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Hybrid Immunity

A recent study by The Lancet Infectious Diseases held that "hybrid immunity" provides better protection against severe Covid-19.

- The study said that a hybrid immunity offers a "higher magnitude and durability" of protection as compared to infection alone, emphasising the need for vaccination.
- Hybrid immunity is gained from a previous infection plus vaccines, either the primary doses or both primary and booster doses.
- A natural infection after vaccination acts like a booster and offers hybrid immunity.
- This infection provides better protection than vaccines alone because it prepares the body against the entire virus, rather than say just the spike protein.
- Individuals with hybrid immunity may be able to extend the period before booster vaccinations compared to individuals who have never been infected.

> *Herd immunity is a kind of protection that a population gets when it becomes immune to an infection, be it through previous infections or vaccination, and thus the likelihood of infection for individuals who lack immunity gets reduced.*

References

1. The Hindu - Hybrid immunity offers more protection
2. IE - 'Hybrid immunity' most effective against severe COVID

Immune Imprinting

Studies find that 'immune imprinting' might be might be making bivalent boosters less effective.

- Immune imprinting is a tendency of the body to repeat its immune response when it comes across a newer or slightly different variant of the same pathogen.
- The immune response of the body is based on the first variant it encountered through infection or vaccination.
- The phenomenon was first observed in 1947, when scientists noted that in flu patients and termed as '***original antigenic sin***'.
- People who had previously had flu, and were then vaccinated against the current circulating strain, produced antibodies against the first strain they had encountered.
- **Role -** Imprinting acts as a database for the immune system, helping it put up a better response to repeat infections.
- After our body is exposed to a virus for the first time, it produces memory B cells that

circulate in the bloodstream and quickly produce antibodies whenever the same strain of the virus infects again.

- **Issue -** The immune system rather than generating new B cells, activates memory B cells, when a similar, not identical, variant of the virus is encountered by the body.
- The memory B cells in turn produce antibodies that bind to features found in both the old and new strains, known as ***cross-reactive antibodies.***
- These cross-reactive antibodies do offer some protection but aren't as effective as the ones produced by the B cells.

References

1. IE - What is 'Immune imprinting' and how does it work?

Transfat

A new status report from the World Health Organisation (WHO) has found that 5 billion people globally remain unprotected from harmful trans-fat.

- Trans-fats or trans-fatty acids (TFA), are a form of unsaturated fat.
- TFA occurs in both natural and artificial forms.
- Naturally-occurring trans-fat come from ruminants (cows and sheep).
- Industrially produced trans-fat (also called industrially produced trans-fatty acids) by hydrogenation of vegetable oils to make them more solid.
- It is commonly found in packaged foods, baked goods, cooking oils and spreads.
- It is done to increase shelf life of food items and for use as an adulterant as they are cheap.
- **Health Impacts -** Increases the risk of heart disease and death.
- Trans-fats are responsible for up to 500 000 premature deaths from coronary heart disease each year globally.
- **WHO on TFA -** In 2018, WHO called for the global elimination of industrially produced trans-fat by 2023.
- WHO established specific criteria to follow 'Best-practices' in trans-fat elimination policies and limit industrially produced trans-fat in all settings.
- There are 2 best-practice policy alternatives:
    1. Mandatory national limit of 2 grams of industrially produced trans-fat per 100 grams of total fat in all foods.
    2. Mandatory national ban on the production or use of partially hydrogenated oils (a major source of trans-fat) as an ingredient in all foods.
- India is among the top implementers in the middle-income countries category.
- **India and TFA -** Food Safety and Standards Authority of India (FSSAI) monitors Trans Fatty Acids (TFAs) in food products.
- FSSAI has capped the amount of TFA in food products to 2% from 2022.

References

1. IE - WHO: 5 billion people are still unprotected from trans-fats

Green Comet - C/2022 E3 (ZTF)

The 'Green comet' named Comet C/2022 E3 (ZTF) is appearing close to Earth after 50,000 years.

- The Comet was first discovered in March 2022 by the wide-field survey camera at the Zwicky Transient Facility (ZTF) in the US.
- The comet was named as C/2022 E3 (ZTF) after the Zwicky Transient Facility (ZTF), which first discovered it.
- After approaching the sun in the middle of January, it is now moving away from it, along its own orbit.
- The Comet is appearing close to Earth and now visible in several parts of the world.
- The comet was calculated to orbit the sun every 50,000 years and comes from the Oort cloud.The Oort cloud in the edge of our solar system is called as "Home of the Comets".

  The Oort cloud is a big spherical region of outer space enveloping our sun, consisting of innumerable small objects, such as comets and asteroids.

- Comets are frozen rocky or gas-filled objects that are remnants of the formation of the solar system.
- Due to their composition, characteristics and the path they move in, they tend to leave a light "behind them".
- **Green Colour of the Comet** - In the 'Green comet', the head of the comet itself is green and emits a whitish light behind it (often called the tail of the comet).
- It gets its beautiful green glow from diatomic carbon (pairs of carbon atoms that are bound together) that is present in the comet's head.
- When the ultraviolet rays of solar radiation fall on the comet, these molecules emit green light.

  The last time the green comet tore past earth was in the time of the Neanderthals.

References

1. IE - What is 'Green Comet' and when can you see it?
2. India Today - Rare green comet reaches Earth

TROPEX - 23

The Indian Navy is carrying out the 2023 edition of Theatre Level Operational Readiness Exercise (TROPEX).

- The Theatre Level Operational Readiness Exercise (TROPEX) is biennial inter-service military exercise in the Indian Ocean Region.
- TROPEX-23 is being conducted over a duration of 3 months with participation of Indian Navy, Indian Army, Indian Air Force and Coast Guard assets.
- TROPEX is aimed at 'validating and refining' the Navy's concept of 'operations' as well as to test overall combat capabilities.
- Involves almost all of its operational assets such as warships, submarines and aircraft to check the force's combat readiness in the region.
- The inter-service military exercise will further strengthen interoperability and joint operations in a complex environment.
- The exercise provides an opportunity to test the combat readiness of the combined fleets of the Indian Navy.

The Navy also conducted the biennial tri-services amphibious exercise (AMPHEX) 2023 at Kakinada in Andhra Pradesh which focussed on joint training of elements of all 3 services in various facets of amphibious operations to enhance interoperability and synergy.

References

1. PIB - Tropex-23 Indian Navy's Largest War Game
2. The Hindu - Indian Navy's TROPEX-23 in Indian Ocean Region

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