What is genome sequencing?

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In news

The Ministry of Health & Family welfare asked state governments to send the samples of the passengers who tested positive(for SARS-CoV-2) on arrival from the UK to the National Institute of Virology (NIV), Pune or any other appropriate lab for genome sequencing study.

What is genome sequencing?

- Genome sequencing is **figuring out the order of DNA nucleotides, or bases, in a genome the order of Adenine(A), thymine(T), cytosine(C,) & guanine(G) that make up an organism's DNA.**
- Whole Genome sequencing is ostensibly the process of determining the complete DNA sequence of an organism's genome at a single time.
- This entails sequencing all of an organism's chromosomal DNA as well as DNA contained in the mitochondria and, for plants, in the chloroplast

What is a genome?

- Genome is a complete set of DNA of an organism including all its genes. Each **genome** contains all of the information needed to build that organism and allow it to grow and develop.
- All information necessary to construct and maintain that organism is contained in each genome.
- The human genome is made up of over 3 billion of these genetic letters.

The methodology of genome sequencing

There are two main types of DNA sequencing.

- **Sanger method:** The classical chain termination method is also called the Sanger method. is a **method** for determining the nucleotide sequence of DNA. The **method** was developed by two time Nobel Laureate Frederick **Sanger** and his colleagues in 1977, hence the name the **Sanger** Sequence.
- **High-Throughput Sequencing:** Newer methods that can process a large number of DNA molecules quickly are collectively called High-Throughput Sequencing (HTS) techniques or Next-Generation Sequencing (NGS) methods.

Cells used for sequencing

- Almost any biological sample containing a full copy of the DNA, even a very small amount of DNA or ancient DNA can provide the genetic material necessary for full genome sequencing.
- Such samples may include saliva, epithelial cells, bone marrow, hair (as long as the hair contains a hair follicle), seeds, plant leaves, or anything else that has DNA-containing cells.

Uses of genome sequencing

- The sequence tells scientists the kind of genetic information that is carried in a particular DNA segment.
- For example, scientists can use sequence information to determine which stretches of DNA contain genes and which stretches carry regulatory instructions, turning genes on or off.
- It will help to map the demographic composition and help to measure the distribution of different traits or diseases across the country.
- Assists in mapping genetic traits in population and genetics.
- Recently government of India advised the state governments to send samples of passengers who tested

positive on arrival from the UK to the National Institute of Virology (NIV), Pune for genome sequencing

- The genome sequencing study would determine if the COVID patients are carrying the existing strain of SARS-CoV-2 or the mutant strain which was discovered in the UK’s population.