

EDITORIALS - 7TH OCT 2026

1. Let there be light (GS Paper III Science and Technology)

This editorial '**Let there be light**' was published in **The Hindu** on 7th Oct 2026, highlights how **optogenetics** advances understanding of the **brain** and why its benefits must reach all.

Discovery and Scientific Significance

- The **2026 Nobel Prize in Physiology or Medicine** jointly honoured Karl Deisseroth, Peter Hegemann and Georg Nagel for discoveries concerning **light-gated ion channels and optogenetics**.
- **Optogenetics** enables previously impossible brain mapping by revealing **nerve-cell communication** underlying memory, emotions and bodily functions.
- **International collaboration** advanced the discovery: Hegemann investigated *Chlamydomonas*' movement towards light; Nagel identified an algal protein enabling blue-light-triggered ion flow and electrical impulses; Deisseroth adapted it into a **light-controlled switch** for neurons.

Research Applications and Public Access

- Scientists use **harmless viral agents** to deliver light-sensitive protein genes into target cells; precise **light pulses** activate channels, enabling study of neural activity.
- **Neural-circuit research** identifies pathways governing specific memories, feelings and behaviours relevant to **neurological and psychiatric disorders**.
- Optogenetics established groundwork for **clinical treatments** targeting Alzheimer's and addiction; researchers also use it experimentally for **sight restoration**.
- Technological advances facilitate translation of **laboratory research** into therapies, diagnostics and healthcare; nations must ensure **equitable access** regardless of location or social position.

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Ethical Challenges in Neurotechnology

- **Informed consent:** Brain interventions require clear disclosure of risks and alternatives; the US National Institutes of Health has examined consent challenges specific to implanted neural-device trials.
- **Mental privacy:** Neural recordings need protection against unauthorised use; Colorado's 2024 law extended its privacy framework to cover biological data, including neural data.
- **Personal autonomy:** Behaviour-influencing technologies require safeguards against manipulation; UNESCO's 2025 recommendation calls for stronger regulation of products that influence behaviour or promote addiction.

- **Human enhancement:** Cognitive enhancement raises concerns about fairness and developmental risks; UNESCO advises against non-therapeutic neurotechnology use among children and young people.
- **Dual-use risks:** Military applications warrant scrutiny of voluntary participation and potential coercion; DARPA's N3 programme sought nonsurgical brain-machine interfaces for able-bodied service members.
- **Long-term responsibility:** Patient support must extend beyond trials; a 2022 NIH workshop examined continued device access, maintenance, removal and research-related medical care.
- **Ethical oversight:** Independent scrutiny should accompany technological development; DARPA's SUBNETS programme incorporated ethical, legal and social experts to identify neurotechnology-related concerns.

2. Break the chain (GS Paper I Society)

This editorial 'Break the chain' was published in **The Hindu** on 7th Oct 2026, highlights the need to prioritise **leprosy transmission** control through stronger **detection, care** and targeted **interventions**.

Elimination Claims and Persistent Transmission

- India achieved **public-health elimination** in **2005**, with prevalence below one case per 10,000; subsequent complacency merged leprosy surveillance into the general health system.
- **Multidrug treatment** shortened patient registration, lowering recorded **prevalence** despite continuing transmission; rising disability in the early 2010s prompted door-to-door screening.
- The **National Strategic Plan and Roadmap for Leprosy 2023–2027** prioritises transmission control; coordination with tuberculosis programmes is needed because India accounted for around **46%** of globally reported childhood tuberculosis cases in 2025.
- **Disease burden** remains concentrated in Chhattisgarh, Jharkhand, Odisha and Maharashtra; only **148 districts** achieved interruption of transmission, pending field verification, against 300 projected in 2025–26.

Detection and Preventive Measures

- In **2025–26**, screening of over 70 crore people in highly endemic areas detected 24,367 cases; **ASHA workers** flagged nearly 40 lakh suspected cases, with 48,027 confirmed.
- **Single-dose rifampicin** reached 91.1% of 16.9 lakh likely contacts as post-exposure prophylaxis; **digital surveillance** is operational, while MIP vaccination is under consideration for highly infectious patients.

Care Gaps and Policy Priorities

- **Stigma** delays care until nerve damage develops; practitioners' unfamiliarity with leprosy pathology and **misdiagnosis** as a skin condition further weaken treatment.

- Overall **incidence** exceeded projections by 41%, childhood incidence by 91.6%, and **grade-2 disability** by 34%; detection must remain rigorous, elimination targets unchanged, and efforts intensified towards 2026–27 projections.

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Rights-Based Rehabilitation of Persons Affected by Leprosy

- **Legal equality:** Disease-based family discrimination requires removal; India's Personal Laws (Amendment) Act, 2019 deleted discriminatory leprosy provisions from five personal-law statutes.
- **Livelihood security:** Vocational training can counter exclusion from employment; The Leprosy Mission Trust India provides job-specific technical training to young people affected by leprosy.
- **Disability support:** Rehabilitation must address lasting impairments after cure; India's leprosy programme provides protective footwear, free reconstructive surgery and a ₹12,000 allowance for patients undergoing surgery.
- **Social reintegration:** Rehabilitation should restore dignity through productive participation; Baba Amte's Anandwan combines treatment, vocational training and livelihood activities to promote self-reliance.
- **Gender sensitivity:** Support must address overlapping discrimination against affected women; the UN disability-rights committee has documented isolation, job dismissal and barriers to autonomy.
- **Educational inclusion:** Schools must prevent disease-based exclusion; the UN disability-rights committee has documented rejection of children affected by leprosy and recommended inclusive education measures.
- **Participatory governance:** Affected persons should shape services concerning their lives; WHO's 2011 guidelines, developed with their active participation, promote shared responsibility and decision-making.

3. Indian research can shape the world (GS Paper III Science and Technology)

This editorial 'Indian research can shape the world' was published in **The Hindu** on 7th Oct 2026, highlights how **fundamental research**, wider **scientific access** and **institutional reforms** can enable India to lead technological **innovation**.

From Technological Catch-Up to Scientific Leadership

- **Technological catch-up** becomes costly when ambition follows others' achievements, creating recurring **licensing and know-how dependence** and reliance on foundations developed elsewhere.
- **Fundamental research** and **technological application** have increasingly converged over the past 50 years; studies of bacteria-infecting viruses explained gene regulation, while bacterial defence research produced CRISPR technology.
- Shorter **discovery-to-application timelines** allow thinking and training to drive innovation; investing in **basic research** can enable India to lead emerging technologies instead of repeatedly catching up.

Reforms for Global Research Impact

- Scale **high-quality education** through artificial intelligence (AI), reaching underserved students and bypassing ineffective institutions where necessary; establish hundreds of **experimental foundries** across engineering, physics, biology, chemistry and mathematics for practical work on real problems.
- Open **national laboratories** to external researchers, students and companies through three zones: green for open interaction, amber for collaboration and red for **strategic work**; much existing activity belongs in the first two.
- Grant compliant, high-quality institutions **financial flexibility**, relieving burdensome General Financial Rules requirements; measure **accountability by outcomes**, addressing the cycle of poor compliance, low trust and onerous procedures.
- Ensure **speedy, predictable regulation** for biological research and clinical trials; approval delays disproportionately disadvantage **small and medium institutions**, while well-funded organisations can absorb the time and costs.

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Bridging India's Research Commercialisation Gap

- **Technology transfer:** Dedicated intermediaries can connect discoveries with industry; India's National Research Development Corporation has licensed technologies to over 5,100 entrepreneurs, according to a July 2026 government statement.
- **Prototype funding:** Early grants can reduce technical uncertainty; the Biotechnology Industry Research Assistance Council (BIRAC) offers Biotechnology Ignition Grants of up to ₹50 lakh for 18 months.
- **Intellectual property:** Clear ownership facilitates licensing; the Department of Biotechnology's 2023 guidelines provide institutional ownership with exclusive or non-exclusive licensing through institutional mechanisms.
- **Industry partnerships:** Shared development can translate research into products; BIRAC's Biotechnology Industry Partnership Programme supports high-risk innovation through government–industry cost sharing and collaboration with public institutions.
- **Entrepreneurial support:** Incubation can help discoveries become viable ventures; BIRAC has established 94 biotechnology incubation and pre-incubation centres across 25 States and Union Territories.
- **Public procurement:** Government purchasing can create initial markets; Government e-Marketplace enables recognised startups to sell to public buyers, alongside qualifying exemptions from prior experience and turnover requirements.
- **Commercialisation incentives:** Evaluation should recognise deployment alongside publications; government assessments of research organisations in 2022 and 2025 included intellectual-property creation and technology transfer as innovation indicators.