

India's first mRNA vaccine against Omicron approved

Jacob Koshy
NEW DELHI

GEMCOVAC-OM, India's first indigenous mRNA vaccine for the Omicron variant of the novel coronavirus, was approved under emergency use guidelines by the Drug Controller General of India (DCGI) late on Monday. This comes a year after the Pune-based Gennova Biopharmaceuticals Ltd. got approval for GEMCOVAC-19 against COVID-19.

Both the vaccines are yet to be commercially available, though Gennova



The new vaccine is likely to be rolled out in three weeks. REPRESENTATIVE IMAGE

officials said at a press conference on Tuesday that the vaccines were likely to be formally "launched and

rolled out" within the next "two to three weeks".

The company said GEMCOVAC-OM was stable in a 2-8 degrees Celsius range and hence could be stored in ordinary refrigerators. It could be administered into the skin via a "needle-free" Pharmajet system.

Data from clinical trials, which are not public yet but submitted to the DCGI for review, suggested that GEMCOVAC-OM had a "greater" safety profile as Covishield and generated more neutralising antibodies, said Gennova CEO Sanjay Singh.

Yoga, cognitive behavioural therapy can tackle Internet addiction: NIMHANS study

Afshan Yasmeen
BENGALURU

A pilot study by researchers from NIMHANS has found that the integration of yoga and cognitive behavioural therapy (Y-CBT) is useful in reducing Internet addiction and psychological distress.

June 21 is observed as International Yoga Day.

Researchers from the Service for Healthy Use of Technology (SHUT) Clinic and the Department of Integrative Medicine at NIMHANS studied the impact of integrated Y-CBT in adolescents with severe Internet addiction, from July to



A mass yoga session in Bengaluru on June 21 last year. FILE PHOTO

December 2022. "We found that it was feasible and useful to combine yoga with CBT in managing excessive Internet use. We took up four cases with

severe Internet addiction, including a 21-year medical student, who had an online betting addiction, and put them on Y-CBT intervention. All of them report-

ed a significant reduction in psychological distress and improvement in quality of sleep within two weeks of the intervention," said Manoj Kumar Sharma, Professor at the Department of Clinical Psychology, who also heads SHUT Clinic.

Ten sessions of yoga and six sessions of CBT programme were conducted for them for two weeks, followed by online booster sessions once a week.

"At the end of 12 weeks, the subjects reported sustained improvement without deterioration at any point in time," Dr. Sharma told *The Hindu*.

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2 Indian surgeons honoured at conference in Canada

Two Indian surgeons – Gunaseelan Rajan from Chennai and Sanjiv Nair from Bengaluru – were honoured at the inaugural ceremony of the 25th International Conference of Oral and Maxillofacial Surgery (ICOMS 2023) in Canada as the President of the Asian Chapter and as President of the International Association respectively. In the conference, held once in two years in different countries, over 1,300 specialists from 67 countries met from June 8-11 to debate recent advances in oral surgery, mouth cancer, research and innovation in facial surgery. While Dr. Rajan chaired a special session on mouth cancer, including robotic surgery and advanced dental implant treatment, Dr. Nair chaired a session on vascular tumors of the facial region.

T.N. police launch new scheme for women's safety

The Tamil Nadu police have introduced a new service where women travelling alone in remote locations could seek police assistance in case they felt unsafe. According to police sources, women travelling alone and in need of police help could dial 1091, 112, 044-23452365 and 044-28447701. A police patrol vehicle in the vicinity would reach them as early as possible and provide assistance.

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India and U.S. share values of democracy, diversity: Modi

Ahead of state visit, PM says there is an unprecedented trust between the two countries; he is making his sixth visit to the U.S. as Prime Minister and will be hosted by President Joe Biden

Suhasini Haidar
NEW DELHI

Prime Minister Narendra Modi said his visit to Washington this week will reinforce shared democratic "values" between India and the United States. Departing from New Delhi on Tuesday, he added that "there is an unprecedented trust" between the two countries today.

Mr. Modi, on his sixth visit to the U.S. as Prime Minister, will be hosted by U.S. President Joe Biden for his first official state visit. He will meet the U.S. leadership, members of Congress, American CEOs, and members of the Indian-American community during the visit, which will focus on enhancing trade



Key visit: Prime Minister Narendra Modi being welcomed upon his arrival in New York on Tuesday. ANI

and energy, collaborations in science & technology, education, and health.

It is also expected to yield a number of agreements on defence ties, including deals for jet engines and drones.

"I am confident that my visit to the US will reinforce our ties based on shared values of democracy, di-

versity and freedom. Together we stand stronger in meeting the shared global challenges," Mr. Modi said.

Mr. Modi will begin his visit to New York with meetings with about 24 "CEOs and Thought leaders", including Tesla founder and Twitter CEO Elon Musk, astrophysicist Neil deGrasse Tyson and singer

Falguni Shah.

On Wednesday, he will participate in a yoga event at the site where "India's proposal in December 2014 to recognise an International Day of Yoga" was accepted, Mr. Modi said.

He will also lay flowers at a bust of Mahatma Gandhi installed at the United Nations last year.

Mr. Modi's visit is also expected to face some protests from human rights activists and a section of the Indian-American diaspora. On Tuesday, international groups Human Rights Watch (HRW) and Amnesty International are screening *India: The Modi Question*, the BBC documentary – on the PM's record during the 2002 Gujarat riots – that is banned in India.

Climate breakdown: the Arctic Ocean could be ice-free by the 2030s

Considerable effort has been invested in determining when the Arctic Ocean might first become ice-free in summer, a.k.a. a 'blue ocean event'. We do not know exactly when the last blue ocean event happened, but one in the near future would mean open water at the North Pole for the first time in millennia

Jonathan Bamber

The Arctic Ocean could be ice-free in summer by the 2030s, even if we do a good job of reducing emissions between now and then. That's the worrying conclusion of a new study in *Nature Communications*.

Predictions of an ice-free Arctic Ocean have a long and complicated history, and the 2030s is sooner than most scientists had thought possible (though it is later than some had wrongly forecast). What we know for sure is the disappearance of sea ice at the top of the world would not only be an emblematic sign of climate breakdown, but it would have global, damaging and dangerous consequences.

The Arctic has been experiencing climate heating faster than any other part of the planet. As it is at the frontline of climate change, the eyes of many scientists and local indigenous people have been on the sea ice that covers much of the Arctic Ocean in winter. This thin film of frozen seawater expands and contracts with the seasons, reaching a minimum area in September each year.

The ice which remains at the end of summer is called multiyear sea ice and is considerably thicker than its seasonal counterpart. It acts as barrier to the transfer of both moisture and heat between the ocean and atmosphere. Over the past 40 years this multiyear sea ice has shrunk from around 7 million sq. km to 4 million. That is a loss equivalent to roughly the size of India or 12 UKs. In other words, it's a big signal, one of the most stark and dramatic signs of fundamental change to the climate system anywhere in the world.

As a consequence, there has been considerable effort invested in determining when the Arctic Ocean might first become ice-free in summer, sometimes called a "blue ocean event" and defined as when the sea ice area drops below 1 million sq. km. This threshold is used mainly because older, thicker ice along parts of Canada and northern Greenland is expected to remain long after the rest of the Arctic Ocean is ice-free. We can't put an exact date on the last blue ocean event, but one in the near future would likely mean open water at the North Pole for the first time in thousands of years.

One problem with predicting when this might occur is that sea ice is notoriously difficult to model because it is influenced by both atmospheric and oceanic circulation as well as the flow of heat between these two parts of the climate system. That means that the climate models - powerful computer programs used to simulate the environment - need



An aerial view of an iceberg in the Arctic Ocean in September 2018. ANNIE SPRAAT/UNSPASH

to get all of these components right to be able to accurately predict changes in sea ice extent.

Melting faster than predicted

Back in the 2000s, an assessment of early generations of climate models found they generally underpredicted the loss of sea ice when compared to satellite data showing what actually happened. The models predicted a loss of about 2.5% per decade, while the observations were closer to 8%.

The next generation of models did better but were still not matching observations which, at that time were suggesting a blue ocean event would happen by mid-century. Indeed, the latest IPCC climate science report, published in 2021, reaches a similar conclusion about the timing of an ice-free Arctic Ocean.

As a consequence of the problems with the climate models, some scientists have attempted to extrapolate the observational record resulting in the controversial and, ultimately, incorrect assertion that this would happen during the mid 2040s. This did not help the credibility of the scientific community and its ability to make reliable projections.

The scientists behind the latest study



Arctic sea ice is an important component of the climate system. As it dramatically reduces the amount of sunlight absorbed by the ocean, removing this ice is predicted to further accelerate warming, through a process known as a positive feedback

have taken a different approach by, in effect, calibrating the models with the observations and then using this calibrated solution to project sea ice decline. This makes a lot of sense, because it reduces the effect of small biases in the climate models that can in turn bias the sea ice projections. They call these "observationally constrained" projections and find that the Arctic could become ice-free in summer as early as 2030, even if we do a good job of reducing emissions between now and then.

There is still plenty of uncertainty around the exact date - about 20 years or so - because of natural chaotic fluctuations in the climate system. But compared to previous research, the new study still brings forward the most likely

timing of a blue ocean event by about a decade.

You might be asking the question: so what? Other than some polar bears not being able to hunt in the same way, why does it matter? Perhaps there are even benefits as the previous US secretary of state, Mike Pompeo, once declared - it means ships from Asia can potentially save around 3,000 miles of journey to European ports in summer at least.

But Arctic sea ice is an important component of the climate system. As it dramatically reduces the amount of sunlight absorbed by the ocean, removing this ice is predicted to further accelerate warming, through a process known as a positive feedback. This, in turn, will make the Greenland ice sheet melt faster, which is already a major contributor to sea level rise.

The loss of sea ice in summer would also mean changes in atmospheric circulation and storm tracks, and fundamental shifts in ocean biological activity. These are just some of the highly undesirable consequences and it is fair to say that the disadvantages will far outweigh the slender benefits.

(Jonathan Bamber is professor of physical geography, University of Bristol.) This article is republished from The Conversation.

Semiconductor fab: the unfinished agenda

To set up a semiconductor fabrication plant in India is not mere hubris. There is a growing market. There are also strategic reasons: India's susceptibility to coercion increases due to its dependence on the import of semiconductors. Therefore, the government's 2022 Semiconductor Mission is laudable. But today, there is still uncertainty about whether India will have a fab. In this context, it is important to understand why earlier attempts failed and examine alternate approaches.

Earlier attempts

The first serious attempt was made in 2007 in the form of a Special Incentive Package (SIP), but it yielded no response. The second attempt in the form of Modified SIP in 2012 fared better. After over two years of extensive outreach with practically all the major fab companies in the world, India came close to having a fab. Two consortia were approved by the Cabinet with an attractive set of incentives. Jaiprakash Associates in partnership with IBM and Israeli company Towerjazz constituted one, while the other was led by Hindustan Semiconductor Manufacturing Corporation along with ST Microelectronics. The two fabs together involved investment of \$10 billion, and the government offered incentives amounting to nearly \$5 billion in the form of cash and tax cuts. Locations for the fabs were finalised and land was allotted. But finally, both failed to mobilise resources.

Semiconductor fabrication represents the ultimate frontier of human tech advancement. The frontier has been advancing adhering to Moore's law that the number of transistors in a unit area doubles every 18 months. But the progress of miniaturisation is accompanied by higher complexity and costs. As a result, the industry has seen a decline in the number of participants.

China started late in the semiconductor fab industry. But



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India, which is way behind China on the fab journey, could take lessons from its neighbour

backed by massive government financial support over the last two decades, it acquired hundreds of loss-making fabs from around the world and built its fab industry. Aided by lower manufacturing costs and a massive electronics manufacturing industry, China's chip production has grown rapidly. By the time the U.S., the traditional leader in this game, realised, China had become one of the major producers of chips. Aided by its market supremacy in rare earths, which are essential for chip production, it has a strategic stranglehold on chip-making. Over the last year, the U.S. and its Western allies have blocked the transfer of the latest fab-related technology to China. But this could be a case of closing the stable door after the horses have bolted. The U.S. enacted the CHIPS and Science Act in 2022, with nearly \$40 billion in subsidies, in an effort to bring back semiconductor manufacturing to the country. The European Union sanctioned €7.4 billion for a new fab in France. India will have to contend with these countries in what has become an intense chip warfare.

Investment in a semiconductor fab is one of the riskiest. Billions of dollars need to be recovered before the technology becomes obsolete. This necessitates substantial production volumes for economic viability, often reaching levels that are adequate to meet global demand. It is therefore difficult to conceive of a fab which is based on the domestic market only. The advantage of semiconductors having a small freight-to-price ratio and a zero-custom duty regime under the Information Technology Agreement, 1996, facilitates production in a single location and global sales. This is why no company is interested in setting a greenfield fab.

Developing an ecosystem for chip manufacturing in a greenfield location is a major challenge. Hundreds of chemicals and gases are required for chip fabrication, people need to be trained, and

abundant clean water be made available. But above all is the art of chip-making. Despite the best of equipment, poor quality and low yields can make fabs fail.

There are other issues, such as whether to set up a logic/processor, memory or analog fab. An electronic equipment and its functionalities are characterised by their logic chips, which are therefore strategically important and generate the highest profit. The most advanced set of technologies is needed to manufacture them. Analog chips are essential, but have the least strategic value. Memory fabs use the most advanced feature nodes, while analog fabs can be even as large as 130 nm. Logic fabs are the most expensive and analog fabs the least. A relatively easier option is Assembly, Testing, Packaging and Marking (ATMP), to get the fab ecosystem developed before the full-fledged fab is set up. But ATMPs have little value in terms of actual chip-making.

Lessons from China

India's strategy has been to set up a new logic fab. China, which acquired loss-making fabs and then set up its own logic fab, provides lessons. Acquiring existing fabs has many advantages: they are reasonably priced, have stabilised technology, a supply chain ecosystem, an established product line, and market. They will enable India to build the fab ecosystem and train human resources. Much lower subsidies would be required, and the funds saved could be used for advanced R&D in fab technologies which will help build state-of-the-art fab in next few years. Another strategy could be setting up ATMPs. Tessolve, now acquired by Tatas, had set up an ATMP in 2013-14. This ATMP is successfully packaging chips upto 7 nm feature size. China has over 100 ATMPs.

China started on the fab journey about 20 years ago. As the Chinese saying goes, the best time to plant a tree was 20 years ago, but the second best time is now.

What is the contention between Coal India and CCI?

Why did the Competition Commission of India impose a penalty of ₹591 crore on the PSU?

Saptaparno Ghosh

The story so far:

In June 15, the Supreme Court held that there was "no merit" in Coal India Ltd (CIL), a public sector undertaking, being excluded from the purview of the Competition Act. The Court was hearing the PSU's appeal against the Competition Appellate Tribunal's order which alleged the former of abusing its position.

What was the case about?

The chain of events goes back to March 2017 when the Competition Commission of India (CCI) had imposed a penalty of ₹591.01 crore on CIL for "imposing unfair/discriminatory conditions in fuel supply agreements (FSAs) with the power producers for supply of non-coking coal." In other words, CIL was found to be supplying lower quality of the essential resource at higher prices and placing opaque conditions in the contract about supply parameters and quality. The regulator contended that Coal India and

its subsidiaries operated independently of market forces and enjoyed market dominance in the relevant market with respect to production and supply of non-coking coal in India.

What did the PSU argue in court?

Coal India argued that it operated with the principles of 'common good' and ensuring equitable distribution of the essential natural resource. With this objective, it was secured as a 'monopoly' under the Nationalisation Act, 1973 (more specifically, the Coal Mines (Nationalisation) Act, 1973).

The entity said that it may have to adhere to a differential pricing mechanism to encourage captive coal production (referring to mines that are handed over to companies for specific and exclusive use through lease or any other route). Differential pricing, which may be inconsistent with market principles, was to ensure the viability of the larger operating ecosystem as well as for pursuing welfare objectives. Furthermore, coal supply also has a

bearing on larger national policies, for example, if the government were to encourage growth in backward areas through increased allocation.

The PSU stated that it did not operate in the commercial sphere. It specifically pointed to 345 out of its 462 mines having suffered cumulative losses totalling ₹9,878 crore in 2012-13.

How did the CCI respond?

The respondents broadened the scope of the arguments. The Raghavan Committee (2020) report, put up for perusal by the respondents, had observed that state monopolies were not conducive to the best interests of the nation. They could not be allowed to operate in a state of inefficiency and should instead, operate amid competition. Furthermore, coal ceased to be an 'essential commodity' in February 2007 and the Nationalisation Act too was removed from the Ninth Schedule (laws that cannot be challenged in court) in 2017. It was also pointed out that Coal India was a fully-government owned entity until the disinvestment in

2010. The government's shareholding reduced to 67% with the rest held by private hands. Moreover, it was stated that the CIL directed 80% of its supplies to power companies. The latter would then pass power generated using coal to discoms (distribution companies), who, in turn, would supply power to the final consumer. The continual supply of coal, adherence to the contract, reasonableness in the rates and quality of coal also serve a common good, the respondents contended. Coal constitutes about 60 to 70% of the costs for power generation companies. Thus, irregular prices and supply will have a significant bearing indirectly on consumers.

What were the SC's observations?

The court said there was "no merit" in the argument that the Competition Act would not apply to CIL because they are governed by the Nationalisation Act, and it cannot be reconciled with the Competition Act. "The novel idea which permeates the Act, would stand frustrated, in fact, if the state monopolies, the government companies and public sector units are left free to contravene the (competition) act," it stated. Separately, it said that entities cannot act with caprice, treat unfairly otherwise or similarly situated entities with discrimination.

According to Anshuman Sakle, partner at law-firm Khaitan & Co, the judgment reinforced the principle of "competitive neutrality" – entailing that the Competition Act equally applies to public and private sector enterprises.