

1. **SHOX Gene** : Recently, a study has provided fresh insights into the long-standing height difference between men and women, revealing that men are, on average, about 5 inches taller.
 - While hormones and environmental factors have traditionally been considered contributors, researchers have now identified a specific genetic component—the SHOX gene—as playing a significant role in this disparity.
 - **Key Findings:** The SHOX gene, known to be associated with height, is found on both the **X and Y chromosomes**—the sex chromosomes that determine biological gender.
 - **Genetic Distribution:** Females have two X chromosomes, each carrying the SHOX gene, while males have one X and one Y chromosome, both containing active copies of the gene.
 - **Chromosomal Influence on Height:** Researchers studied over **1,225 individuals** with atypical sex chromosome configurations (like extra or missing X/Y chromosomes), sourced from **three major biobanks** in the US and UK.
 - **Key Discovery:** Individuals with an extra Y chromosome were generally taller than those with an extra X chromosome. This indicates that the SHOX gene on the Y chromosome has a stronger influence on height than the version on the X chromosome.
 - **Gene Activity Levels:** In females, one X chromosome is mostly inactivated, but the SHOX gene largely escapes this silencing. However, males still have a higher active SHOX dosage from both X and Y chromosomes, contributing to their taller height.
 - **Impact on Average Height Difference:** The heightened SHOX expression in males accounts for **nearly 25% of the average height gap** between men and women. The rest is attributed to male sex hormones and other genetic factors.
2. **Study of Toxicity of Air Pollution:** Recently, a pioneering long-term study by researchers at Kolkata's Bose Institute revealed that simply measuring the concentration of air pollutants like PM2.5 is insufficient.
 - The study emphasizes that the toxicity, or the potential harm these pollutants cause to the human body, must also be factored into air quality assessments.
 - **Key Highlights:** The study found that in Kolkata, the toxicity of PM2.5 pollutants increases sharply once concentrations exceed $70 \mu\text{g}/\text{m}^3$, continuing up to around $130 \mu\text{g}/\text{m}^3$, after which the damage potential levels off.

- This is the first study in India to examine how the oxidative toxicity of PM_{2.5} varies with its concentration.
 - The human body responds to air pollutants by producing Reactive Oxygen Species (ROS), which, in excess, can harm healthy cells.
 - Antioxidants counter ROS, but their limited supply means high pollutant levels can overwhelm the body, causing oxidative stress and cell damage.
 - Pollution below 70 $\mu\text{g}/\text{m}^3$ affects health, but toxicity—and health risk—increases sharply beyond this threshold.
 - Toxicity is influenced more by the chemical composition of pollutants, especially from biomass and solid waste burning, than by particle volume.
 - Vehicular emissions also contribute to toxicity but are less harmful than emissions from waste combustion.
 - Different cities have varied pollution sources, so toxicity thresholds are likely to differ by location.
 - The study recommends city-specific, toxicity-based air quality warning systems tailored to local pollution sources.
- 3. GDP Growth in 2024-25:** Recently, provisional estimates revealed that India's economy grew by 6.5% in FY 2024–25, marking the slowest full-year GDP growth since the pandemic-affected year of 2020–21.
- Although the fourth quarter showed signs of recovery, it wasn't sufficient to push the overall annual growth rate beyond 6.5%.
- **About Gross Domestic Product (GDP):** Measures the total value of goods and services produced within a country over a specific period, usually a year. It reflects economic health, growth, and development.
- **Types of GDP:**
 - Nominal GDP:** Current market prices without inflation adjustment; useful for same-year comparisons.
 - ✓ **Real GDP:** Inflation-adjusted, allowing comparison across years by reflecting actual output changes.

- ✓ **GDP Per Capita:** Average economic output per person, indicating living standards and productivity.
 - ✓ **GDP based on Purchasing Power Parity (PPP):** Adjusted for price differences across countries, enabling international comparisons.
 - **GDP Growth Rate:** Measures the rate of economic expansion or contraction, influencing monetary policy decisions.
 - **Calculation Methods:**
 - Income Method:** Sum of incomes earned by labor and capital, adjusted for taxes and subsidies.
 - ✓ **Expenditure Method:** Total spending on Consumption, Investment, Government, and Net Exports ($C + I + G + (X - IM)$).
 - ✓ **Production (Output) Method:** Market value of all goods and services produced, adjusted for taxes and subsidies.
- 4. Mobile Forensic Science Lab Van :** Recently, the Delhi Chief Minister inaugurated a state-of-the-art Mobile Forensic Science Lab Van at the Delhi Secretariat, marking a significant advancement for the city's criminal justice system.
- **About Mobile Forensic Science Lab Van:** Equipped with advanced forensic tools to enable on-the-spot evidence collection and preliminary testing at crime scenes.
 - Designed for rapid deployment to cases involving murder, theft, fraud, and cybercrime.
 - Facilitates collection of critical scientific evidence such as **DNA samples, blood traces, and digital data.**
 - **Significance:** The government is committed to enhancing judicial speed, transparency, and reliability through technology.
 - Timely evidence collection is crucial to prevent tampering or destruction by perpetrators.
 - The mobile lab will improve investigation efficiency and credibility, boosting public trust in law enforcement.
- 5. Ayush Suraksha Portal :** Recently, the Ministry of Ayush launched the Ayush Suraksha Portal at Ayush Bhawan, New Delhi, as a landmark initiative to enhance consumer protection and regulatory oversight in India's traditional medicine sector.

- **About Ayush Suraksha Portal:** Acts as a centralized platform to monitor misleading ads and adverse drug reactions (ADRs), integrating data from regulatory bodies like State Licensing Authorities and national pharmacovigilance centers for real-time tracking and analysis.
 - Provides a user-friendly interface for citizens to directly report misleading advertisements and ADRs.
 - Developed in response to a Supreme Court order from July 2024, mandating a robust system to monitor misleading ads and ADRs, with the Ministry of Ayush meeting the deadline ahead of schedule.
 - Supported technically by the Central Council for Research in Siddha (CCRS), aligning the portal with national pharmacovigilance standards.
 - Integrates multiple stakeholders including the Ayush division under CDSCO, Ministry of Information and Broadcasting (MoI&B), and others, enabling coordinated responses, inter-state referrals, and updates on complaint resolutions.
 - Enhances governance and safety in the Ayush sector by promoting evidence-based practices and increasing transparency, boosting consumer trust in traditional medicine.
- 6. **AI Progress in India:** Recently, India's compute capacity for Artificial Intelligence (AI) surpassed **34,000 GPUs**, marking a significant milestone in its tech infrastructure.
 - Additionally, **three new startups** have been selected under the **IndiaAI Mission** to develop India-specific **Foundation Models**, further boosting the country's indigenous AI capabilities.
- **Indigenous Foundation Models:** The newly selected startups are tasked with developing AI models tailored to India's unique linguistic and cultural landscape:
 - **Soket AI:** Developing a 120-billion parameter open-source foundation model optimized for India's linguistic diversity, targeting sectors such as defense, healthcare, and education.
 - **Gan AI:** Creating a 70-billion parameter multilingual foundation model aimed at achieving "superhuman" text-to-speech capabilities, surpassing current global leaders.
 - **Gnani AI:** Building a 14-billion parameter Voice AI foundation model capable of real-time, multilingual speech processing with advanced reasoning abilities.
- **About IndiaAI Mission:** Launched in 2023 as a joint initiative by the **Ministry of Electronics and Information Technology (MeitY)** and **NASSCOM**.

- **Core Objectives: "Making AI in India"** – Promote indigenous development of AI technologies.
 - ✓ **"Making AI Work for India"** – Leverage AI for societal and sectoral benefits across domains.
- **Focus Areas:** Strengthening India's AI innovation ecosystem.
 - ✓ Providing **high-end compute infrastructure** to startups, researchers, and academia.
 - ✓ Supporting development of **India-specific Foundation Models** and responsible AI solutions.
- 7. **Second Fully Literate State:** Recently, Goa became the **second state in India** to achieve **100% functional literacy**, surpassing the **national benchmark of 95%** and marking a major milestone in the country's literacy mission.
 - Achieved under the **ULLAS - Nav Bharat Saaksharta Karyakram (New India Literacy Programme)**.
 - **About ULLAS :** Launched in 2022 as a centrally sponsored scheme by the Ministry of Education.
 - Aims to achieve universal literacy in India by 2030, in line with the National Education Policy (NEP) 2020.
 - Focuses on inclusive learning for adults aged 15 years and above who missed out on formal education.
 - **Five Core Components of the Scheme:** Foundational Literacy and Numeracy
 - ✓ Critical Life Skills
 - ✓ Basic Education
 - ✓ Vocational Skills
 - ✓ Continuing Education
 - **Nationwide Impact of the ULLAS Scheme:** Over 2.40 crore learners and 41 lakh volunteer teachers are registered on the ULLAS Mobile App.
 - More than 1.77 crore learners have participated in the Foundational Literacy and Numeracy Assessment Test (FLNAT).
 - Goa's achievement in full functional literacy is a model of progress, highlighting the power of public participation, effective governance, and community-driven efforts.