The superiority of hybrid immunity

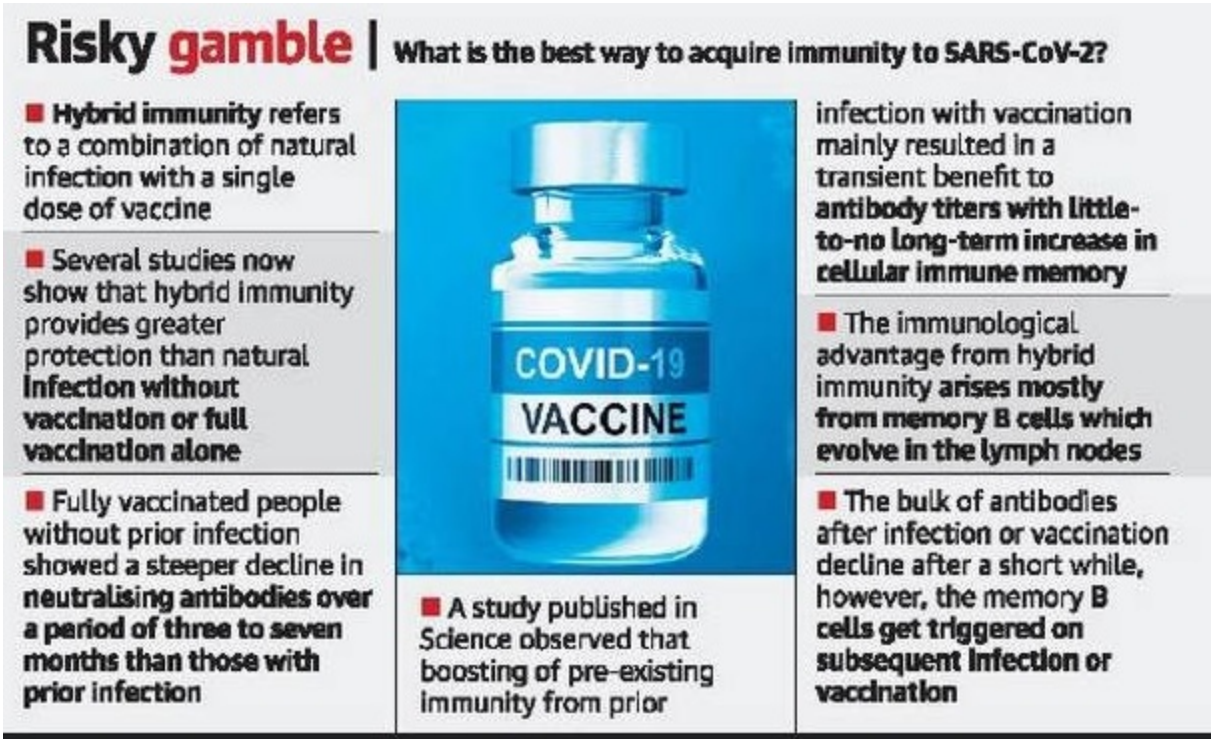
(Mains GS 3 : Science and Technology-Recent developments and their applications and effects in everyday life)

Context:

> Recent studies have shown that a combination of natural infection with a single dose of vaccine provides greater immunity than either natural infection without vaccination or full vaccination in infection-naïve individuals.

Durable antibody:

- Hybrid immunity is natural immunity developed from an infection combined with the immunity provided by the vaccine.
- Hybrid immunity results in stronger protection than just infection or vaccination alone.
- Antibody levels are variable after recovering from infections, and those at the lower end of the spectrum might be more susceptible to reinfections.
- But after a single vaccine in people who have recovered from Covid-19, antibodies skyrocket up, including those that neutralize variants of concern.”



Protection against potential variants:

- In a study posted to the preprint server BioRxiv, researchers at Rockefeller University in New York City looked at how different types of immunity would protect against potential variants.
- To do so, they designed a modified version of the coronavirus spike protein with 20 naturally occurring mutations to test how antibodies would work against it.
- These modified spike proteins were tested in lab dishes against antibodies from people who had recovered from Covid-19, from those who had been vaccinated and from those who had hybrid immunity.
- The spike proteins were able to evade the antibodies from the first two groups, but not antibodies from people with hybrid immunity.

Neutralising antibodies

- The study also found that in 500 health-care workers, the neutralising antibodies were twofold more in people immunised with Pfizer vaccine following natural infection compared with people immunised with Pfizer vaccine but without prior infection.
- In the case of people vaccinated with AstraZeneca following natural infection, the neutralising antibodies were threefold more than in vaccinated people with no prior infection.

Contrary point

- A study published recently in the journal *Science* observed that “boosting of pre-existing immunity from prior infection with vaccination mainly resulted in a transient benefit to antibody titers with little-to-no long-term increase in cellular immune memory”.
- There is a growing body of evidence that protection from natural immunity can be potent, and researchers are beginning to acknowledge this.
- However, scientific consensus about the exact strength or durability of the natural immunity post natural infection is not known.
- Also, the strength and durability of natural immunity might not be uniform and might vary between people depending on the nature and duration of infection (asymptomatic or symptomatic) and severity of disease (mild, moderate or severe).

Immunological advantage:

- The immunological advantage from hybrid immunity arises mostly from memory B cells.
- While the bulk of antibodies after infection or vaccination decline after a short while, the memory B cells, which evolve in the lymph nodes, get triggered on subsequent infection or vaccination.
- So when people who recovered from COVID-19 are re-exposed to the spike protein, the memory B cells are capable of churning out highly potent antibodies.
- According to *Nature,* unlike after vaccination, the memory B cells formed after natural infection are more likely to make antibodies that block immune-evading variants.
- But studies have also found that memory B cells in the fully vaccinated people without prior infection are growing in number and gaining mutations up to 12 weeks after the second dose, which allows the B cells to recognise and neutralise variants.

Conclusion:

People who put off getting vaccinated because they’ve already been infected with the coronavirus need to vaccinate for hybrid immunity as evidence suggests that vaccination plus natural immunity leads to particularly robust protection, including against variants of the virus.