IndiGen Project

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Context: The Council of Scientific and Industrial Research (CSIR) has launched an ambitious project, IndiGen, to sequence whole genomes of diverse ethnic Indian populations to develop public health technology applications.

- CSIR first sequenced an Indian genome in 2009, only now it has been able to scale up whole-genome sequencing and offer them to the public.
- The driving motive of the project is to understand the extent of genetic variation in Indians, and learn why some genes linked to certain diseases based on publications in international literature doesn't always translate into disease.
- Under "IndiGen", the CSIR drafted about 1,000 youth from a pool of about 5,000 and included representatives from every State and diverse ethnicities.
- Every person whose genomes are sequenced would be given a report.
- The participants would be informed if they carry gene variants that make them less responsive to certain classes of medicines.
- The project involved the Hyderabad-based Centre for Cellular and Molecular Biology (CCMB), the CSIR-Institute of Genomics and Integrative Biology (IGIB)
- The project ties in with a much larger programme Genome India project

Genome India Project

- It is funded by the Department of Biotechnology (DBT) to sequence at least 10,000 Indian genomes.
- The project will aim to make predictive diagnostic markers available for some priority diseases such as cancer and other rare and genetic disorders.

Gene Sequencing?

- A genome is the DNA or sequence of genes in a cell.
- Most of the DNA is in the nucleus and intricately coiled into a structure called the chromosome.
- Every human cell contains a pair of chromosomes, each of which has three billion base pairs or one of four molecules that pair in precise ways
- The order of base pairs and varying lengths of these sequences constitute the “genes”.
- Sequencing a genome means deciphering the exact order of base pairs in an individual.
- It has been known that the portion of the genes responsible for making proteins called the exome occupies about 1% of the actual gene.
- The genome has to be mapped in its entirety to know which genes of a person’s DNA are “mutated”.

Prospects of Gene Sequencing:

- Determining unique genetic traits, susceptibility and resilience to diseases.
- For new advancements in medical science like predictive diagnosis and precision medicine, genomic information is the backbone.
- The technique has allowed drug makers to come up with medicines that work on a select group of individuals based on similar genetic makeup, as against generic drugs used with little success so far.
- With the help of DNA sequencing, healthcare practitioners are using the new technique called cancer immunotherapy to treat cancer where the patient’s genes are altered to help his or her immune system fight cancer cells.
- The common early onset disorders with “complex” inheritance like asthma, type-1 diabetes mellitus, and the epilepsies and behavioural phenotypes of autism and attention deficit hyperactivity disorder can be

understood.

Issues with gene sequencing:

- Synthetic human genome could be created which will be against the law of nature.
- Morality of eugenics, which is the theory and practice of improving the genetic quality of the human population.
- Danger of genetic misuse.
- Biosafety and biosecurity concerns related to the implications of technology.
- Selection of genes for specific traits might change the dynamics of genes and alter the ecological balance.
- Agencies that fund large genomic initiatives have tended to treat the data these projects produce as a community resource to be made publicly available before thorough analysis by the consortia that generate them which violates privacy.
- The inability to anticipate the types of benefits and risks associated with future research using donated biological materials raises major ethical worries.
- By its very nature, a fully or partially sequenced individual genome can reveal information about genetically based or -contributed characteristics that is unknown to the participant.
- Where targeted populations comprise organized cultural entities like different tribes consultation demonstrates respect for the moral authority of those communities. Community consultation or engagement, however, should not be mistaken for community consent nor does every medical-sequencing project or every population warrant advance consultation.

Other

- The UK was the first to launch a program called Genomics England which aims to sequence up to 100,000 whole

genomes from patients with rare diseases, their families, and cancer patients.

- The non-profit consortium GenomeAsia 100K decided to generate genomic data for Asian populations. Supporters of the initiative include genomics companies Macrogen in Korea and MedGenome in India, as well as Illumina.