Genome India Project

Why in News?

The Government of India has cleared a gene-mapping project called “Genome India” recently.

What is a genome?

- A genome is defined as an organism’s complete set of Deoxyribose Nucleic Acid (DNA), including all of its genes.
- Each genome contains all of the information needed to build and maintain that organism.
- In humans, a copy of the entire genome — more than 3 billion DNA base pairs — is contained in all cells that have a nucleus.
- The discovery that DNA is structured as a “double helix” was the spark in the long, continuing quest for understanding how genes dictate life.

Hasn’t the human genome been mapped before?

- The Human Genome Project (HGP) was an international programme that began in 1990 and completed in 2003.
- It led to the decoding of the entire human genome by sequencing and mapping all of the genes of humans.
- The HGP gave us the ability, for the first time, to read nature’s complete genetic blueprint for building a human being.

What then is the ‘Genome India’ Project?

- **Aim** - To build a grid of the Indian “reference genome”, to understand fully the type and nature of diseases and traits that comprise the diverse Indian population.
- This is spearheaded by the Centre for Brain Research at Bengaluru-based Indian Institute of Science as the nodal point of about 20 institutions.
- Each of these institutions will do their bit in collecting samples, doing the computations, and then the research.

So, what will the project broadly do?

- It hopes to form a grid after collecting 10,000 samples in the first phase from

across India, to arrive at a representative Indian genome.
- Most genomes have been sourced from urban middle-class persons and are not really seen as representative.
- Over 95% of the genome samples available, which are the basis of new, cutting-edge research in medicine and pharmacology, use the Caucasian genome as the base.
- So, this Indian genome project is seen as a necessity.
- The Indian project will aim to vastly add to the available information on the human species and advance the cause, both because of the scale of the Indian population and the diversity here.

Who is an Indian?

- The Indian subcontinent has been the site of huge migrations.
- **Horizontal diversity** - Scientists associated with the project, recognise that the first migrations were from Africa.
- Later too, there were periodic migrations by various populations, making this a special case of almost all races and types intermingling genetically. This can be seen as "horizontal diversity".
- **Vertical diversity** - Later, there has been endogamy or inter-marriage practised among distinct groups resulting in some traits inherited by just some groups. This can be seen as "vertical diversity".
- Studying and understanding both diversities would provide the bedrock of personalised healthcare for a very large group of persons on the planet.

What are the challenges involved?

- **Medical Ethics** - In a project that aims only to create a database of genetic information, gene modification is not among the stated objectives.
- It is important to note, however, that this has been a very fraught subject globally.
- The lure to "intervene" may be much more if this kind of knowledge is available, without one being fully aware of the attendant risks.
- **Data & storage** - After collection of the sample, anonymity of the data and questions of its possible use and misuse would need to be addressed.
- Keeping the data on a cloud is fraught with problems and would raise questions of ownership of the data.
- India is yet to pass a Data Privacy Bill with adequate safeguards.
- So, launching a Genome India Project before the privacy question is settled could give rise to another set of problems.
- **Social issues** - Scientific studies of genes and classifying them could reinforce stereotypes and allow for politics and history to acquire a racial twist.

- In India, a lot of politics is now on the lines of who are indigenous people and who are not.
- So, this Project could add a genetic dimension to the cauldron.

Source: The Indian Express

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