-20: Ex-IAF Chief Dhanoa calls China's bluff with 'two simple questions'

Chinese Communist Party's tabloid Global Times quoted a military 'expert' who claimed the Rafale fighter is only superior to the IAF's Sukhoi-30 MKI jets but a generation below Chinese PLA's J-20 fighter

By Shishir Gupta

New Delhi: Former Air Chief Marshal BS Dhanoa on Friday dismissed claims that the Rafale fighter jets inducted by the Indian Air Force this week had no chance against China's J-20 stealth fighter.

Former Air Chief Marshal BS Dhanoa has always highlighted how Rafale fighter jets (R) are better stealth fighters and are not superior to China's J-20 jets (L). Rafale is 4.5 generation jet. (HT Photos)

The claims, made by an 'expert' in Chinese Communist Party's tabloid Global Times, said that the Rafale was only superior to the IAF's Sukhoi-30 MKI jets but a generation below Chinese PLA's J-20 fighter.

"It is only about one-fourth of a generation more advanced and does not yield a significant qualitative change," Zhang Xuefeng, who was described by the communist party's propaganda website as a Chinese military expert, said.

The website, quoting unnamed experts claimed, that "Rafale is only a third-plus generation fighter jet, and does not stand much of a chance against a stealth, fourth generation one like the J-20".

Ex-IAF chief Dhanoa, who has described the 4.5 generation Rafale fighter jets as a "game changer for the IAF, responded to the Chinese claim with "two simple questions".

"If the J-20, also called the Mighty Dragon, is indeed a fifth generation stealth fighter, then why does it have canards while genuine 5th generation fighters such as the US' F 22, F 35 and Russian fifth generation Su 57 don't," Dhanoa asked.

Canards are fuselage-mounted small, forward wings located forward of the main wing to improve aircraft control and contribute to lift. They are considered to present large angular surfaces that tend to reflect radar signals.

"I don't think J-20 is stealthy enough to be called a fifth generation fighter as the canard increases the radar signature of the fighter and gives away its position to a long-range meteor missile that the Rafale has," he said.

The other question the former IAF chief has for the Chinese is: "Why can't the J-20 supercruise if it is really a 5th generation fighter as its manufacturer Chengdu Aerospace Corporation calls it."

Supercruise is the ability of a fighter jet to fly at speeds above Mach 1 - the speed of sound - without the use of afterburners, the additional combustion component used on some jet engines to increase thrust.

"The Rafale has the supercruiseaility and its radar signature is comparable to the best of the fighters in the world," Dhanoa told Hindustan Times.

Dhanoa has flown top of the line Indian fighter aircraft including Sukhoi 30 MKI. He was the man responsible for targeting the Pakistani intruders on Drass, Kargil, Battalik heights and spearheaded the Balakot air strikes along with National Security Adviser Ajit Doval.

The retired top air force officer had earlier this week shredded the Chinese propaganda of superior air capability, wondering that if the Chinese equipment was so good, Pakistan would have used its Chinese JF-17 and not the F-16 aircraft to attack Nangi Tekri brigade in Rajouri sector on 27 February 2019. But Pakistan used the Chinese JF-17 to merely give air defence cover to its Mirage 3/5 bombers. Or why China's "iron brother" uses Swedish early air warning platforms up north and the keep Chinese AWACS in the south.

Incidentally, India is expected to get 12 more Sukhoi 30 MKI and 21 MiG 29s next year from Russia. According to diplomats based in Moscow, the Su-30 MKI will "look better, shoot better, and fight better". The MiG 29 will be used for setting up a new squadron in Jamnagar in Gujarat and will have the same capability as the MiG 29 that India currently has.

https://www.hindustantimes.com/india-news/rafale-vs-j-20-ex-iaf-chief-dhanoa-calls-china-s-bluff-with-two-simple-questions/story-Al6kSI8wjj0SvypDHeIrXI.html

Sat, 01 Aug 2020

How will Rafale transform Indian Air Force's combat potential

Rafale is a game changing fighter which will change the way we fight

By MJ Augustine Vinoth

On July 29, amid Covid-19 pandemic, Rafale fighter jets landed in India from France, travelling almost 8,500 km. Let's look at some of the capabilities that Rafale brings to the table.

Rafale is equipped with AESA (active electronically scanned array) radar and frontal infra-red search and track (IRST) sensor. What is an AESA in a nutshell? It is nothing but a non-moving radar whose beams are electronically steered through small modules called TR (Transmit Receive) modules.

Since non-rotating equipment, its failure rate is very low. Since using TR modules, it can vary parameters in a manner that its performance in dynamic situations will be far better. IRST is a passive system that looks for hot objects both on ground and in air, currently there is no counter measure to IRST.

Using AESA Radar and IRST Rafale employs two potent missiles to shoot down enemies very far, namely MICA & METEOR missiles. They have very high ranges nearly 80+ km for MICA and 100+ km for METEOR. To put things in perspective, Pathankot to Gujranwala is less than 100 km.

Air-to-Ground Combat Potential

Rafale carries varied air-to-ground munitions. SCALP EG missile with multispectral sensor to guide itself to the target accurately and with a range of 560 km. To put things in perspective, Pathankot to Islamabad or Sargodha is only 280 km.

It will carry HAMMER missiles, six of them which have a range of 50-80 km and can target bunkers and dig in position, six at a time and all independently targeting different targets.

It can carry paveway Laser Guided Bombs, MK82/84 1000/2000 lbs unguided bombs and rockets.

It will carry Spice 2000 weapon famous for bombing Balakot to smithereens which will be an engagement as part of India-specific modifications.

Electronic Warfare Suite

Rafale has inbuilt jammers to jam enemy's airborne and surface-based sensors. It has a potent radar warning receiver and countermeasure dispensing system which automatically dispenses counter measures to counter enemy's radar and weapons. It also warns pilots of threat from enemy radar and missiles.

Stealth Features

Though not a pure stealth aircraft, Rafale has exceptional stealth features like composite structures, blended design, radar absorbent material and automatic emission control to control own sensors. Attack on Al-Watiya air base with spectra coordination is case in point.

Conclusion

Naysayers need to understand these capabilities are rolled in one fighter that can engage the enemy effectively. To put things in perspective, when the Kargil war happened, India had only three Mirage 2000 jets and only 12 in air-to-ground role. These engaged 80% of the targets and gave India Tiger Hill, Muntho Dhalo on a platter. Rafale is a game changing fighter which will change the way we fight.

https://www.news18.com/news/opinion/how-will-rafale-transform-indian-air-forces-combat-potential-2747309.html

Outlook
THE FULLY LOADED MAGAZINE

Sat, 01 Aug 2020

Verma takes charge of Air Force college

Coimbatore: Air Commodore Rajnish Verma on Friday assumed the Command of Air Force Administrative College (AFAC) here from Air Commodore SR Menon, who retired after 33 years of dedicated service. Before assuming the Command of AFAC, Verma was serving at Directorate of Air Veterans, Indian Air Force, New Delhi, an official release said. Commissioned in the Administrative Branch of IAF in 1989, Verma has held various important portfolios in his 31 years of commendable service, it said. Poonam Verma took charge as President, Air Force Wives Welfare Association (Local), AFAC from Jayashree Menon. The aim of the AFAC is to impart advanced training to the officers in various branches of the Indian Air Force and perfect their knowledge and skill so as to enable them to handle their duties independently in their respective branches.

(Disclaimer: This story has not been edited by Outlook staff and is auto-generated from news agency feeds. Source: PTI)

https://www.outlookindia.com/newsscroll/verma-takes-charge-of-air-force-college/1906584

THE NEW INDIAN EXPRESS

Sat, 01 Aug 2020

Women power that challenged the norms

Meet Commander Prasanna Edayilliam who along with a group of female offices is fighting gender inequalities in the armed forces

By Anu Kuruvilla

History is witness to the fact that when it comes to women, nothing comes easy. But recently, a group of women who served in the armed forces of the country marked a major victory when the apex court ruled in their favour, directing the Central Government to change its policy and give permanent commission (PC) to women officers. One of the members of this team is Commander Prasanna Edayilliam, who hails from Kanhangad in Kasaragod district.

Cdr Prasanna Edayilliam

"When we apply for the posts, we do so alongside men. There are no special recruitments for women. We train with male officers too. So, we should be treated as officers, not lady officers. We are questioning the glaring disparity when it comes to granting commission. For male officers, those from selected branches have the option to get a permanent commission and can continue in service till they complete 54 years of service.

But, we are forced to leave after 14 years of service sans pension and medical facilities," she says. Prasanna and her contemporaries thought it was high time things changed. "The permanent commission based on vacancy, merit and recommendation from the Chief of Naval Staff must be given to woman officers as well. We were not sure whether such a decision would come during our time. But then, we wanted to do it for the future generation. Many young girls are reluctant to take up opportunities with the armed forces because services don't provide job security," she adds.

However, the SC ruling has come as a harbinger of change. "Though the court gave the judgement on March 17, the government has not made any initiatives to implement it yet. A permanent commission is still a distant dream for women in the Indian Navy, while it has been implemented in the Air Force," she says. The decision to take on the establishment along with five other woman officers shows the indomitable strength Cdr Prasanna possesses. "It is something that had been instilled in me right from a very young age. I was raised by my parents to be an independent person capable of taking on challenges," says Prasanna, who is an alumnus of FACT Township High School.

"My teachers who called me up after seeing stories about me ask if I am still the firebrand from the school days," she quips. According to her, book knowledge alone wouldn't fetch you a spot in the armed forces. "You have to be an all-rounder for that. You have to be capable and confident to tackle any situation," she says. The Indian Navy started inducting woman officers from 1992. "The early batches were more like an experiment. However, a lot of corrections and modifications in training methods were done for the subsequent batches.

I belonged to the third batch of women officers in the Indian Navy," she remembered. According to her, a lot more needs to be done for female officers in the armed forces. She points out an example to explain how the system needs to go a long way when it comes to giving women officers niche posts in the armed forces, though the country claims progress in many fields.

"In 2000, I was selected to go sailing onboard a Singapore naval ship that was commanded by a lady officer. The operation officer was also a lady. If a country like Singapore in those days could implement such policies, why can't we?" she asks. Prasanna joined the Navy becasue she was extremely passionate about serving in the country's first line of defence.

"I was an NCC cadet during my school and college days and attended many camps. After interacting with my seniors who were in the Navy, I decided to join. Also, I had a fascination towards white uniform with the golden stripes," she quips. Cdr Prasanna's first posting was on INS Rajali in Arakkonam. "I moved to INS Utkrosh based in Port Blair, then INS Dega Visakhapatnam, INS Garuda Kochi and then I was sent on deputation to the Air Force station at Yelahanka, Bengaluru, where I was part of the Aero India 2007 team," concludes Prasanna.
https://www.newindianexpress.com/cities/kochi/2020/aug/01/women-power-that-challenged-the-norms-2177452.html

नवभारत टाइम्स

Sat, 01 Aug 2020

भारतीय सेना में गोरखाओं की भर्ती की समीक्षा करेगा नेपाल, कहा- 1947 का समझौता निरर्थक हो गया

भारत से सीमा विवाद के बीच नेपाल अब भारतीय सेना में गोरखा सैनिकों के भर्ती को लेकर किए गए समझौते की समीक्षा करने जा रहा है। नेपाली विदेश मंत्री प्रदीप कुमार ज्ञावली ने कहा कि इस समझौते के कुछ प्रावधान संदिग्ध हैं इसलिए 1947 का यह समझौता निरर्थक हो गया है।

Edited By Priyesh Mishra

हाइलाइट्स

- ***भारत से सीमा विवाद के बीच नेपाल अब भारतीय सेना में गोरखा सैनिकों के भर्ती को लेकर किए गए समझौते की समीक्षा करने जा रहा***
- ***नेपाली विदेश मंत्री प्रदीप कुमार ज्ञावली ने कहा- इस समझौते के कुछ प्रावधान संदिग्ध हैं इसलिए 1947 का यह समझौता निरर्थक हो गया है***
- ***1815 से लेकर आजतक नेपाली गोरखाओं का भारतीय सेना के साथ हैं अभूतपूर्व संबंध, कई युद्धों में दिखा चुके हैं पराक्रम***

काठमांडू: भारत से सीमा विवाद के बीच नेपाल अब भारतीय सेना में गोरखा सैनिकों के भर्ती को लेकर किए गए समझौते की समीक्षा करने जा रहा है। नेपाली विदेश मंत्री प्रदीप कुमार ज्ञावली ने कहा कि इस समझौते के कुछ प्रावधान संदिग्ध हैं इसलिए 1947 का यह समझौता निरर्थक हो गया है। नेपाल में पहले भी गोरखाओं के भारतीय सेना में शामिल होने पर रोक की मांग उठ चुकी है।


गोरखा सैनिक

गोरखाओं को लेकर समझौता निरर्थक

नेपाली विदेश मंत्री ज्ञावली ने कहा कि भारतीय सेना में गोरखाओं की भर्ती अतीत की विरासत है। नेपाली युवाओं के विदेश जाने के लिए यह पहली खिड़की थी। इसने अतीत में समाज में बहुत सारी नौकरियां पैदा कीं लेकिन बदले हुए संदर्भ में कुछ प्रावधान संदिग्ध हैं। उन्होंने यह भी कहा कि 1947 का त्रिपक्षीय समझौता निरर्थक हो गया है।

नेपाल में गोरखाओं को पहले भी वापस

प्रतिबंधित कम्युनिस्ट पार्टी ऑफ नेपाल के नेत्र बिक्रम चंद ने पहले भी नेपाल सरकार से अपील करते हुए कहा था कि गोरखा नागरिकों को भारतीय सेना का हिस्सा बनने से रोका जाए। उन्होंने कहा कि चीन से विवाद के बीच भारत नेपाली गोरखाओं को सीमा पर तैनात करना चाहता है। नेपाल एक

स्वतंत्र देश है और एक देश की सेना में काम करने वाले युवा का इस्तेमाल दूसरे देश के खिलाफ नहीं किया जाना चाहिए। यह नेपाल की विदेश नीति के खिलाफ है।

अलग है गोरखा सैनिकों का महत्व

गोरखा सैनिकों का सेना में एक अलग ही महत्व है। भारत में भी पहाड़ी इलाकों पर ज्यादातर गोरखा जवान ही तैनात रहते है। वहीं गोरखा सैनिकों के बारे में यह भी कहा जाता है कि पहाड़ों पर उनसे बेहतर लड़ाई कोई और नहीं लड़ सकता है। भारत ही नहीं ब्रिटेन में भी गोरखा सैनिक वहां की सेना में शामिल हैं। हाल ही में आईएमए ने तीन नेपाली नागरिकों को ट्रेनिंग पूरी होने के बाद कमिशन दिया है।

गोरखाओं के बारे में क्या कहते थें सैम मानेकशा

गोरखाओं की बहादुरी के किस्से यूं तो दुनियाभर में प्रसिद्ध हैं लेकिन, भारत के पूर्व सेनाध्यक्ष सैम मानेकशा जो खुद गोरखा रेजीमेंट से थे वे इनके बारे में अक्सर कहा करते थे कि अगर कोई यह बोले कि वह मौत से नहीं डरता तो या तो वह झूठ बोल रहा है या वह गोरखा है। 1815 से लेकर आजतक नेपाली गोरखाओं का भारतीय सेना के साथ अभूतपूर्व संबंध है।

खुखरी है गोरखाओं की पहचान

गोरखा सैनिक जंग के मैदान में खुखरी की सहायता से ही दुश्मनों पर भारी पड़ते हैं। यह एक तेज धार वाली कटार होती है जो हर गोरखा सैनिक के पास हमेशा होती है। यह हथियार उन्हें ट्रेनिंग के बाद दिया जाता है। जिसका उपयोग वे युद्धकाल में दुश्मनों के खिलाफ करते हैं।

चीनी राजदूत के इशारे पर तनाव बढ़ा रहे ओली

नेपाल में मचे सियासी घमासान को लेकर पीएम ओली सीधे तौर पर भारत पर आरोप लगा रहे हैं। उन्होंने कुछ दिन पहले ही एक कार्यक्रम में भारत के ऊपर अपनी सरकार को अस्थिर करने का आरोप लगाया था। वहीं, खुफिया रिपोर्ट में दावा किया गया है कि नेपाली पीएम देश में चीन की राजदूत हाओ यांकी के इशारे पर भारत विरोधी सभी कदम उठा रहे हैं।

मेंटली और फिजिकली बहुत मजबूत होते हैं गोरखा

गोरखा सैनिक शारीरिक और मानसिक रूप से बहुत मजबूत होगे हैं। भारतीय सेना में 42 हफ्ते की कड़ी ट्रेनिंग के बाद इन्हें पोस्टिंग पर भेजा जाता है। ये पहाड़ों पर लड़ाई में बेहद माहिर होते हैं। ये आमने सामने की लड़ाई और बिना हथियारों की लड़ाई में दुश्मनों पर भारी पड़ते हैं। इनकी कदकाठी छोटी और गठी हुई होती है।

नेपाल से संबंधों में खटास

नेपाल के साथ भारत के संबंध अब तक सही रहे हैं लेकिन हाल ही में इनमें खटास आने लगी है। प्रधानमंत्री के पी शर्मा ओली की घरेलू राजनीति की वजह से सीमा विवाद गहराया हुआ है। नेपाल की संसद ने विवादित नक्शे को हरी झंडी दी है। इसमें उत्तराखंड के लिपुलेख, काला पानी और लिम्पियाधुरा को नेपाल ने अपने इलाके में दिखाया है।

https://navbharattimes.indiatimes.com/world/asian-countries/nepal-will-review-gurkha-recruitment-in-indian-army-says-1947-agreement-became-redundant/articleshow/77288209.cms

ThePrint

Sat, 01 Aug 2020

With India-US badly coordinated in Indian Ocean, China-Iran naval ties now a fresh concern

The prospect of a comprehensive military and trade partnership between Iran and China is a concern for India. Beijing plans to invest $400 billion in Iran

By Abhijit Singh

Iran's recent decision to drop India from the Chabahar-Zahidan railway line project has been the subject of some consternation in Indian strategic circles. The development has generated disquiet in New Delhi, where some have questioned the timing of the move by Iran. As Indian observers see it, the railway line was part of a strategic endeavour: the development of Chabahar port and an associated rail-links to circumvent Pakistan and its traditional obstruction of India's overland routes into Central Asia and Afghanistan. Amidst US sanctions, as Delhi searched for suppliers and funding, Tehran suddenly (and unilaterally) decided to go it alone. Oddly, this comes at a time when China has made itself available to assist in the project.

More worrying for Indian watchers is the prospect of a comprehensive military and trade partnership between Iran and China. Beijing, ostensibly, has undertaken to invest $400 billion in key sectors of Iran's economy, in return for an assured supply of Iranian fuel for the next 25 years. The proposed investment is the biggest China has ever pledged to any country as a part of its Belt and Road Initiative (BRI), and envisages huge expenditure in building Iran's oil and gas and infrastructure sector ($280 billion and $120 billion respectively). Beijing also plans to station over 5,000 Chinese security personnel to protect the investments in Iran.

A file photo of PM Narendra Modi after commissioning INS Kalvari at Naval Dockyard in Mumbai | Photo: Indian Navy

The implications of a China-Iran strategic partnership are particularly stark in the maritime arena. According to a leaked 18 page draft agreement, parts of which were published by the *New York Times* last week, Chinese construction companies are set to initiate multiple infrastructure projects along Iran's Gulf coastline, including free-trade zones in Abadan, a city on the eastern bank of the Shaṭṭ Al-ʿArab River, and on the island of Qeshm, where Tehran is planning a major hub for oil production and storage. China will also build infrastructure at Jask, a port city just outside of the Strait of Hormuz, only 150 miles away from Gwadar, where a Chinese company has already developed and operating a port. Observers say a rudimentary Chinese naval presence at Jask could lead to greater joint military training and exercises between Iran, China and Pakistan, enhancing China's regional security profile.

To be sure, there is no cause for alarm yet. It is worth noting that the Iranian Revolutionary Guards navy (IRGCN), that is responsible for the waters of the Gulf, is opposed to any foreign naval presence at Iranian ports. The IRGCN controls the Imam Ali naval base in Chabahar, and also has a presence in Bandar-e-Jask and the island of Qeshm. An armed force of radicalized cadres loyal to Iranian Supreme Leader, Ayatollah Khomeini, the Republican Guards' Corps has a two point agenda: to protect the revolution and counter the United States. The IRGCN, that uses asymmetric tactics to harass the USN in the Straits of Hormuz, has been instrumental in keeping foreign military activity in Iranian ports to a minimum, and there have been no foreign bases on Iranian soil since 1979. As much as the Iran-China pact creates possibilities for greater Chinese influence in Gulf region, analysts say the IRGC leadership is unlikely to allow a substantial PLA presence in Iranian ports.

In the wider context of Western Indian Ocean region, however, the China-Iran agreement has greater significance. The PLA, which already possesses base in Djibouti, has been gradually expanding its military footprint on Africa's Eastern seaboard, and in the Northern Indian Ocean. A comprehensive strategic pact with Iran, analysts posit, could allow China to establish military presence along the Iran-Pakistan coastline; the PLA could even assist in the creation of a surveillance network to monitor US and Indian naval activity in the region. With the benefit of Chinese support, and an oil terminal outside the Hormuz, Iran could also be emboldened into adopting a more aggressive stance inside the Persian Gulf.

Notwithstanding the abundant caution the PLAN has displayed in the Gulf region so far, there has been an uptick in Chinese naval engagements with Iran and other regional states. Last year, the PLAN held a trilateral exercise with Iran and Russia, signaled a desire for greater presence in the Northern Indian Ocean. If Iran builds a permanent base in the Indian Ocean, as announced by the head of the IRGCN last year, analysts say Chinese warships could well be frequent visitors at the facility. A proposed a tie-up between Gwadar and Chabahar, could exacerbate India's predicament. For the Indian navy, already troubled by the China – Pakistan maritime nexus, the development of China-Iran naval ties isn't good news.

Expectedly, many in New Delhi are blaming the United States for the dip in Indian fortunes in Chabahar. The crisis of faith in India-Iran relations, they aver, could well have been avoided had Washington not systematically alienated Tehran. As US sanctions have forced India to reduce its oil imports from Iran, Tehran has lost faith in New Delhi as a reliable partner. What is more, pressure from the Trump Administration has forced the Iranian government's hand in ways that have hurt Indian interests.

This also highlights a contradiction in India's maritime relationship with the US: it's a relationship that works well in the Eastern Indian Ocean, where Indian and American interests neatly align, but is somewhat constrained in the Western Indian Ocean, where there is a divergence of perspectives. Importantly though, New Delhi's strategic interests are "weighted west": the oil flows are from west, the bulk of trade is west, as is the diaspora, and India major investments. Not only are India and the US badly coordinated in the Western Indian Ocean, observers say Washington's Iran policy actively impinges on Indian interests.

Policymakers in Washington and New Delhi must, then, recognize the need for better coordination on Iran. Greater Chinese naval presence in the Northern Indian Ocean in coming years raises the prospects of greater instability and elevated tensions in the Gulf region. The USN and IN have every reason to work together in the Western Indian Ocean, synergizing operations to preserve peace, even as they strive to exert strategic influence in the littorals.

(A former naval officer, Abhijit Singh @abhijit227 is a Senior Fellow and heads the Maritime Policy Initiative at ORF. Views are personal.)

https://theprint.in/opinion/with-india-us-badly-coordinated-in-indian-ocean-china-iran-naval-ties-now-a-fresh-concern/471934/

THE TIMES OF INDIA

Sat, 01 Aug 2020

ISRO will allow private sector to set up own launchpad at Sriharikota: K Sivan

By Surendra Singh

New Delhi: Kicking off the process of "unlocking" the space sector, Indian space research organisation (Isro) will allow the "private sector to set up their own launchpad at the Sriharikota launch centre" (SHAR).

ISRO Chairman K Sivan

Talking to TOI, Isro chairman K Sivan said, "The space agency has started the process of involving the private sector in space activities. We will allow the private entities to set up their own launch facility at Sriharikota that they can use for launching their spacecraft or rocket. We won't charge anything for such launches. Instead, we will provide them all the expertise they need from us for setting up such facilities." Currently, Isro has two launchpads and two rocket assembly buildings at Sriharikota.

He said that Isro is also ready to share its expertise for free with the private sector in areas where monetary support is not involved like providing technical support.

"Department of space is in the process of setting up Indian National Space Promotion and Authorisation Centre (IN-SPACe) (which is being set up to promote, hand-hold, monitor and supervise space activities by the private sector). But we don't want the industry to wait till it is set up. If private entities are interested, they can apply for it (using Isro's space assets) now itself. Though most centres of Isro are either closed or working with skeletal staff because of Covid-related restrictions in different states, we want to start at least the consultation process of involving the private sector in space activities based on their requirement. At least, we can get to know about their requirement," Sivan told TOI.

On the launch of satellites this year, Sivan said as some key Isro centres like Vikram Sarabhai Space Centre and Liquid Propulsion Systems Centre in Thiruvananthapuram are closed due to Covid-19, it is very difficult to carry out satellite launches with such restrictions. However, he did not rule out satellite launches this year, saying "it all depends upon the situation in coming months".

Following the recent Cabinet decision to open up the space sector for all, Isro will involve non-government private entities (NGPEs) in the production of components and subsystems of a launch vehicle, launch vehicle integration, production of components of a spacecraft, spacecraft integration and testing. It will also rope them in for providing space-based services, including operation, control and station-keeping of spacecraft by establishing and operation of ground segment or stations. NGPEs can also provide help in development of space-based applications using satellite data and rolling out of commercial services, says a statement from the agency.

https://timesofindia.indiatimes.com/india/isro-will-allow-private-sector-to-set-up-own-launchpad-at-sriharikota-k-sivan/articleshow/77272875.cms

THE FINANCIAL EXPRESS

Sat, 01 Aug 2020

ISRO and IN-SPACe; This is how the new body will guide private players in Space industry

According to the information shared on the website of ISRO, Department of Space, the IN-SPACe will consist of four directorates namely- Technical, Legal, Safety & Security, Monitoring & Promotion- which will carry on the functions and mandate assigned to the organisation

Taking an opportunity to unlock the potential of private enterprises in the Indian Space industry, the Modi government decided to allow private players to use the assets of the Indian Space Research Organisation (ISRO) and formed an autonomous body Indian National Space Promotion and Authorization Center (IN-SPACe) under the Department of Space to facilitate the same in June this year. Let's look at how the Department of Space has envisaged to use IN-SPACe in its motive to ensure participation of enterprising private companies into the Indian Space sector.

Roles and Responsibilities of IN-SPACe

IN-SPACe will be established as a single window nodal agency which will oversee and permit the activities of the private companies into the space sector. Activities which will be permitted include building of space launch vehicles, satellites and providing other space based services. It will also oversee the sharing of the ISRO assets by the private players with due consideration to the present and ongoing projects of the ISRO.

In order to facilitate the entry of the private players in the space domain, the IN-SPACe will also handhold and guide the private players on the issue of technology, promotion and expertise. This will help the private players to get a foothold in the space sector. As far as sharing the technology and assets of the ISRO is concerned, the IN-SPACe will allow the private players to use some facilities free of cost while for some other facilities the private players will be charged reasonably. They will also be allowed to establish their own facilities within the premises of ISRO based on the safety norms and other standards. The government has also made it clear that the decision of the IN-SPACe will be definite and final with regard to the participation of private industries and no direct permission will be allowed to be sought from ISRO by the private players.

Structure of IN-SPACe

The newly formed body will have its own cadre of officials which will be responsible for running day to day operations of the newly formed body. According to the information shared on the website of ISRO, Department of Space, the IN-SPACe will consist of four directorates namely- Technical, Legal, Safety & Security, Monitoring & Promotion- which will carry on the functions and mandate assigned to the organisation. The body will be headed by the Chairman and have technical experts, members from academia/industry and other members from the Prime Minister's Office and Ministry of External Affairs.

How will Private players seek permission from IN-SPACe?

Applications by interested private players will be allowed to be filed in both offline and online mode. The application submitted by any private firm will first be vetted by the Legal Directorate, Technical Directorate and Safety and Security Directorate. After getting the go ahead from the three directorates, a final review will be done by the IN-SPACe after which permission will be granted to the private players. All the activities conducted by the private players will be under close monitoring and supervision of the Directorate of Monitoring of IN-SPACe.

Similarly, the private players will be allowed to seek access to use the facilities of ISRO. After the approval from IN-SPACe, a facility in-charge will be given the responsibility to facilitate the usage of the facility by the private players. The whole activity will again be under complete and continuous monitoring by the Directorate of Monitoring, IN-SPACe. A similar procedure has also been devised to allow private players to establish their own facilities on the premises of the

Department of Space (DOS). After the allocation of the location to the private players, a concerned DOS centre will collaborate with the private players till the time of the completion of the facility. The Directorate of Monitoring will keep an eye on the whole process and give its feedback to the IN-SPACe.

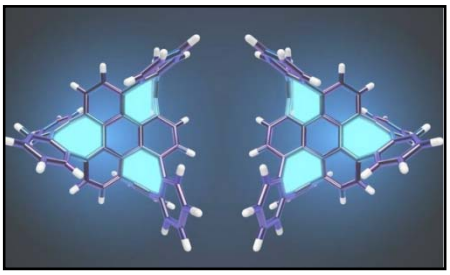
https://www.financialexpress.com/lifestyle/science/isro-and-in-space-this-is-how-the-new-body-will-guide-private-players-in-space-industry/2040908/

Sat, 01 Aug 2020

A new synthesis method for three-dimensional nanocarbons

A team of scientists led by Kenichiro Itami, Professor and Director of the Institute of Transformative Bio-Molecules (WPI-ITbM), has developed a new method for the synthesis of three-dimensional nanocarbons with the potential to advance materials science.

Three-dimensional nanocarbons, next-generation materials with superior physical characteristics which are expected to find uses in fuel cells and organic electronics, have thus far been extremely challenging to synthesize in a precise and practical fashion. This new method uses a palladium catalyst to connect polycyclic aromatic hydrocarbons to form an octagonal structure, enabling successful three-dimensional nanocarbon molecule synthesis.



A new synthesis method creates curved octagonal structures by linking benzene rings. Credit: Issey Takahashi

Nanocarbons, such as fullerene (a sphere, for which the 1996 Nobel Prize was awarded), the carbon nanotube (a cylinder, discovered in 1991) and graphene (a sheet, for which the 2010 Nobel Prize was given) have attracted a great deal of attention as functional molecules with a variety of different properties. Since Mackay et al. put forward their theory in 1991, a variety of periodic three-dimensional nanocarbons have been proposed.

However, these have been extraordinarily difficult to synthesize. A particular challenge is the eight-membered ring structure, which appears periodically, necessitating an efficient method for its synthesis. To do so, Dr. Itami's research team developed a new method for connecting polycyclic aromatic hydrocarbons using a palladium catalyst to produce eight-membered rings via cross-coupling, the first reaction of its type in the world.

The success of this research represents a revolutionary achievement in three-dimensional nanocarbon molecule synthesis. It is expected to lead to the discovery and elucidation of further novel properties and the development of next-generation functional materials.

More information: Satoshi Matsubara et al, Creation of negatively curved polyaromatics enabled by annulative coupling that forms an eight-membered ring, *Nature Catalysis* (2020). DOI: 10.1038/s41929-020-0487-0

Journal information: *Nature Catalysis*

https://phys.org/news/2020-07-synthesis-method-three-dimensional-nanocarbons.html

PHYS.ORG

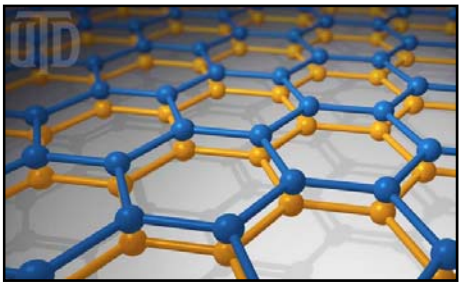
Sat, 01 Aug 2020

Physicists find misaligned carbon sheets yield unparalleled properties

By Amanda Siegfried

A material composed of two one-atom-thick layers of carbon has grabbed the attention of physicists worldwide for its intriguing—and potentially exploitable—conductive properties.

Dr. Fan Zhang, assistant professor of physics in the School of Natural Sciences and Mathematics at The University of Texas at Dallas, and physics doctoral student Qiyue Wang published an article in June with Dr. Fengnian Xia's group at Yale University in *Nature Photonics* that describes how the ability of twisted bilayer graphene to conduct electrical current changes in response to mid-infrared light.



Graphene is a single layer of carbon atoms arranged in a flat honeycomb pattern, where each hexagon is formed by six carbon atoms at its vertices. UT Dallas physicists are studying the electrical properties that emerge when two layers of graphene are stacked. Credit: University of Texas at Dallas

From One to Two Layers

Graphene is a single layer of carbon atoms arranged in a flat honeycomb pattern, where each hexagon is formed by six carbon atoms at its vertices. Since graphene's first isolation in 2004, its unique properties have been intensely studied by scientists for potential use in advanced computers, materials and devices.

If two sheets of graphene are stacked on top of one another, and one layer is rotated so that the layers are slightly out of alignment, the resulting physical configuration, called twisted bilayer graphene, yields electronic properties that differ significantly from those exhibited by a single layer alone or by two aligned layers.

"Graphene has been of interest for about 15 years," Zhang said. "A single layer is interesting to study, but if we have two layers, their interaction should render much richer and more interesting physics. This is why we want to study bilayer graphene systems."

A New Field Emerges

When the graphene layers are misaligned, a new periodic design in the mesh emerges, called a moiré pattern. The moiré pattern is also a hexagon, but it can be made up of more than 10,000 carbon atoms.

"The angle at which the two layers of graphene are misaligned—the twist angle—is critically important to the material's electronic properties," Wang said. "The smaller the twist angle, the larger the moiré periodicity."

The unusual effects of specific twist angles on electron behavior were first proposed in a 2011 article by Dr. Allan MacDonald, professor of physics at UT Austin, and Dr. Rafi Bistritzer. Zhang witnessed the birth of this field as a doctoral student in MacDonald's group.

"At that time, others really paid no attention to the theory, but now it has become arguably the hottest topic in physics," Zhang said.

In that 2011 research MacDonald and Bistritzer predicted that electrons' kinetic energy can vanish in a graphene bilayer misaligned by the so-called "magic angle" of 1.1 degrees. In 2018, researchers at the Massachusetts Institute of Technology proved this theory, finding that offsetting two graphene layers by 1.1 degrees produced a two-dimensional superconductor, a material that conducts electrical current with no resistance and no energy loss.

In a 2019 article in Science Advances, Zhang and Wang, together with Dr. Jeanie Lau's group at The Ohio State University, showed that when offset by 0.93 degrees, twisted bilayer graphene

exhibits both superconducting and insulating states, thereby widening the magic angle significantly.

"In our previous work, we saw superconductivity as well as insulation. That's what's making the study of twisted bilayer graphene such a hot field—superconductivity. The fact that you can manipulate pure carbon to superconduct is amazing and unprecedented," Wang said.

New UT Dallas Findings

In his most recent research in Nature Photonics, Zhang and his collaborators at Yale investigated whether and how twisted bilayer graphene interacts with mid-infrared light, which humans can't see but can detect as heat.

"Interactions between light and matter are useful in many devices—for example, converting sunlight into electrical power," Wang said. "Almost every object emits infrared light, including people, and this light can be detected with devices."

Zhang is a theoretical physicist, so he and Wang set out to determine how mid-infrared light might affect the conductance of electrons in twisted bilayer graphene. Their work involved calculating the light absorption based on the moiré pattern's band structure, a concept that determines how electrons move in a material quantum mechanically.

"Graphene has been of interest for about 15 years. A single layer is interesting to study, but if we have two layers, their interaction should render much richer and more interesting physics. This is why we want to study bilayer graphene systems," he says.

"There are standard ways to calculate the band structure and light absorption in a regular crystal, but this is an artificial crystal, so we had to come up with a new method," Wang said. Using resources of the Texas Advanced Computing Center, a supercomputer facility on the UT Austin campus, Wang calculated the band structure and showed how the material absorbs light.

The Yale group fabricated devices and ran experiments showing that the mid-infrared photoresponse—the increase in conductance due to the light shining—was unusually strong and largest at the twist angle of 1.8 degrees. The strong photoresponse vanished for a twist angle less than 0.5 degrees.

"Our theoretical results not only matched well with the experimental findings, but also pointed to a mechanism that is fundamentally connected to the period of moiré pattern, which itself is connected to the twist angle between the two graphene layers," Zhang said.

Next Step

"The twist angle is clearly very important in determining the properties of twisted bilayer graphene," Zhang added. "The question arises: Can we apply this to tune other two-dimensional materials to get unprecedented features? Also, can we combine the photoresponse and the superconductivity in twisted bilayer graphene? For example, can shining a light induce or somehow modulate superconductivity? That will be very interesting to study."

"This new breakthrough will potentially enable a new class of infrared detectors based on graphene with high sensitivity," said Dr. Joe Qiu, program manager for solid-state electronics and electromagnetics at the U.S. Army Research Office (ARO), an element of the U.S. Army Combat Capabilities Development Command's Army Research Laboratory. "These new detectors will potentially impact applications such as night vision, which is of critical importance for the U.S. Army."

More information: Bingchen Deng et al. Strong mid-infrared photoresponse in small-twist-angle bilayer graphene, *Nature Photonics* (2020). DOI: 10.1038/s41566-020-0644-7

Journal information: *Nature Photonics*

https://phys.org/news/2020-07-physicists-misaligned-carbon-sheets-yield.html

PHYS.ORG

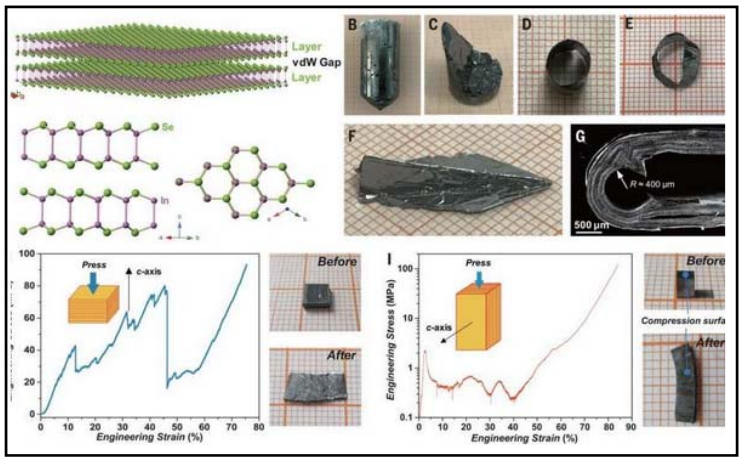
Sat, 01 Aug 2020

Researchers find crystals of indium selenide have exceptional flexibility

By Bob Yirka

A team of researchers affiliated with multiple institutions in China and one in the U.S. has found that semiconducting crystals of indium selenide (InSe) have exceptional flexibility. In their paper published in the journal *Science*, the group describes testing samples of InSe and what they learned about the material. Xiaodong Han with Beijing University of Technology has published a Perspective piece outlining the work by the team in China in the same journal issue.

As the researchers note, most semiconductors are rigid, which means they are difficult to use in applications that require varied surfaces or bending. This has presented a problem for portable device makers as they attempt to respond to user demand for bendable electronics. In this new effort, the researchers in China have found one semiconductor, InSe, that is not only flexible, but is so pliable that it can be processed using rollers.



Deformability of InSe single crystals. (A) Crystal structure of β-InSe and the projection on the (110) and (001) planes. (B) As-grown crystal and (C) cleavage surface. (D to F) InSe single crystal is morphed into various shapes without breaking. (G) Scanning electron microscopy (SEM) image of a folded crystal slab. R, radius. Compression engineering stress-strain curves along (H) and perpendicular to (I) the c axis. The smallest grid denotes 1 mm in all photographs. Credit: *Science* (2020). DOI: 10.1126/science.aba9778

InSe, as its name implies, is a compound made from indium (a metal element often used in touchscreens) and selenium (a non-metal element). Selenium is also a 2-D semiconductor, and has come under scrutiny after researchers discovered that its bandgap matched the visible region in the electromagnetic spectrum. It has previously been studied for use in specialty optoelectronic applications. In this new effort, the researchers looked into the possibility of using it as a semiconductor in bendable portable electronic devices.

In testing the material, the researchers found that its compressive strain was approximately 80 percent at room temperature. They also found that a single flake made from approximately 10^5 layers of the material was still extremely bendable. Additional testing showed that bulk InSe had a bandgap of approximately 1.26 eV at room temperature and a honeycombed hexagonal crystalline structure. Its layers were formed via Se-In-In-Se covalent bonds, and the layers were held together by Se-Se Van der Waals interactions. Perhaps most importantly, the researchers found that the material could be mass-produced using thermal-mechanical rolling, where a succession of increasingly small rollers were used to flatten and widen the material into thin continuous sheets.

The researchers conclude by suggesting InSe may be suitable for use in developing next-generation deformable or even flexible electronic devices.

More information: Tian-Ran Wei et al. Exceptional plasticity in the bulk single-crystalline van der Waals semiconductor InSe, *Science* (2020). DOI: 10.1126/science.aba9778

Journal information: *Science*

https://phys.org/news/2020-07-crystals-indium-selenide-exceptional-flexibility.html

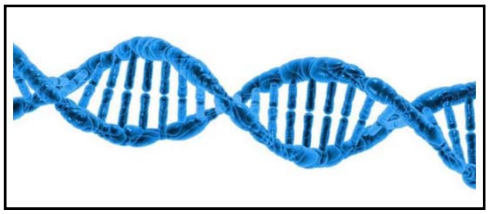
PHYS.ORG

Sat, 01 Aug 2020

Detective work in the cell: Scientists uncover a new RNA-modifying enzyme

By Johannes Angerer

Scientists led by Javier Martinez from the Max Perutz Labs, a joint venture of the Medical University of Vienna and the University of Vienna, have identified a unique chemical reaction at the end of RNA molecules for the first time in human cells. This reaction was previously only observed in bacteria and viruses. Tracing its source among thousands of proteins, they discovered that an unexpected culprit, an enzyme called ANGEL2, executes this reaction. ANGEL2 may play a key role in regulating the response to cellular stress, and possibly in the pathogenesis of neurodegenerative and metabolic diseases. The study is published in *Science*.



Credit: CC0 Public Domain

Ribonucleic acid (RNA) is a biomolecule with numerous functions. Among them, RNA can transmit the genetic information contained in deoxyribonucleic acid (DNA), for conversion into proteins, the workhorses of the cell. RNA is composed of a chain of building blocks called nucleotides. Nucleotides also contain sugar groups, and chemical modifications in the last sugar of an RNA chain are critical for a variety of cellular processes. Initially, Javier Martinez's Laboratory investigated how one of these modifications, a terminal cyclic phosphate group, is produced. Later, they identified a reaction in human cells that removes this modification. The enzyme responsible for this reaction has, until now, remained enigmatic.

By using protein purification techniques, the scientists of the Max Perutz Labs set out to trace the tracks of this mysterious enzyme. "Step-by-step, we filtered out the candidate enzyme from a complex 'soup' of thousands of proteins, fol-lowing its ability to remove the cyclic phosphate," explains Ph.D. student and first author Paola Hentges Pinto. Finally, together with the co-author Stefan Weitzer, she identified ANGEL2 as the much sought-after enzyme.

ANGEL2 belongs to a family of enzymes known as deadenylases, that carry out a radically different reaction on RNA ends. Deadenylases remove a string of adenosines found at the end of messenger RNAs, a specific class of RNAs. Removal of this particular type of nucleotide leads to the degradation of mRNAs. By performing structural analyses as part of a collaboration with Mar-tin Jinek and Alena Kroupova at the University of Zurich, the scientists could reveal the reaction mechanism of ANGEL2 and explain why it does remove cyclic phosphates rather than eliminating adenosines.

Modifying the levels of ANGEL2 in cells provided important clues about its bio-logical function. ANGEL2 emerged as involved in a type of stress reaction called the unfolded protein response (UPR). In order for proteins to carry out their functions, the amino acid chain has to be correctly folded. The UPR is triggered when misfolded, non-functional proteins accumulate due to cellular disturbances. The UPR seeks to correct the protein-folding defect and to re-store normal function of the cell. "We could ultimately show that ANGEL2 regulates the UPR, a significant finding since perturbation in the UPR is in-volved in neurodegenerative and metabolic disorders," conclude the research-ers. This finding provides the basis for a potential therapeutic application in dis-eases linked to UPR.

More information: Paola H. Pinto et al. ANGEL2 is a member of the CCR4 family of deadenylases with 2′,3′-cyclic phosphatase activity, *Science* (2020). DOI: 10.1126/science.aba9763

Journal information: *Science*

https://phys.org/news/2020-07-cell-scientists-uncover-rna-modifying-enzyme.html

livemint

Sat, 01 Aug 2020

India's capacity to be crucial when effective vaccine is ready: Anthony Fauci

The agreement with Britain's GSK and France's Sanofi will supply the UK with 60 million doses of their vaccine based on existing DNA-based technology used to produce Sanofi's flu vaccine

By Leroy Leo

- ***There are seven companies developing various vaccine candidates in India***
- ***AstraZeneca's vaccine candidate, which is being co-developed by the University of Oxford, is the front runner globally with a phase III trial underway***

India's position as the world's largest vaccine manufacturer by volume will play a crucial role when an effective vaccine is developed globally and the US government is monitoring the vaccine development efforts of Indian companies through its 30-year-old partnership with India's department of biotechnology, Anthony Fauci, director, National Institute of Allergy and Infectious Diseases (NIAID) of the US, said on Thursday.

Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (REUTERS)

"India's private sector also has a very important role in being the world's leading manufacturer of vaccines. As effective covid-19 vaccines emerge from our research effort, this manufacturing capability is going to be very important," Fauci said at the international symposium on vaccines against the covid-19 pandemic, hosted by the Indian Council of Medical Research (ICMR).

Fauci is the top infectious diseases expert in the US government.

NIAID and India's department of biotechnology have had a partnership of more than 30 years through the Indo-US Vaccine Action Plan (VAP), and this is playing a role in monitoring India's research and development (R&D) efforts in vaccine development, Fauci added.

"Three weeks ago, VAP convened an expert advisory committee to review covid-19 vaccine research and development in India. Eleven vaccines were reviewed by a panel that provided recommendations for how these candidates might be further developed and assessed, and we look forward to continuing this involvement and supporting the vaccine R&D efforts," Fauci said.

There are seven companies developing various vaccine candidates in India, with the Serum Institute of India, the world's largest manufacturer of vaccines by volume, partnering AstraZeneca plc to produce about 1 billion doses of its covid-19 vaccine.

AstraZeneca's vaccine candidate, which is being co-developed by the University of Oxford, is the front runner globally with a phase III trial underway and interim data published in the Lancet journal earlier this month indicated that it was safe and provided two levels of immunity.

Governments should start taking financial risks in scaling up production of vaccines to meet demand, but when vaccine candidates get regulatory approval, companies and governments should not take short cuts as this can endanger patients, said Fauci.

https://www.livemint.com/science/health/india-s-capacity-to-be-crucial-when-effective-vaccine-is-ready-anthony-fauci-11596159651563.html

Business Today

Sat, 01 Aug 2020

Coronavirus vaccine update: Eyes on India as candidates race towards finish line

Coronavirus vaccine news update: Biocon founder Kiran Mazumdar-Shaw said that the first doses of the vaccine should be administered to young people and health workers

All eyes are on India now as the largest manufacturer of vaccines gets its machines rolling. Serum Institute of India that is producing the frontrunner Oxford University-AstraZeneca COVID vaccine has committed to producing 1 billion doses of the vaccine. CEO Adar Poonawalla had stated earlier that the company aims to offer these doses to low income countries.

Anthony Fauci, director, National Institute of Allergy and Infectious Diseases (NIAID) has also underscored India's role in the development of a coronavirus vaccine. "India's private sector also has a very important role in being the world's leading manufacturer of vaccines. As effective covid-19 vaccines emerge from our research effort, this manufacturing capability is going to be very important," he said at the symposium on vaccines hosted by the Indian Council of Medical Research (ICMR).

He also said that Indo-US Vaccine Action Plan (VAP) convened an expert advisory committee to review coronavirus vaccine research and development in India. "Eleven vaccines were reviewed by a panel that provided recommendations for how these candidates might be further developed and assessed, and we look forward to continuing this involvement and supporting the vaccine R&D efforts," he said.

High Commissioner of UK in India Philip Barton said in an interview to The Indian Express that while trials are on, Oxford University-AstraZeneca's candidate seems to be the most promising so far. "We don't know which vaccine is going to work as trials are still going on but the one that at the moment looks promising is the Oxford University vaccine which will be manufactured with the Serum Institute," he said.

He added that the Oxford-AstraZeneca candidate would be made available on a global, equitable basis. "We are very clear, as is the Indian government, that this vaccine is for everybody. This is a global pandemic and vaccines must be for everybody," said Barton.

Speaking about distribution, Biocon founder Kiran Mazumdar-Shaw shared her views on who she thinks should be administered the COVID-19 vaccine first. "Who will receive the first supply of vaccines? Young people and health workers ought to get first priority. The elderly, those with comorbidities and children should not be exposed to the vaccine until safety risk is established," she said. She reasoned that since the vaccine development is very accelerated and hence the entire safety data would not be available to assess the risk of exposure of vulnerable population.

Health Minister Harsh Vardhan said, "We have fought the pandemic in full force. Two Indian companies have reached the clinical trial phase for Covid-19 vaccine. It is a matter of pride."

Here are the latest developments from India and across the world:

Oxford University-AstraZeneca vaccine: The company said that they have received good data on their COVID-19 vaccine. "The vaccine development is progressing well. We have had good data so far. We need to show the efficacy in the clinical programme, but so far, so good," AstraZeneca Chief Executive Pascal Soriot said. AstraZeneca has already reached deals with countries to make more than 2 billion doses of its COVID-19 vaccine, developed in partnership with the University of Oxford, and says it could be approved by the end of this year.

Johnson and Johnson: The company has begun trials of coronavirus vaccine after the study on monkeys showed its efficacy. The vaccine offered protection from infectious virus in one dose. According to the company, six out of the six monkeys that were administered the doses did not get any lung disease while five remained protected when exposed to coronavirus. Dr Paul Chief

Scientific Officer of J&J said, "This gives us confidence that we can test a single-shot vaccine in this epidemic and learn whether it has a protective effect in humans." It has begun human trials in the US and Belgium.

Moderna: JP Morgan analyst Cory Kasimov said that the company's vaccine candidate is making good progress. Kasimov said, "We see the publication of Moderna's data in non-human primates (NHP) as supportive of the potential for mRNA-1273 (COVID-19 vaccine), adding to the other encouraging pieces of early evidence, including Phase 1 results. That said, how results in monkeys ultimately translate to humans and whether the lack of an apparent CD8 T-cell response is relevant (especially when other vaccine candidates have shown CD8 T-cell involvement) are two (of admittedly many) outstanding questions."

https://www.businesstoday.in/current/economy-politics/coronavirus-vaccine-update-eyes-on-india-as-candidates-race-towards-finish-line/story/411660.html

The Indian EXPRESS

Sat, 01 Aug 2020

Covid-19 vaccine tracker, July 31: Oxford, Johnson & Johnson vaccines prevent infection in monkeys

Coronavirus (COVID-19) vaccine tracker update: The vaccine being developed by Oxford University has just begun phase-III human trials, while the one by Johnson & Johnson is carrying out phase-I and phase-II trials

A vaccine candidate being developed by Oxford University in association with AstraZeneca was able to "prevent" the Coronvirus infection in monkeys, a new study published in the *Nature journal* has said. Another study in the same journal said even the vaccine being developed by Johnson and Johnson was able to achieve similar results.

Detailed findings of animal trials of these two leading vaccine candidates were published separately in *Nature* on Thursday. Both the candidates are now being tested on humans. The vaccine being developed by Oxford University has just begun phase-III human trials, while the one by Johnson & Johnson is carrying out phase-I and phase-II trials.

Just two days ago, a vaccine being developed by Moderna Therapeutics, a US biotech firm, had also published findings of its animal trials. This study, published in the *New England Journal of Medicine* had also reported encouraging results of the tests on monkeys. Moderna has also begun phase-III testing on human beings.

Oxford and Moderna have also released preliminary results of their phase-I and phase-II human trials, and they too have been found to be satisfactory.

The phase-III trials could take a few months. Researchers are hoping that one of the leading contenders would be able to finalise the vaccine by early next year, if not by the end of this year itself.

Interestingly, Russia had said that a vaccine being developed by a research institute in Moscow was in line to get final regulatory approval by the middle of next month, and it could be made available for public use by September. This Russian vaccine is still in phase-II trials, but indications are that it would get a conditional approval for use, if the phase-II results are satisfactory. The phase-III trials would be taken up, even while it is released for public use.

Moderna intends to make profits from its vaccine: Report

Four companies considered front-runners for developing a vaccine against novel Coronavirus recently appeared before a Congressional hearing in the United States, where three of them —

AstraZeneca, Johnson & Johnson, and Pfizer — promised to US lawmakers that they would not profit from their vaccine, according to a report in *The New York Times*.

Moderna, however, made no such promise. Its president Dr Stephen Hoge said the company would not sell the vaccine "at cost", according to the report.

All the four companies are carrying out human trials of their vaccines. A Pfizer executive was quoted by the newspaper as saying that the company would price its vaccine "consistent with the global health emergency" and that a vaccine was "meaningless" if people were unable to afford it.

The companies told the US lawmakers that they were optimistic their vaccines would be ready by the end of this year, or the beginning of 2021.

Indian manufacturing capabilities key to success of Coronavirus vaccine: Fauci

As the world's leading manufacturer of vaccines, India's private sector was key to the success of any Coronavirus vaccine that is developed, Dr Anthony Fauci, one of world's leading experts on infectious diseases, has said.

Fauci, director of the National Institute of Allergy and Infectious Diseases in the United States, was speaking at an online symposium organised by the Indian Council of Medical Research.

"India's private sector also has a very important role to play as the world's leading manufacturer of vaccines, and as effective Covid19 vaccines emerge from our research efforts, this manufacturing capability is going to be very, very important," Dr Fauci said.

India's Health Secretary Rajesh Bhushan, who also spoke at the symposium, said there was a growing consensus within the government that when the vaccine is finally ready, the frontline health workers have the best claim to get it administered first.

The story so far

- About 25 candidate vaccines in human trials
- Five in Stage-III trials
- 139 candidates in pre-clinical trial stage
- Two Indian candidates in Stage-I trials
- One Chinese vaccine already approved for limited use, only on army personnel as of now
- The frontrunners: Oxford-AstraZeneca, Moderna, Pfizer, Russia's Gamaleya Institute

https://indianexpress.com/article/explained/covid-19-vaccine-tracker-july-31-oxford-astrazeneca-johnson-and-johnson-moderna-6531902/

INDIA TV

Sat, 01 Aug 2020

3 coronavirus vaccines in final stage: Oxford vs Moderna vs BioNTech

Coronavirus vaccine is an urgency for the world as COVID-19 cases continue to rise with the United States, Brazil, and India sharing the top 3 positions in terms of maximum cases of the infectious disease. As all vaccines are currently under trial stage, a look at where some of the leading vaccines stand at this point in time

Coronavirus vaccine is an urgency for the world as COVID-19 cases continue to rise with the United States, Brazil, and India sharing the top 3 positions in terms of maximum cases of the infectious disease. While many pharmaceuticals companies are dedicatedly working for developing a vaccine for coronavirus, some of them have now entered phase-3 human trials and if results are successful, following this phase, the vaccine is expected to be released for public use. With the world eagerly waiting for the coronavirus vaccine, let's take a look at where some of the leading vaccines stand at this point in time.

Coronavirus vaccines: Oxford-AstraZeneca vs Moderna vs BioNtech-Pfizer vs Covaxin

Vaccine Candidate Name	Trial Status	No Of Doses Required	How It Helps	Trial End Date | Expected
Oxford-Astrazeneca | United Kingdom	Trials currently underway in Phase 3	1	Generate anti-bodies and T-cells	July 2021
Moderna | United States	Trials currently underway in Phase 3	2	Generate anti-bodies and T-cells	October 2022
BioNTECH-Pfizer | Germany	Trials currently underway in Phase 3	2	Generate anti-bodies and T-cells	June 2021
Bharat Biotech - Covaxin | India	Trials currently underway in Phase 1	Not known yet	Helps body to detect inactivated virus and trains it to recognise, respond to Sars-Cov-2	Not known yet

The latest entrants in this crucial phase of vaccine development are Moderna and one jointly developed by US-based Pfizer and German biotech firm BioNTech. Pfizer and BioNTech announced the start of a Phase 2/3 study of its vaccine candidate BNT162b2.

Vaccine development under trial | Key takeaways

- The Phase 2/3 study will involve up to 30,000 participants between 18 and 85 years of age.
- The Phase-3 trial by Moderna will also include 30,000 participants who do not have Covid-19.
- The mRNA-1273 vaccine is designed to induce neutralising antibodies directed at a portion of the coronavirus "spike" protein, which the virus uses to bind to and enter human cells.
- The Phase 3 trial is crucial in the development of a vaccine as it can help answer the question whether it is effective enough to prevent the targeted disease.
- Vaccine candidate developed by Oxford-AstraZeneca made early progress and entered into phase trials in South Africa and Brazil.
- Oxford's vaccine results of the Phase 1/2 trials showed that it produces strong immune responses.
- Phase 3 trial of Oxford vaccine will also be conducted in several other countries including India. This vaccine will be called Covishield in India.
- Phase 3 clinical trials are expected to commence in India around August 2020 in which 4,000-5,000 patients are likely to participate.
- Phase 3 clinical trial of Chinese state-owned pharmaceutical company Sinopharm's inactivated Covid-19 vaccine started in Abu Dhabi in the United Arab Emirates.
- UAE health authorities recently issued a permit for up to 15,000 volunteers to take part in the trials.
- Chinese vaccine maker Sinovac said it had received approval for starting a phase-3 clinical trial of its COVID-19 vaccine candidate, CoronaVac, in Brazil.
- The New York Times vaccine tracker also includes a Phase-3 trial by Murdoch Children's Research Institute in Australia to evaluate the efficacy of a Bacillus Calmette-Guerin vaccine, originally developed as a protection against tuberculosis, to protect against Covid-19.

- Work on more than 165 Covid-19 vaccine candidates has started, 27 vaccines have entered human trials, according to New York Times tracker.
- The approval for the Recombinant Novel Coronavirus Vaccine (Ad5-nCoV) was granted on June 25, for one year.
- The phase-1 and phase-2 clinical trials of the Ad5-nCoV were conducted in China.

(*With inputs from IANS*)

https://www.indiatvnews.com/fyi/coronavirus-vaccines-final-stage-trials-oxford-astrazeneca-moderna-biontech-pfizer-covaxin-covishield-results-performance-638555

THE HINDU

Sat, 01 Aug 2020

UK scientists to immunise hundreds with coronavirus vaccine

Shattock said he was optimistic the Imperial vaccine would work, but must await the scientific data from the trial

London: Scientists at Imperial College London say they are immunizing hundreds of people with an experimental coronavirus vaccine in an early trial after seeing no worrying safety problems in a small number vaccinated so far.

Dr Robin Shattock, a professor at the college, told *The Associated Press* that he and colleagues had just finished a very slow and arduous process of testing the vaccine at a low dose in the initial participants and would now expand the trial to about 300 people, including some over age 75.

"It's well tolerated. There aren't any side effects," he said, adding it was still very early in the study. Shattock, who is leading the vaccine research at Imperial, said he hopes to have enough safety data to start inoculating several thousand people in October.

A research technician uses a centrifuge on blood samples from volunteers in the laboratory at Imperial College in London on July 30, 2020. | Photo Credit: AP

Since COVID-19 infections have dropped dramatically in Britain, making it difficult to determine whether or not the vaccine works, Shattock said he and his colleagues are also looking to test their vaccine elsewhere.

"We're looking very carefully at the pandemic, at the numbers where the hot spots are and talking to collaborators that have the facilities to do these kinds of studies," he said.

The Imperial vaccine uses synthetic strands of genetic code based on the virus. Once injected into a muscle, the body's own cells are instructed to make copies of a spiky protein on the coronavirus. That should in turn trigger an immune response so the body can fight off any future COVID-19 infection.

Earlier this week, the world's biggest coronavirus vaccine study started in the United States, with the first of 30,000 planned volunteers getting immunized with shots created by the US National Institutes of Health and Moderna Inc.

Several other vaccines made by China and by Britain's Oxford University, based on different vaccine technologies, began smaller final-stage tests in Brazil and other hard-hit countries earlier this month.

The World Health Organization has said multiple vaccine approaches are necessary for COVID-19, noting that the usual success rate for vaccine development is about 10 per cent.

Shattock said there were numerous coronavirus vaccines now in clinical trials, and he predicted that at least some of them would prove to be effective.

"We have 20 vaccines in clinical trials, (so) we can be pretty confident that at least two of those will work," he said. "It really depends on how strong the immune response needs to be to provide protection."

Shattock said he was optimistic the Imperial vaccine would work, but must await the scientific data from the trial.

"I'm just going to hold my breath and wait to see," he said.

https://www.thehindu.com/sci-tech/health/uk-scientists-to-immunise-hundreds-with-coronavirus-vaccine/article32235442.ece

CLINICAL TRIALS ARENA

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AstraZeneca reports good progress of Covid-19 vaccine in trials

AstraZeneca has reported that it has obtained 'good data so far' on its Covid-19 vaccine candidate, which was licensed from the University of Oxford and is currently in large-scale clinical studies.

The potential vaccine has entered its final trial in Brazil, with studies ongoing in the UK and South Africa.

On a media call, AstraZeneca chief executive Pascal Soriot said: "The vaccine development is progressing well. We have had good data so far. We need to show the efficacy in the clinical programme, but so far, so good."

In the Phase I/II COV001 trial conducted in the UK, the vaccine was tolerated and generated strong immune responses in all evaluated participants. Findings were published in The Lancet journal.

Study results showed that a single dose of the vaccine led to a four-fold increase in antibodies to the SARS-CoV-2 spike protein in 95% of participants one month following vaccination.

Furthermore, a T-cell response that peaked by day 14 and maintained two months after injection was observed in all subjects.

AstraZeneca forged deals with multiple countries to produce more than two billion doses of the investigational Covid-19 vaccine and hopes to secure approval by the end of this year.

The company signed agreements with the UK, US, European Union, the Coalition for Epidemic Preparedness Innovations (CEPI), and Gavi, the Vaccine Alliance.

In addition, it reached a licensing agreement with Serum Institute of India to supply low and middle income countries, along with agreements with R-Pharm in Russia and SK Biopharmaceuticals in the Republic of Korea.

Serum Institute of India filed an application with the Drugs Controller General of India (DCGI) to study the Covid-19 vaccine candidate in Phase II and III trials.

AstraZeneca committed to not profit from the Covid-19 vaccine during the pandemic.

https://www.clinicaltrialsarena.com/news/astrazeneca-covid-vaccine-progress/

ScienceDaily

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Young kids could spread COVID-19 as much as older children and adults, study suggests

Findings important to nationwide conversations on reopening schools and daycare

Summary:

Researchers have discovered that children younger than 5 years with mild to moderate COVID-19 have much higher levels of genetic material for the virus in the nose compared to older children and adults. The findings point to the possibility that the youngest children transmit the virus as much as other age groups.

A study from Ann & Robert H. Lurie Children's Hospital of Chicago discovered that children younger than 5 years with mild to moderate COVID-19 have much higher levels of genetic material for the virus in the nose compared to older children and adults.

Findings, published in *JAMA Pediatrics*, point to the possibility that the youngest children transmit the virus as much as other age groups. The ability of younger children to spread COVID-19 may have been under-recognized given the rapid and sustained closure of schools and daycare during the pandemic.

"We found that children under 5 with COVID-19 have a higher viral load than older children and adults, which may suggest greater transmission, as we see with respiratory syncytial virus, also known as RSV," says lead author Taylor Heald-Sargent, MD, PhD, pediatric infectious diseases specialist at Lurie Children's and Assistant Professor of Pediatrics at Northwestern University Feinberg School of Medicine. "This has important public health implications, especially during discussions on the safety of reopening schools and daycare."

Dr. Heald-Sargent and colleagues analyzed 145 cases of mild to moderate COVID-19 illness within the first week of symptom onset. They compared the viral load in three age groups -- children younger than 5 years, children 5-17 years and adults 18-65 years.

"Our study was not designed to prove that younger children spread COVID-19 as much as adults, but it is a possibility," says Dr. Heald-Sargent. "We need to take that into account in efforts to reduce transmission as we continue to learn more about this virus."

Story Source:

Materials provided by **Ann & Robert H. Lurie Children's Hospital of Chicago**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Taylor Heald-Sargent, William J. Muller, Xiaotian Zheng, Jason Rippe, Ami B. Patel, Larry K. Kociolek. **Age-Related Differences in Nasopharyngeal Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Levels in Patients With Mild to Moderate Coronavirus Disease 2019 (COVID-19)**. *JAMA Pediatrics*, July 30, 2020; DOI: 10.1001/jamapediatrics.2020.3651

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