

Biotechnology & Health:

1. Breakthroughs in Vaccine Development (India):

Indigenous Multi-Stage Malaria Vaccine 'AdFalcivax': India has made significant strides in combating malaria with the development of a new indigenous vaccine candidate named 'AdFalcivax'. This vaccine is a collaborative effort by the Indian Council of Medical Research (ICMR) through its institutes (RMRC Bhubaneswar and National Institute of Malaria Research - NIMR) and the Department of Biotechnology's National Institute of Immunology (DBT-NII).

Unique Approach: Unlike most existing malaria vaccines that target a single stage of the parasite's life cycle, AdFalcivax targets two key stages of Plasmodium falciparum, the parasite responsible for the deadliest form of malaria. This dual approach aims to provide stronger and longer-lasting protection by targeting both the human infection stage and the stage responsible for transmission through mosquitoes.

Promising Results & Stability: Early lab testing has shown excellent results, suggesting it could offer broader protection, reduced chances of parasite immune escape, and improved long-term immunity compared to current vaccines like RTS,S/AS01 and R21/Matrix-M. The vaccine also exhibits impressive thermal stability, remaining functional for over nine months at room temperature, which is crucial for storage and transport in tropical regions.

"Make in India" Initiative: AdFalcivax is being developed entirely in India, aligning with the government's "Make in India" initiative. ICMR plans to license the technology to other organizations and manufacturers under non-exclusive agreements to facilitate wider production. The vaccine is currently in the preclinical stage, with an estimated seven-year timeline for public use if all goes as planned (manufacturing, clinical trials, and regulatory approvals).

2. Advances in Agricultural Biotechnology (India):

Climate-Adaptive Gene-Edited Rice Varieties: Researchers at the Indian Agricultural Research Institute (IARI) and the Indian Institute of Rice Research (IIRR), both under the Indian Council of Agricultural Research (ICAR), have developed two innovative genome-edited rice varieties: DRR Dhan 100 (Kamala) and Pusa DST Rice 1.

Enhanced Yield & Climate Resilience: These varieties aim to significantly enhance yield and strengthen climate resilience, addressing growing concerns about food security amidst escalating climate challenges. Kamala, derived from the popular Samba Mahsuri rice, also boasts improved grain numbers and a reduced environmental impact.

Regulatory Discussions: While this development is widely seen as a positive step towards sustainable agriculture, some experts have raised concerns about the long-term implications and regulatory oversight of genome editing technologies.

3. Global Biotechnology Partnerships:

NK Cell Therapy in Japan: US-headquartered NKGen Biotech, Inc., a clinical-stage biotechnology company focused on natural killer (NK) cell therapeutics, has entered a strategic partnership with Japan-based HekaBio K.K. This collaboration aims to accelerate the regulatory, manufacturing, and commercialization efforts to bring novel NK cell therapy to Japan.

4. Healthcare Policy and Infrastructure (India - Budget 2025 Overview):

Focus on Affordability and Access: The Indian government's "people-first approach" continues to prioritize making quality healthcare accessible and affordable, especially for underprivileged and rural populations. Key initiatives include:

Ayushman Vay Vandana Scheme: Over 58 lakh senior citizens enrolled, with over 2.67 lakh treatments availed, requiring only Aadhaar for registration.

Ayushman Bharat Digital Mission (ABDM): With an outlay of ₹1,600 crore (2021-2026), it aims to create a digital backbone for healthcare. Over 78 crore Ayushman Bharat Health Accounts (ABHAs) have been created.

Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM): A ₹64,180 crore scheme (2021-2026) to strengthen health service delivery at all levels and build resilience against pandemics.

National Health Mission (NHM): Continues as the primary vehicle for universal access to equitable, affordable, and quality healthcare,

aligning with SDG 3 (Good Health and Well-being).

Cancer Care: The Union Budget 2025-26 allocated ₹98,311 crore for healthcare, with plans to establish Daycare Cancer Centres in all district hospitals across the country over the next three years (200 centers in 2025-26).

Drug Accessibility: 36 life-saving drugs, including those for cancer and rare diseases, are fully exempt from customs duty. An additional 37 medicines are added to Patient Assistance Programmes for customs duty exemptions.

Medical Education Expansion: Plans to add 10,000 additional seats in medical colleges and hospitals in the coming year, contributing to a goal of 75,000 new seats over five years.

Healthcare for Gig Workers: Healthcare coverage under PM Jan Aarogya Yojana (PM-JAY) for gig workers, expected to benefit nearly 1 crore individuals.

Digital Connectivity: Broadband connectivity for all government secondary schools and primary healthcare centres to enhance digital access to healthcare services, especially in rural areas.

5. Biotechnology Investment and Market Activity (India):

Anthem Biosciences IPO Listing: Shares of Anthem Biosciences, a Bengaluru-based contract research, development, and manufacturing organization (CRDMO), debuted strongly on the Indian stock market today, July 21, 2025. The IPO, which was open from July 14-16, was heavily oversubscribed (67.42 times overall, with QIBs bidding 192.80 times). The shares listed at a significant premium, with the

grey market premium (GMP) indicating an estimated listing price around ₹747 apiece against an issue price of ₹570, suggesting a potential listing gain of approximately 31%. This indicates strong investor confidence in India's biotech and pharmaceutical services sector.

6. Global Health and Disease Surveillance:

Ongoing Public Health Challenges: While not detailed for July 21 specifically, global health discussions continue to focus on various issues including:

Measles Surge: Continued concerns over a global measles surge linked to falling vaccination rates.

Climate Change Impacts on Health: Extreme weather events driven by climate change are impacting food security and leading to higher grocery bills, which indirectly affects public health and nutrition.

Infectious Diseases and Drug Resistance: International conferences scheduled for July-August 2025 indicate ongoing research and focus on antimicrobials, antibiotic resistance, and pharmaceutical advancements to address various diseases.

MCQS

1. What is the name of India's new indigenous multi-stage malaria vaccine candidate that targets two key stages of Plasmodium falciparum?

- a) MalVac-Dual
- b) AdFalcivax
- c) PlasmoGuard
- d) BioMalaria Shield

Answer: b) AdFalcivax

The news states: "India has made significant strides in combating malaria with the development of a new indigenous vaccine candidate named 'AdFalcivax'."

2. Which two genome-edited rice varieties have been developed by researchers under the Indian Council of Agricultural Research (ICAR) to enhance yield and climate resilience?

- a) Swarna and Basmati 370
- b) DRR Dhan 100 (Kamala) and Pusa DST Rice 1
- c) MTU 1010 and IR 64
- d) Jaya and Ratna

Answer: b) DRR Dhan 100 (Kamala) and Pusa DST Rice 1

The news mentions: "...have developed two innovative genome-edited rice varieties: DRR Dhan 100 (Kamala) and Pusa DST Rice 1."

3. What is the total outlay for the Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) for the period 2021-2026?

- a) ₹1,600 crore
- b) ₹64,180 crore
- c) ₹78,000 crore
- d) ₹98,311 crore

Answer: b) ₹64,180 crore

The news states: "Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM): A ₹64,180 crore scheme (2021-2026)..."

4. What kind of organization is Anthem Biosciences, whose shares debuted strongly on the Indian stock market on July 21, 2025?

- a) A pharmaceutical retail chain
- b) A hospital network
- c) A contract research, development, and manufacturing organization (CRDMO)



d) A medical device manufacturer

Answer: c) A contract research, development, and manufacturing organization (CRDMO)

The news describes Anthem Biosciences as "a Bengaluru-based contract research, development, and manufacturing organization (CRDMO)."

5. What major global public health concern is linked to falling vaccination rates, as highlighted in the ongoing discussions?

- a) Polio eradication challenges
- b) Global measles surge
- c) Avian flu outbreaks
- d) Ebola resurgence

Answer: b) Global measles surge

The news points out: "Continued concerns over a global measles surge linked to falling vaccination rates."

