

DAILY PT POINTERS

25th November, 2023



HEADLINES OF THE DAY

The Hindu: Cyber Security, GS 3



HOME / NEWS / INDIA

RTI EXEMPTION

Central government exempts CERT-In from RTI Act

CERT-In joins a list of 26 other intelligence and security organisations established by the Central government such as the IB, the R&AW, the ED, and the NTRO that are exempt under RTI

November 24, 2023 07:46 pm | Updated November 25, 2023 07:00 am IST - New Delhi



- The Central government has added the Indian Computer Emergency Response Team (CERT-In) among a list of organisations that are exempted from the ambit of the Right to Information Act (RTI), 2005.
- There are 26 other intelligence and security organisations established by the Central government such as the **Intelligence Bureau, Research and Analysis Wing, Directorate of Enforcement, National Technical Research Organisation** that are exempt under RTI.

The Indian Computer Emergency Response Team (CERT-In)

- The CERT-In is the **national nodal agency** for responding to computer security incidents as and when they occur.
- One of its primary objectives is enhancing “security awareness among common citizens”.
- It functions under the **Ministry of Electronics and Information Technology**.

HEADLINES OF THE DAY



IE: Science and Technology, GS 3

Why a NASA spacecraft fired a laser at Earth, and why it is a big deal

ARJUN GUPTA
NEW DELHI, NOVEMBER 24

LAST WEEK, NASA's Psyche spacecraft successfully fired a laser signal at Earth from more than 16 million km away. Psyche is on its way to a metal-rich asteroid between Mars and Jupiter, studying which could provide insights into the iron core of our own planet. It will also carry out another mission that might hold the key to deep space exploration — which saw it firing a laser on November 14.

using radio waves — which have the longest wave lengths but the lowest frequencies in the electromagnetic spectrum.

However, if all other factors are equal, higher bandwidths (range of frequencies) carry more data per second, by packing data in significantly tighter waves. Thus, scientists would like to transmit data at the highest bandwidths possible. This throws up its own challenges.

Radio waves are most widely used for communication than other electromagnetic waves because of their desirable propagation properties, stemming from their large wavelengths. They can pass through the atmosphere regardless of weather, through foliage and most building materials, and bend around obstructions. Shorter wavelengths, however, tend to scatter when they face any interference.

EXPLAINED SCIENCE

Frequency in Hertz
Wavelength in metres

10⁶ Hz* 10⁹ Hz 10¹² Hz 10¹⁵ Hz 10¹⁸ Hz 10²¹ Hz

Radio Waves Microwaves Infrared Ultraviolet X-rays Gamma Waves

10² m** 10⁻³ m 10⁻⁹ m 10⁻¹² m

FM radio Mobile phone Remote Visible spectrum Nuclear power

and ground-based laser transmitter will need to point with great precision. Reaching their targets will be akin to hitting a dime from a mile away while the dime is moving," the report says. A dime is under 2 cm in diameter.

This is done by isolating the transceiver from the spacecraft's vibrations, adjusting for constantly changing positions of the craft and Earth, and with new signal-processing techniques which squeeze information out of weak laser signals.

Transforming space travel

While such technology has previously been tested in Earth-orbiting satellites, DSOC is taking it to deep space.

Why does this matter? With humanity's ambitions to travel far beyond the Moon, improving communications is crucial.

Trudy Kortes, of NASA's Space Technology Mission Directorate said: "Achieving first light is one of many critical DSOC milestones... in support of humanity's next giant leap: sending humans to Mars."

Challenge of data rates in space

Simply put, how do spacecraft transmit vast amounts of data over extremely long distances, while moving at rapid speeds?

Like wireless communications on Earth, spacecraft encode data on various bands of electromagnetic frequencies. Currently, most space communication is carried out

Communications (DSOC) experiment comes in — pioneering the use of near-infrared laser signals for communication with spacecraft. NASA says that DSOC will allow data rates at least 10 times higher than state-of-the-art radio telecommunications systems of comparable size and power, enabling transfer of larger volumes of data, including HD video streaming.

The Psyche spacecraft is the first to carry a DSOC transceiver, and will be testing high-bandwidth optical communications to Earth during the first two years of its journey. The tech demo achieved "first light" in the early hours of November 14 after this transceiver locked on to a powerful uplink laser beacon transmitted from the Optical Communications Telescope Laboratory at the NASA's Table Mountain Facility near Wrightwood, California.

But given limitations on propagation of higher bandwidths, how does this technology work? "Extremely precise pointing," says a NASA report. "The flight laser transceiver

- NASA's Psyche spacecraft, currently over 16 million kilometres away in space, successfully fired a laser signal at Earth.
- This is NASA's Deep Space Optical Communications (DSOC) experiment pioneering the use of near-infrared laser signals for communication with spacecraft.
- The DSOC experiment aims to demonstrate **data transmission rates 10 to 100 times greater** than the state-of-the-art radio frequency systems used by spacecraft today.
- Both radio and near-infrared laser communications utilize electromagnetic waves to transmit data, but near-infrared light packs the data into significantly tighter waves, enabling ground stations to receive more data.

Psyche Spacecraft

- Psyche is a NASA mission to study a metal-rich asteroid with the same name, located in the main asteroid belt between **Mars and Jupiter**.
- The mission was launched in **2023**.
- This is NASA's first mission to study an asteroid that has more metal than rock or ice.

IE: Science and Technology, GS 3 / Health, GS 2

Sickle cell breakthrough

The first therapy based on gene editing technology Crispr-Cas9 for sickle cell disease and thalassaemia has been approved in UK. The potential for India is revolutionary – however, cost is a huge deterrent currently

ANONNA DUTT
NEW DELHI, NOVEMBER 24

THE UK DRUG regulator last week approved a gene therapy for the cure of sickle cell disease and thalassaemia, seen as a landmark breakthrough by many. This is the first licensed therapy in the world based on the gene editing technology Crispr-Cas9 that earned its innovators a Nobel Prize in 2020.

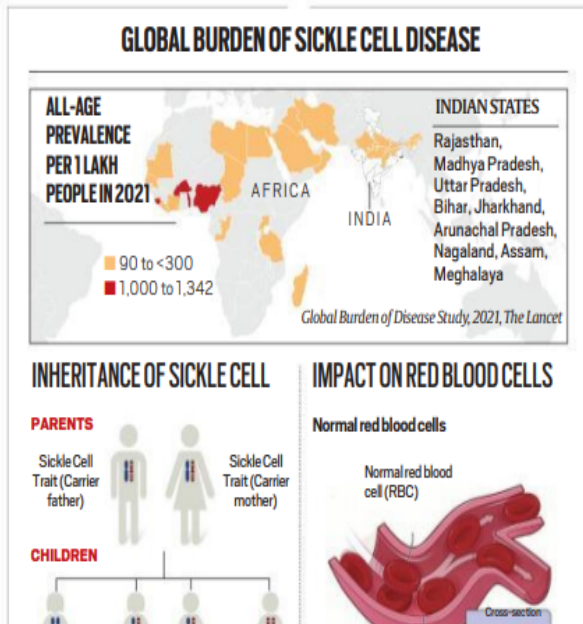
The "genetic scissors" that became available for the first time in 2012 have revolutionised the field of biotechnology.

Called Casgevy, the therapy edits the faulty gene that leads to these blood disorders, potentially curing the person for life. So far, the only permanent treatment has been a bone marrow transplant, for which a closely matched donor is needed.

How does the therapy work?

Both sickle cell disease and thalassaemia are caused by errors in the gene for haemoglobin, a protein in the red blood cells that carry oxygen to organs and tissues.

The therapy uses the patient's own blood



them, 42 were in the trial long enough for the interim analysis. 39 of the 42 patients did not need a transfusion for at least 12 months after the treatment. The need for transfusion dropped by 70% in the other three.

How is the therapy prepared and given?

Casgevy is a one-time treatment for which the doctor has to first collect blood stem cells from the bone marrow using a process called apheresis – used to filter out the blood for different components. The cells are then sent to the manufacturing site where it takes about six months for them to be edited and tested.

Before a transplant with the edited cells, the doctor gives a conditioning medicine for a few days to clear the bone marrow of other cells that will be replaced by the modified cells.

The patient has to stay in hospital for at least a month so that the edited cells take up residence in the bone marrow and start making red blood cells with normal haemoglobin.

Side effects from the treatment are similar to those associated with autologous stem cell transplants, including nausea, fatigue,

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- So far, the only permanent treatment has been a bone marrow transplant, for which a closely matched donor is needed.

How does the therapy work?

- Both sickle cell disease and thalassaemia are caused by errors in the gene for haemoglobin, a protein in the red blood cells that carry oxygen to organs and tissues.
- The therapy uses the patient's own blood stem cells, which are precisely edited using Crispr-Cas9. A gene called BCL11A, which is crucial for switching from foetal to adult haemoglobin, is targeted by the therapy.

HEADLINES OF THE DAY

Mint: Health; GS 2

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Markets Premium Money Mutual Fund Industry Companies Tech

Business News / News / India / Union Health Ministry on rising pneumonia cases in Chin...

Union Health Ministry on rising pneumonia cases in China, says 'Closely monitoring outbreak'

1 min read • 24 Nov 2023, 04:04 PM IST

Livemint , Sharmila Bhadoria

Join us



- Union Health Ministry is closely monitoring outbreak of H9N2 and clusters of respiratory illness in children in China.

What is H9N2?

- H9N2 (A/H9N2) is a subtype of the species Influenza A virus (bird flu virus).
- It is the most common subtype of influenza viruses in Chinese chickens.
- **Transmission from chicken to human:** The H9N2 influenza virus can be transmitted by air droplet, dust, feed, or water.

HEADLINES OF THE DAY

PIB: Defence; GS 3



INDIA- NEPAL JOINT MILITARY EXERCISE SURYA KIRAN

- The Nepal Army contingent arrived in India to participate in **17th edition** of Joint Military Exercise SURYA KIRAN.
- The exercise will be conducted in **Pithoragarh, Uttarakhand.**
- It is an **annual event** and conducted alternatively in the two countries.
- The aim of the exercise is to enhance interoperability in jungle warfare, counter terrorism operations in mountainous terrain and Humanitarian Assistance and Disaster Relief under United Nations Charter on peace keeping operations.

INDIA- NEPAL JOINT MILITARY EXERCISE SURYA KIRAN- XVII COMMENCES AT PITHORAGARH

Posted On: 24 NOV 2023 3:29PM by PIB Delhi

The Nepal Army contingent comprising of 334 personnel arrived in India to participate in 17th edition of Joint Military Exercise SURYA KIRAN. The exercise will be conducted in Pithoragarh, Uttarakhand from 24th November to 07th December 2023. It is an annual event and conducted alternatively in the two countries.

The Indian Army contingent comprising of 354 personnel is being led by a Battalion from the KUMAON Regiment. The Nepal Army contingent is represented by Tara Dal Battalion.

Aim of the exercise is to enhance interoperability in jungle warfare, counter terrorism operations in mountainous terrain and Humanitarian Assistance and Disaster Relief under United Nations Charter on peace keeping operations. The exercise will focus on employment of drones and counter drone measures, medical training, aviation aspects and also environment conservation. Through these activities, the troops will enhance their operational capabilities, refine their combat skills and strengthen their coordination in challenging situations.

HEADLINES OF THE DAY

PIB: Economy ; GS 3

India becomes Chair of International Sugar Organisation (ISO) for 2024 to lead global sugar sector

India pays highest cane price in the World to sugarcane farmers

Despite Record high Global Sugar Prices, India ensures the Cheapest sugar to its people

India achieves 12% ethanol blending with petrol in ESY 2022-23

Posted On: 24 NOV 2023 5:23PM by PIB Delhi

In its 63rd council meeting, International Sugar Organisation (ISO), headquartered in London, has announced India to be the Chair of the organisation for 2024. This is a huge achievement for the country to lead the global sugar sector and reflection of growing stature of the country in this domain. While attending the ISO Council Meeting, Shri Sanjeev Chopra, Secretary (Food), Government of India remarked that during its period of chairmanship of ISO in 2024, India seeks support and cooperation from all member countries and would like to focus on bringing together all member countries to adopt more sustainable practices in sugarcane cultivation, sugar and ethanol production and better utilisation of by-products.



- India becomes Chair of International Sugar Organisation (ISO) for 2024 in its 63rd council meeting.
- India has been the largest consumer and second largest producer of sugar in the world.
- With about 15% share in global sugar consumption and about 20% production of sugar, Indian sugar trends affects the global markets.

International Sugar Organisation (ISO)

- **Headquarters:** London
- It is the apex international body on sugar and relating products having about **90 countries** as members.
- It was established by the International Sugar Agreement of **1968**.

HEADLINES OF THE DAY

PIB: History ; GS 1

Prime Minister pays homage to courage of Lachit Borphukan on Lachit Diwas

Posted On: 24 NOV 2023 5:35PM by PIB Delhi

The Prime Minister, Shri Narendra Modi has paid tributes to Lachit Borphukan on Lachit Diwas.

Shri Modi said today, on Lachit Diwas, we commemorate the courage of Lachit Borphukan. His exceptional leadership in the Battle of Saraighat epitomizes resilience and commitment to duty. His legacy is a timeless testament to the valour and strategic brilliance that have shaped our history.



- The Prime Minister, Shri Narendra Modi has paid tributes to Lachit Borphukan on Lachit Diwas.

Lachit Borphukan

- Lachit Borphukan was born on 24 November 1622 at Charaideo in Assam.
- Lachit was a brilliant military commander in **Ahom kingdom. He** excelled in the art of **Guerrilla Warfare.**
- He led two battles **against** an alien **Mughal army;**
 - i. **Battle of Alaboi in 1669**
 - ii. **Naval battle in Saraighat in 1671**

Ahom kingdom

- The Ahom kings ruled large parts of what is now known as Assam for nearly 600 years, from the early 13th century to the early 19th century.
- This was a prosperous, multi-ethnic kingdom which spread across the upper and lower reaches of the Brahmaputra valley, surviving on rice cultivation in its fertile lands.