

7. Short news

1. Pharmacogenomics

Pharmacogenomics are enabling healthcare systems to personalise drug therapy, reducing trial-and-error prescriptions and improving patient safety.

About Pharmacogenomics

Pharmacogenomics is the study of how an individual's genetic variations influence drug metabolism, effectiveness and risk of adverse reactions. It shifts treatment from population-based prescriptions to personalised medication guided by genetic profiles. Variations in drug-metabolising enzymes, especially the CYP450 family, determine whether a patient is a poor, normal or ultrarapid metaboliser. Nearly 90% of people carry actionable gene variants that can alter drug response, making pharmacogenomics clinically relevant at a population scale.

Applications of Pharmacogenomics

Cardiovascular and Blood-Thinner Therapy – Genetic testing for CYP2C9 and VKORC1 helps tailor Warfarin doses, lowering bleeding risk and achieving therapeutic levels faster. CYP2C19 testing guides the use of Clopidogrel, with poor metabolisers receiving safer alternative antiplatelet drugs.

Psychiatric Treatment – Variants in CYP2D6 and CYP2C19 significantly affect antidepressant and antipsychotic metabolism, and testing improves symptom control and reduces adverse effects.

Oncology – Testing for DPYD variants before 5-fluorouracil therapy prevents life-threatening toxic reactions, improving chemotherapy safety.

Prevention of Severe Drug Reactions – Screening for HLA-B57:01 before Abacavir or HLA-B15:02 before Carbamazepine prevents severe hypersensitivity and Stevens–Johnson syndrome.

2. Mutirão

COP30 negotiations in Belém have intensified as Brazil pushes the Mutirão decision to uphold earlier commitments on transitioning away from fossil fuels.

About Mutirão

The Mutirão is a Brazilian tradition of collective mobilisation, used at COP30 to accelerate consensus-building across contentious climate issues.

Need of Mutirão

1. It aims to convert previous agreements during UAE Consensus (COP 28) into concrete, coordinated global action.
2. It seeks to restore trust in multilateral climate diplomacy by ensuring timely delivery on the Paris Agreement's implementation cycle.

UAE Consensus – It is a global agreement to transition away from fossil fuels, triple renewable energy capacity, and double energy efficiency by 2030. It also calls for a new framework for climate finance, halting deforestation, and addressing methane emissions, with the overall goal of reaching net-zero by 2050.

Roadblocks in Its Implementation

Divergent Negotiation Positions – Developed and developing countries remain sharply divided on adaptation finance, legal obligations for public finance, and equity in climate action.

Contentious Climate Finance Architecture – Disagreements persist over tripling adaptation finance, defining climate finance, and establishing binding mechanisms under the New Collective Quantified Goal.

Pushback on Fossil-Fuel Transition Roadmap – Petrostates and fossil-fuel-dependent economies oppose a structured roadmap for transitioning away from fossil fuels, risking consensus-based progress.

Tensions Over Trade Measures – Conflicts arise between developing countries seeking safeguards against unilateral trade actions and developed countries preferring broader economic wording without explicit trade commitments.

Conclusion

The success of the Mutirão hinges on bridging divides on finance, trade, and fossil-fuel transition, making COP30 a decisive test for global climate cooperation and trust.

3. Indo-Tibetan Border Police (ITBP)

ITBP announced the establishment of 10 all-women border outposts along the India-China LAC as part of its expansion plan.

About Indo-Tibetan Border Police (ITBP)

A specialised Central Armed Police Force under the Ministry of Home Affairs, responsible for guarding the 3,488 km-long India-China LAC and operating in high-altitude terrains.

Establishment – Raised on 24 October 1962 after the India-China war to strengthen the Indo-Tibetan frontier.

1. Initially under the CRPF Act; later empowered through the ITBPF Act, 1992 and rules of 1994.
2. Expanded from 4 battalions to a large high-altitude force operating from 9,000–14,000+ feet.
3. In 2004, under “One Border, One Force”, ITBP took exclusive charge of the entire LAC in Ladakh, HP, Uttarakhand, Sikkim, Arunachal Pradesh.

Motto – “Shaurya – Dridhata – Karma Nishtha” (Valour – Determination – Devotion to Duty).

Functions of ITBP

Border Guarding – Secures India-China LAC from Karakoram Pass (Ladakh) to Jachep La (Arunachal), including extreme high-altitude posts.

Training & Specialisation – Expertise in mountain warfare, skiing, rock-craft, and survival in sub-zero temperatures. Runs premier mountaineering and tactical training institutes such as Mountaineering and skiing institute ITBP Auli.

Disaster Relief & Humanitarian Role – Conducts rescue missions during avalanches, earthquakes, and flash floods. Operates medical and veterinary camps for border communities.

Internal Security Duties – Supports anti-Naxal operations, election security, and VIP protection when assigned.

Civic Engagement – Promotes civil-military cooperation through community outreach in border villages. All-Women Border Outposts (BOPs) – 10 all-women BOPs were established, starting with Lukung (Ladakh) and Thangi (Himachal Pradesh). Enhances women’s frontline deployment in high-altitude border security roles. Part of a broader effort to modernise and diversify ITBP manpower.

Significance

Strengthens India’s forward presence along the LAC while advancing gender inclusion in high-altitude national security roles.

4. 53rd Chief Justice of India

Justice Surya Kant assumed office on 24 November 2025 as the 53rd Chief Justice of India, succeeding Justice B.R. Gavai.

About Justice Surya Kant

A distinguished Supreme Court judge known for landmark rulings on constitutional rights, federalism, gender justice, and electoral transparency. He is the First Chief Justice of India from Haryana; in office Nov 2025–Feb 2027.

Early Life and role in Judiciary – Born 10 Feb 1962, Hisar and became a first-generation lawyer.

1. Senior Advocate and Advocate General, Haryana.
2. Chief Justice, Himachal Pradesh High Court (2018).
3. Elevated to the Supreme Court; known for rights-centric judgments.

Major Judicial Contributions

Key verdicts – Article 370, Pegasus surveillance, Bihar electoral rolls, Sedition law (124A) stay, AMU minority status reconsideration. Directed Election Commission to reveal 65 lakh excluded voters in Bihar.

Reinforced gender justice – Reinstated woman sarpanch; 1/3rd reservation for women in bar associations. Upheld One Rank-One Pension; heard women officers’ permanent commission matters.

Chief Justice of India (CJI)

The CJI is the head of the Indian judiciary, presides over the Supreme Court, and ensures the protection of the Constitution.

Constitutional Provisions

Article 124 – Establishes the Supreme Court and provisions for appointment of judges, including the CJI.

Article 145 – Empowers the Supreme Court to make rules under the CJI's supervision.

Article 146 – CJI controls appointments of Supreme Court staff.

Article 130 – CJI approves the seat of the Supreme Court (if changed from Delhi).

Appointment of the CJI

Appointed by the President of India. Follows the longstanding seniority convention under which the senior-most Supreme Court judge is recommended. Outgoing CJI names their successor (the senior-most eligible judge). The Union Law Ministry processes the appointment.

Tenure – Once appointed, the chief justice remains in office until age 65. There is no fixed tenure provided in the constitution.

Resignation – A Supreme Court judge, including the CJI, can resign by submitting a written resignation letter to the President. It does not involve Parliament.

Removal – The Chief Justice of India can be removed only for proven misbehaviour or incapacity. A motion may begin in either House, requiring signatures from 100 Lok Sabha members or 50 Rajya Sabha members, after which a three-member committee investigates the charges. If the committee upholds the charges, both Houses must pass the motion by a special majority of total membership and two-thirds of members present and voting after which the President issues the removal order.

Eligibility – No separate eligibility for CJI; it is same as SC Judge which is as following

1. Be a citizen of India.
2. Have been a High Court judge for 5 years, OR
3. Have been a High Court advocate for 10 years, OR
4. Be a distinguished jurist, in the President's opinion.

Roles & Responsibilities of CJI

Judicial Leadership – Heads Constitution Benches; ensures uniform interpretation of law. Supervises judicial functioning and precedent consistency.

Administrative Authority – Allocates cases, forms benches, manages court calendars. Oversees Supreme Court registry, staff, and internal processes.

Head of Collegium – Leads appointments and transfers of judges to SC and HCs. Ensures transparency and independence in judicial appointments.

Constitutional Guardian – Protects the basic structure and fundamental rights. Advises the President on judicial and constitutional matters when required.

Last Five CJIs of India

49 – U.U. Lalit (Aug 2022–Nov 2022)

50 – D.Y. Chandrachud (Nov 2022–Nov 2024)

51 – Sanjiv Khanna (Nov 2024–May 2025)

52 – B.R. Gavai (May 2025–Nov 2025)

53 – Surya Kant (Nov 2025–Feb 2027)

5. Random Forest

Recently, a study used random forest models to detect ancient chemical signatures, suggesting photosynthetic microbes existed 2.5 billion years ago.

About Random Forest

Random Forest is an ensemble machine-learning technique that combines multiple decision trees to make stable, accurate predictions for classification and regression tasks.

Decision Tree – It is a supervised learning algorithm that creates a model like a flowchart to make predictions. It uses a tree-like structure with internal nodes representing “if-then” rules (tests on attributes), branches representing the outcomes of those tests, and leaf nodes representing the final predictions or decisions. These models are used for both classification and regression tasks.

How a Decision Tree Works – It divides data through a series of questions at each node (e.g., “Is age > 30?”), moving through branches until reaching a final decision at a leaf.

Why Single Trees Fall Short – Individual trees are easy to interpret but prone to overfitting, often capturing noise or quirks specific to the training dataset, reducing generalisation.

Key Features of Random Forest

Ensemble of Multiple Trees – Random Forest builds many independent decision trees, each trained on a random subset of data and, often, random subsets of variables, ensuring diversity.

Prediction Mechanism – For classification, each tree “votes” and the most common outcome becomes the final prediction; for regression, the average output of all trees is used.

Error Reduction – Random variations across trees cancel out, improving predictive accuracy and reducing bias–variance issues compared to a single tree.

Significance

Reliable and Robust – By leveraging multiple trees, Random Forest produces more consistent results and handles noisy, incomplete, or complex data effectively.

Scientific and Practical Utility – Its ability to detect subtle patterns makes it valuable in fields like ecology, medicine, finance, and, recently, identifying ancient biosignatures in geological samples.

6. Operation Crystal Fortress

Context – A major trans-national methamphetamine cartel was dismantled in Delhi under Operation Crystal Fortress, resulting in the seizure of 328 kg of the synthetic drug.

About Operation “Crystal Fortress”

Introduction – Operation Crystal Fortress is an intelligence-led, multi-agency crackdown conducted jointly by the Narcotics Control Bureau (NCB) and the Delhi Police.

Target and Scope – The operation focused on disrupting a high-volume synthetic drug trafficking network operating across India and abroad. Investigations uncovered a chain involving couriers, layered handlers, safe-houses, and a foreign-based kingpin linked to previous cocaine seizures.

About Methamphetamine

Methamphetamine is a potent synthetic stimulant that affects the central nervous system and is widely trafficked in South and Southeast Asia.

Key Features – It appears as crystalline powder or “ice,” is easy to transport, and yields high profits, making it attractive to organised crime networks.

Health Impact – Methamphetamine use causes severe addiction, aggressive behaviour, cardiovascular damage, cognitive decline, and long-term neurological impairment.

Regulation of Methamphetamine – Methamphetamine is regulated in India under the Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985. It is listed as a psychotropic substance under the NDPS Act.

Prohibition – The Act prohibits the production, manufacture, possession, sale, purchase, transport, warehousing, use, or consumption of any psychotropic substance, except for medical or scientific purposes and with proper authorization, license, or permit.

Enforcement – Various central and state government agencies, including the Narcotics Control Bureau (NCB) and state police forces, are empowered to enforce the provisions of the Act.

International Conventions – The NDPS Act was enacted to fulfill India’s obligations under UN Convention on Psychotropic Substances 1971.

7. Indonesia Declared Polio-Free

WHO declared Indonesia polio-free after confirming no poliovirus type-2 detection since June 2024, following intensive nationwide immunisation campaigns.

Key Highlights on Recent Outbreak and Containment

Indonesia’s outbreak – It began in October 2022, with cases across Aceh, Banten, Java, Maluku, and Papua regions.

Containment Measures – Nearly 60 million additional doses of nOPV2 and strengthened IPV coverage contributed to rapid outbreak control. Transmission ended with the last case reported on June 27, 2024. Global Polio Eradication Initiative assessments (2023–2025) confirmed Indonesia met all criteria for outbreak closure. WHO’s outbreak-closure criterion requires 12 consecutive months of zero virus detection in both humans and the environment.

About Poliomyelitis (Polio)

Poliomyelitis is a highly infectious viral disease primarily affecting children under five years of age.

Transmission – It spreads mainly through person-to-person contact via the faecal-oral route or through contaminated water or food.

Impact – The virus multiplies in the intestine and can invade the nervous system, causing paralysis.

Wild Poliovirus Strain Status Worldwide

1. **Type 1** – Remains endemic in Pakistan and Afghanistan as of 2022.
2. **Type 2** – Declared eradicated in 1999.
3. **Type 3** – Declared eradicated in 2020.

Vaccine-Derived Polio – The Oral Polio Vaccine (OPV) contains a weakened form of the poliovirus, which induces an immune response. In under-immunized populations, the excreted vaccine virus can circulate, undergo genetic changes, and revert to a form capable of causing Circulating vaccine-derived poliovirus (cVDPV). To stop the transmission of cVDPV, WHO recommends conducting multiple rounds of high-quality immunization campaigns.

Preventive Measures – OPV and IPV

Oral Polio Vaccine (OPV) – It contains live attenuated Polio virus which is administered orally. It induces strong intestinal immunity and helps block community transmission. nOPV2 is a genetically stabilised version designed to reduce vaccine-derived poliovirus risks.

Inactivated Polio Vaccine (IPV) – IPV contains a killed virus, administered via injection. It provides systemic immunity and protects individuals from paralysis. Indonesia recently introduced a hexavalent DPT-HB-Hib-IPV vaccine to raise protection levels. India achieved a polio-free status in 2014 by WHO, with the last reported wild poliovirus case in 2011.

Significance – Indonesia's success strengthens the WHO Western Pacific Region's polio-free status and demonstrates the importance of high vaccination coverage, rapid surveillance, and coordinated global partnerships.

8. Guru Tegh Bahadur

President Droupadi Murmu paid tribute to Guru Tegh Bahadur on his 350th martyrdom day, emphasising his courage, sacrifice, and enduring message of religious freedom.

About Guru Tegh Bahadur

Guru Tegh Bahadur (1621–1675) was the ninth Sikh Guru and is revered as Hind-di-Chadar for safeguarding the religious freedom of oppressed communities. He was born as Tyaga Mal, the youngest son of Guru Hargobind, the sixth Sikh Guru. He received the name Tegh Bahadur ("Mighty of the Sword") for his valour in battle against Mughal forces. In 1664, he succeeded Guru Har Krishan as the ninth Guru, and his son Guru Gobind Singh later became the tenth Guru.

Key Contributions

1. **Spiritual and Literary Contributions** – He composed over 100 hymns in the Guru Granth Sahib, addressing devotion, detachment, humility, dignity, and the nature of God.
2. **Institutional and Social Contributions** – He founded Anandpur Sahib in Punjab, which later became central to Sikh spiritual life and the birthplace of the Khalsa in 1699.
3. **Expedition** – He travelled extensively to spread Sikh teachings and promote compassion and equality.

He offered support to communities facing persecution and upheld the principle of freedom of conscience. He resisted the forced conversions of Kashmiri Pandits and other non-Muslims, defending their right to practice their faith.

Martyrdom – He was arrested and publicly executed in Delhi in 1675 on the orders of Aurangzeb for refusing to convert to Islam.

Legacy Sites – Gurdwara Sis Ganj Sahib, marks the site of his execution, while Gurdwara Rakab Ganj Sahib marks the cremation site.

Enduring Significance – His martyrdom is observed annually on 24 November (Nanakshahi calendar) as Shaheedi Divas, symbolising supreme sacrifice for religious freedom.