

## MQ9Bs

- The MQ-9Bs, which will be assembled in India, will enhance the Intelligence, Surveillance, and Reconnaissance (ISR) capabilities of India's armed forces across domains.
- "As part of this plan, General Atomics will also establish a Comprehensive Global Maintenance, Repair, and Overhaul (MRO) facility in India in support of India's long-term goals to boost indigenous defense capabilities."
- The procurement process has commenced with the Defence Acquisition Council (DAC) chaired by Defence Minister Rajnath Singh
- "The current indigenous content proposed is 8-9% while India is hoping it can be increased up to 15-20% what do the UAVs bring in terms of capability?"
- The MQ-9B has two variants the SkyGuardian and the SeaGuardian, its maritime variant.
- The MQ-9B is designed to fly over the horizon via satellite for up to 40 hours, depending on configuration, in all types of weather and safely integrate into civil airspace, according to its manufacturer.
- For instance, the SeaGuardian configuration can include a 360-degree surface-search maritime radar, automatic identification

system, sonobuoy monitoring system, and sonobuoy dispensers for persistent anti-surface and anti-submarine warfare missions.

- According to General Atomics, the MQ-9B can provide roughly 80% of the capability of a large human flown maritime patrol aircraft at about 20% of its cost per hour.

## THE HINDU

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### Submersible VS Submarine

#### What is the Titan submersible?

- Titan is a submersible or an underwater vehicle.
- It is operated by the privately owned U.S. company OceanGate which organizes underwater expeditions for both research and tourism.
- The company claims that Titan, which it said was built with "off-the-shelf" components, is a lighter and more cost-efficient than other deep-diving submersibles.
- The 6.7-metre-long manned submersible is intended for "site survey and inspection, research and data collection, film and media production, and deep sea testing of hardware and software. The UNESCO guidelines stress the long-term preservation of "underwater cultural heritage" and the need to protect the surrounding waters by ensuring "responsible

non-intrusive access.”

- The NOAA guidelines are similar and insist that recovered material and artifacts must be managed as per professional standards.
- In other words, taking souvenirs from the wreckage site is strongly discouraged.
- What is the difference between a submarine and a submersible?
- While the two categories can overlap, a submarine refers to an underwater vehicle that is largely independent and has power reserves to help it depart from a port or come back to the port after an expedition.
- Meanwhile, a submersible is generally smaller in size and has less power, so it needs to work with a ship in order to be launched and recovered.
- Titan was working with a vessel named Polar Prince.

## **THE HINDU**

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### **Heat waves in UP**

- Deadly heatwave over Uttar Pradesh recently claimed as many as 100 lives.
- There were subsequently several reports saying that according to a model called the ‘Climate Shift Index’ (CSI), developed by a reputed U.S. nonprofit called Climate Central,

this heatwave was made twice as likely by climate change. A rather unique set-up of events -- including the warming of the northern Indian Ocean from January onwards and the cyclones and typhoons during May and June -- have disrupted the normal march of the southwest monsoon this year.

- Also playing out in the background is the world’s transition from a La Niña winter in 2022-2023 to the emerging El Niño summer of 2023.
- These events also underscore the fact that natural variability i.e. natural variations in the climate always adds to or subtracts from the effects of climate change at the local level. For example, South India can have its hottest summer and in the same season, Chennai can have its coolest day in June.
- Climate change also affects the natural variability itself.
- The number and intensities of tropical cyclones, as well as the El Niños and the La Ninas, are also likely affecting change.

## **THE HINDU**

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### **Y chromosome**

- Two studies have shed light on the role of the Y chromosome in cancer outcomes, in which males are often more adversely affected than females.

- Sex is known to affect cancer incidence, clinical outcomes, and tumor biology, with most cancers causing worse outcomes in males than in females.
- Some studies have suggested that the function of the Y chromosome may have a role.
- Colorectal cancer is the second most common cause of cancer-related deaths, which is more aggressive and metastatic in males.
- The model is a specific form of the disease, driven by a known oncogene called KRAS

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### Hybridization

- A study has now focused on hybridization in mammalian evolution.
- The researchers studied the genome sequences from a group of monkey species in the *Rhinopithecus* genus and found evidence that the grey snub-nosed monkey is derived from hybridization between the golden snub-nosed monkey and the ancestor of two extant *Rhinopithecus* species.
- One group of species that have been identified as having a history of hybridization is the baboons.

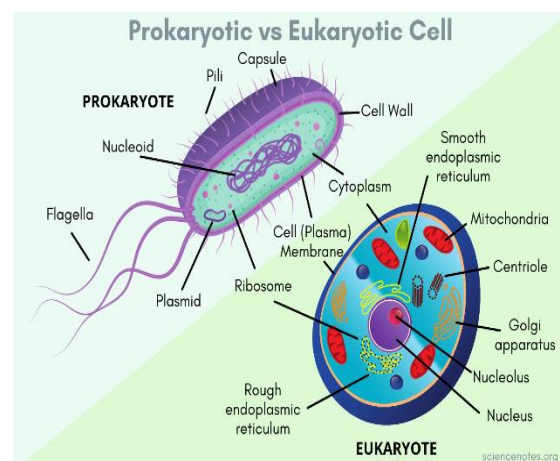
## THE HINDU

### Tundra Diversity and Climate

- Tundra diversity, including plants, lichens, and fungi, declined over a 15-year experiment in the Arctic due to warming temperatures mediated by the disappearance of sea ice.
- However, the presence of large herbivores such as caribou and musk oxen slowed this decline, by affecting the plant understory with their different browsing behaviors, a study found.
- The findings offer support for the idea that encouraging herbivore diversity in the tundra could temper some of the impacts of climate warming.

## THE HINDU

### Prokaryote and Eukaryotes



Prokaryotic cell	Eukaryotic Cell
prokaryotes' genetic information is indeed not membrane-bound	eukaryotes have "real" nuclei that house their DNA
Prokaryotic cell walls are often made of various chemicals than eukaryotes.	Eukaryotes are substantially larger than prokaryotic cells.
Prokaryotic cells differ from eukaryotic in that they have only one loop of secure genetic material contained in the nucleoid	eukaryotic DNA found on securely bonded and organised chromosomes.
Though plasmids are found in certain eukaryotes, they are typically considered a prokaryote trait, and many critical genes in prokaryotic organisms are kept on plasmids.	Several chromosomes, made up of DNA and protein, are common in eukaryotic organisms. Most eukaryotic organisms have only a few chromosomes, whereas others have hundreds or even thousands. Within the nucleus, these chromosomes are safeguarded.
The DNA, or genetic information, in prokaryotic cells forms a single big circle, which spirals upon itself. The DNA is found in the cell's main body.	Eukaryotic cells have various membrane-bound components termed organelles in addition to a nucleus. Eukaryotic cells are often larger and more complicated than prokaryotic cells. They lack a nucleus as well as many other membrane-bound organelles.

## THE HINDU

### Cell-cultivated chicken

#### What is cell-cultivated chicken?

- To make cell-cultivated meat, the two companies isolate the cells that make up the meat (the meat that we consume), and put them in a setting where they have all the resources they need to grow and make more copies of themselves.
- These resources are typically nutrients, fats, carbohydrates, amino acids, the right temperature, etc.
- The 'setting' in which this process transpires is often a bioreactor (also known as a 'cultivator'), a sensor-fit device like a container that has been designed to support a particular biological environment.
- Once there are enough of these cells,

which takes around two to three weeks in Upside's process, they resemble a mass of minced meat.

- They are collected and processed with additives to improve texture

## THE HINDU

### China and Pak nuclear deal

#### What is the latest deal?

- Pakistan's Prime Minister Shehbaz Sharif on June 20 witnessed the signing of the agreement for the construction of a 1,200 MW nuclear plant.
  - This is the fifth reactor at the Chashma nuclear complex (C-5). The financial details have not been spelled out, but Mr. Sharif said China had given "special concessions" for financing the construction amid Pakistan's continuing financial crisis and on-going negotiations for a bailout from the International Monetary Fund (IMF).
  - C-5 will be the biggest reactor at Chashma, where China has already constructed four phases of the complex, with four reactors of around 325 MW each.
  - It will use China's Hualon One reactor, which has also been installed in two plants in Karachi.
- #### What are the broader implications?
- China's civilian nuclear projects with

Pakistan have come under scrutiny because the Nuclear Suppliers Group (NSG), which describes itself as a group of nuclear supplier countries “that seeks to contribute to the non-proliferation of nuclear weapons through the implementation of two sets of Guidelines for nuclear exports and nuclear-related exports”, explicitly prohibits the transfer of nuclear technology by its members to countries that have not signed the nuclear Non-Proliferation Treaty (NPT).

- China joined the 48-member grouping in 2004, and argued subsequently that the Chashma 3 and Chashma 4 reactors were “grandfathered” under its earlier Chashma deals with Pakistan that pre-dated its joining of the NSG.
- Chinese analysts have now justified the continuing nuclear commerce, despite Beijing’s NSG commitments, by pointing to the India-U.S. Nuclear deal.
- There are, however, significant differences.
- For one, India and the U.S. had to seek a waiver from the NSG for their civilian nuclear deal, which was granted in 2008, paving the way for India to enter the tent of global nuclear commerce.
- That was, however, only granted after India undertook a number of

commitments such as placing facilities under International Atomic Energy Agency (IAEA) safeguards, separating civilian and military nuclear programs, and a continued moratorium on testing.

- Neither has China sought any such waiver from the NSG nor has Pakistan undertaken similar commitments. China has suggested that the reactors being under IAEA safeguards would suffice.

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