

'Svatva' : Celebration of Genome India Project

Every human being is composed of millions of cells. Within the core of each cell lies the individual's genetic makeup, stored in the form of DNA sequences organized into 23 pairs of chromosomes. This genetic code, made up of unique sequences of adenine (A), thymine (T), guanine (G), and cytosine (C), represents the distinct identity of each person. The technique known as 'DNA sequencing' allows us to determine the order of these nucleotides. Today, the time and cost required for DNA sequencing have significantly reduced. Interestingly, there is only a 1% difference in the DNA of humans and chimpanzees, while the genetic difference between two humans is just 0.1%, which defines individual traits.

In 1990, Western countries launched the 'Human Genome Project' to map the complete human genetic code. The findings were published in 2003, covering 92% of the human genome, including both protein-coding and non-coding DNA sequences. Due to technological limitations, the remaining 8% of the genome was decoded and published in 2022. This international project primarily focused on the genes of Western populations, with objectives including the identification of genetic causes for diseases, developing genetic treatments, and understanding human diversity. During the study, over 250 cancer-related genes were identified, enabling early detection and improved treatment.

Following this model, the Department of Biotechnology, Government of India, initiated the ambitious 'GenomeIndia Project' in 2020. By February 2024, the genetic sequencing of 10,074 individuals across 99 ethnic groups was completed. Within five years, the project achieved a significant milestone by mapping the genome of ten thousand Indian citizens. The Honorable Prime Minister officially announced this achievement on January 9, 2025, marking a proud moment for India. This success is attributed to the contributions of numerous researchers and research institutions. Over 19,000 blood samples were collected and stored in the 'GenomeIndia Biobank,' with all data archived at the 'Indian Biological Data Center' (IBDC).

While government spending on physical infrastructure is easily visible, investments in research take longer to yield results. The GenomeIndia Project, funded by the Ministry of Science and Technology, has identified over 13.5 crore (135 million) genetic variations. This project highlights the unique genetic diversity of the Indian population and may facilitate advanced treatments for genetic and infectious diseases prevalent in specific communities. It is expected to revolutionize research on genetic disorders, leading to India-specific solutions and transformative advancements in medical diagnostics, genetics, and healthcare.

To raise public awareness about this groundbreaking project, a unique initiative titled 'Svatva: Celebrating the GenomeIndia Project' was organized from February 25 to 28, 2025, by the Departments of Biotechnology and Microbiology of B.N. Bandodkar Autonomous College, in

collaboration with the College of Engineering. This event was held on the Thane college campus to commemorate National Science Day.

The inaugural ceremony took place on February 25, 2025, at the Thane campus, conceptualized by VPM trustee Dr. Mahesh Bedekar. In his inaugural address, Dr. Bedekar explained the immediate impact of the GenomeIndia Project on the Indian healthcare system with practical examples. Dr. Vinda Manjarmakar, Principal of B.N. Bandodkar College of Science, elaborated on the project's significance for the general public. An online keynote address was delivered by Professor Thangaraj, Coordinator of GenomeIndia and a scientist from the Center for Cellular and Molecular Biology, on 'Population Genomics and Public Health.' He detailed the project's importance in tracing the origins of Indian ancestry and prenatal diagnosis of genetic diseases.

Following this, Dr. Puneet Prasad, a scientist from the Institute of Life Sciences, Bhubaneswar, Odisha, delivered an online lecture on 'A Paradigm Shift in Indian Genomics: India's Genome Project.' He covered fundamental concepts like gene expression, the influence of the epigenome, and the role of artificial intelligence in the project.

After the inauguration, Dr. Mahesh Bedekar visited the GenomeIndia exhibition. Various topics, including DNA, genes, genetic diseases, their impact, diagnosis, and preventive measures, were presented through posters, models, street plays, and science games. Students from the Departments of Biotechnology and Microbiology, along with the College of Engineering, created engaging models and interactive games like Snakes and Ladders to convey the significance of genetic screening and diagnosis. Posters depicted the Human Genome Project, the GenomeIndia Project, associated institutions and scientists, methodologies, and their benefits and limitations. A book exhibition on genetics and genomics was also arranged, and a government-produced documentary on the project was screened. Guests received commemorative bookmarks as a souvenir.

The event was guided by Dr. Vinda Manjarmakar (Principal, B.N. Bandodkar College of Science), Dr. Naik (Principal, College of Engineering), Dr. Kalpita Mule and Dr. Jayashree Pawar (Coordinators), and faculty members including Prof. Purvi Shah, Prof. Sayali Daftardar, Dr. Ashwini Tilak, Prof. Vaishali Joshi, and Prof. Suhasini Shukla. Open to the public on February 27 and 28, 2025, from 9 a.m. to 5 p.m., the exhibition attracted enthusiastic participation from school and college students as well as the general public of Thane.

The closing ceremony took place on February 28, 2025, at 2 p.m. in the Patanjali Auditorium of Bandodkar College. It began with the national anthem and a documentary summarizing the GenomeIndia Project's objectives and achievements. Dr. Jayashree Pawar outlined the vision behind the Swatva event. Dr. Archana Krishnan, Director of BioGenomics, a leading Indian biopharmaceutical company, delivered the closing speech. She illustrated how the project could

revolutionize treatments, from organ transplants to insulin production. Dr. Kalpita Mule concluded the event with a vote of thanks. Both the inauguration and the closing ceremonies were broadcast live on YouTube.

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Activity Report: SVATV – Celebrating the Success of the GenomeIndia Project

Every human is a mosaic of genetic information encoded within 23 pairs of chromosomes. This genetic blueprint determines our unique traits through sequences of adenine (A), thymine (T), guanine (G), and cytosine (C). Understanding these sequences through DNA sequencing has revolutionized biological sciences, enabling insights into genetic diseases, human evolution, and personalized medicine.

Inspired by the global Human Genome Project, the Government of India launched the GenomeIndia Project in 2020. By February 2024, the project successfully mapped the genomes of 10,074 individuals across 99 ethnic groups. This milestone, celebrated nationwide, was formally announced by the Honorable Prime Minister on January 9, 2025. The project has identified over 135 million genetic variations, fostering groundbreaking advancements in healthcare, including early disease diagnosis and personalized treatments tailored to the Indian population.

Recognizing the importance of public awareness about this scientific achievement, the Department of Biotechnology and Microbiology, VPM's B.N. Bandodkar College of Science (Autonomous), in collaboration with the VPM's College of Engineering, organized "SVATV: Celebrating the Success of the GenomeIndia Project" from February 25th to 28th, 2025. This initiative aimed to bridge the gap between complex genomic research and public understanding, commemorating National Science Day and highlighting the transformative potential of genomic science.

The event commenced on February 25, 2025, at the Thane campus, with a distinguished gathering of scientists, educators, and students. The inaugural session opened with the National Anthem featuring significant contributions of Indian scientists to the Genome India Project. This was followed by the video showing glimpses of the Svatv exhibition. Dr. Jayashree Pawar introduced the vision behind the Svatv initiative, emphasizing its goal to make cutting-edge genomic research accessible to the public. The ceremony was conceptualized by Dr. Mahesh Bedekar, a VPM trustee, who delivered an insightful address outlining the immediate impact of the GenomeIndia Project on the Indian healthcare system.

Dr. Vinda Manjramkar, Principal of B.N. Bandodkar College of Science, emphasized the significance of the GenomeIndia Project for public welfare and the future of precision medicine. An online keynote address was delivered by Dr. K. Thangaraj, National Coordinator, GenomeIndia; and a leading scientist from the Centre for Cellular and Molecular Biology, on 'Population Genomics and Public Health.' He elaborated on how genomic data aids in tracing Indian ancestry and the early diagnosis of genetic diseases.

Following this, Dr. Puneet Prasad from the Institute of Life Sciences, Bhubaneswar, delivered an online lecture on 'A Paradigm Shift in Indian Genomics: India's Genome Project.' He explained

core genomic concepts, including gene expression, the influence of the epigenome, and the integration of artificial intelligence in genomic analysis.

After the inauguration, guests visited the interactive GenomeIndia exhibition. The exhibition showcased posters, models, street plays, and scientific games, curated by students from the Departments of Biotechnology, Microbiology, and the College of Engineering. Themes included:

- Understanding DNA structure and functions.
- Genetic diseases: causes, diagnosis, and prevention.
- The evolution of genomics: From the Human Genome Project to GenomeIndia.

Notably, the students designed interactive science games like Snakes and Ladders, demonstrating how genetic screening influences health outcomes. A book exhibition featuring works on genetics and genomics and a documentary on the GenomeIndia Project produced by the Government of India were also part of the display. Attendees received commemorative bookmarks as a token of the event.

The exhibition, open to the public on February 27 and 28, 2025, attracted enthusiastic participation from school and college students, educators, and local communities. The off-campus street plays were particularly impactful, raising awareness of genetic health and ethical concerns surrounding genomics.

Valedictory Session: The event concluded on February 28, 2025, with a grand Valedictory Ceremony held at the Patanjali Auditorium of Bandodkar College. The session began with the National Anthem. Dr. Jayashree Pawar reflected on the vision behind SVATV and acknowledged the collective efforts that made the event a success. The valedictory speech was delivered by Dr. Archana Krishnan, Director of BioGenomics, a pioneering Indian biopharmaceutical company. She highlighted how the GenomeIndia Project could revolutionize treatments in organ transplants, insulin production, and precision medicine. Her speech inspired students to pursue further research and contribute to scientific progress.

The event concluded with a Vote of Thanks by Dr. Kalpita Mule, expressing gratitude to the organizers, participants, and supporting institutions. Both the inauguration and valedictory sessions were streamed live on YouTube, reaching a broader audience beyond the campus.

SVATV: Celebrating the Success of the GenomeIndia Project successfully achieved its objective of promoting scientific literacy and public engagement with cutting-edge genomics research. Through interactive exhibits, insightful lectures, and community-driven outreach, the event bridged the gap between scientific innovation and societal awareness.

The event not only celebrated a significant scientific achievement but also fostered a spirit of inquiry and collaboration. As the GenomeIndia Project continues to evolve, initiatives like

SVATV will play a crucial role in encouraging future generations to explore the exciting possibilities of genomics and its transformative impact on society.