

'Gain of function' research

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In news- 'Gain of function' research came to light with the re-emergence of the lab-leak origin theory for the SARS-CoV-2.

About gain of function research-

- It involves **deliberately altering an organism in the lab, altering a gene**, or introducing a mutation in a pathogen to study its transmissibility, virulence and immunogenicity.
- It is believed that this allows researchers to **study potential therapies, vaccine possibilities** and ways to control the disease better in future.
- This research involves manipulations that make certain pathogenic microbes more deadly or more transmissible.
- This is done by genetically engineering the virus and by allowing them to grow in different growth mediums, a technique called **serial passage**.
- **The Wuhan Institute of Virology was said to have conducted gain-of-function research** on coronaviruses.
- The gain-of-function studies, which **enhance viral yield and immunogenicity**, are required for vaccine development.
- Some forms of gain-of-function research reportedly carry inherent biosafety and biosecurity risks and are thus referred to as **'dual-use research of concern (DURC)'**.
- This indicates that while the research may result in benefits for humanity, there is also the potential to cause harm accidental or deliberate escape of these altered pathogens from labs may even cause pandemics.
- In India, all activities related to genetically engineered organisms or cells and hazardous microorganisms and products are regulated as per the Manufacture, Use, Import, Export and Storage of

Hazardous Microorganisms/ **Genetically Engineered Organisms or Cells Rules, 1989.**

- In 2020, the Department of Biotechnology issued guidelines for the **establishment of containment facilities, called 'Biosafety labs'**, at levels two and three.

What is loss of function research?

- It involves inactivating mutations, resulting in a significant loss of original function, or no function to the pathogen.
- When mutations occur, they alter the structure of the virus that is being studied, resulting in altered functions.
- Some of these significant mutations might weaken the virus or enhance its function.