India’s First Tribal Genome Sequencing Project

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Why in News?

Gujarat has launched **India’s first Tribal Genome Sequencing Project** to map the **genetic profile of tribal populations**.

Gujarat’s Tribal Genome Sequencing Project

- **Aim:** It aims to identify **genetic health risks** like **Sickle Cell Disease, Thalassemia** and **provide precision healthcare** tailored to the needs of tribal populations**.**
  - It seeks to bridge the gap between **scientific advancements and tribal traditions,** fostering a healthier future for these communities.
- **Implementation**: Managed by the **Gujarat Biotechnology Research Centre (GBRC**).
- **Scope**: The genomes of 2,000 individuals from tribal communities across 17 districts will be sequenced.

Genome Sequencing

- **About:** It is the process of **determining the exact order of nucleotide bases (A, C, G, T)** in an individual’s DNA.
  - It reveals a person's genetic makeup, providing insights into traits, health risks, and potential disorders.
- **Types**:
  - **Whole Genome Sequencing (WGS)** maps the entire DNA sequence for comprehensive genetic information.
  - **Partial Genome Sequencing** focuses on specific genome parts.
  - **Targeted Gene Sequencing** sequences specific genes.
- **Applications:**
  - Helps identify **disease-causing mutations**, understand the **genetic basis of diseases**, and discover **new drug targets**.
  - Enables **personalised medicine** by predicting individual responses to drugs, allowing for **optimized drug selection**.
  - Used in crop improvement to identify genes linked to **disease resistance, high yield**, and **better nutrition**, aiding the development of **improved crop varieties**.

Difference Between Gene Editing and Gene Sequencing:

Characteristics	Gene Sequencing	Gene Editing
Definition	The process of determining the precise order of nucleotides (A, T, C, G) in a DNA or RNA molecule.	The process of making targeted modifications to the DNA sequence of a gene or genes.
Purpose	To obtain the complete or partial sequence of a gene, a set of genes, or an entire genome.	To introduce desired changes, such as correcting genetic defects, modifying gene expression, or introducing new genetic traits.
Techniques	Sanger sequencing, Next-Generation Sequencing (NGS), and others.	CRISPR-Cas9, zinc finger nucleases, TALENs, and other specialised tools.
Outcome	Provides information about the genetic makeup and composition of an organism.	Allows for the direct manipulation and alteration of the genetic code.
Modification	Does not directly modify the genetic material.	Enables the addition, removal, or alteration of specific DNA sequences.

Read more: **Genome India Project**