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Biotechnology & Health:

On August 22, 2025, a key development in biotechnology and health is the focus on plant health, with the Indian government initiating the National Plant Health Initiative (NPHI). This initiative, spearheaded by the Prime Minister's Science, Technology & Innovation Advisory Council (PM-STIAC), aims to use an integrated, AI-enabled digital platform to enhance plant health management and mitigate threats from climate change and other factors.

Beyond this, broader trends in the field for 2025 include:

Advanced Therapies: Cell and Gene Therapies (CGTs) are at the forefront, with a strong focus on making them more accessible and scalable through allogeneic therapies (using donor cells) rather than just autologous (patient's own cells). The success of CRISPR-based therapies and mRNA-based therapeutics is expanding to new areas like cancer and autoimmune disorders.

Artificial Intelligence (AI): AI is a transformative force, accelerating drug discovery by predicting the effectiveness of new compounds, and streamlining diagnostics and patient care. It is also being used in precision medicine to tailor treatments to a patient's unique genetic makeup.

Genetic Discoveries: Recent research has unveiled new findings, such as the discovery of microbes shaping the brain in the womb and the use of engineered bacteria to deliver viruses that can kill cancer cells in a "Trojan Horse" approach. Another study found that ancient viral DNA in our genomes plays an active role in

gene control, potentially unlocking a "secret code" in our DNA.

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MCQS

1.What is the primary objective of the National Plant Health Initiative (NPHI) launched by the Indian government on August 22, 2025?

- a) To increase agricultural exports.
- b) To use an AI-enabled digital platform for enhancing plant health and mitigating threats.
- c) To develop new genetically modified crops.
- d) To fund research on animal health.

Answer: b) To use an AI-enabled digital platform for enhancing plant health and mitigating threats.

The prompt explicitly states that the NPHI aims to "use an integrated, AI-enabled digital platform to enhance plant health management and mitigate threats from climate change and other factors."

2. Which of the following best describes the trend in Cell and Gene Therapies (CGTs) for 2025?

- a) A shift from allogeneic to autologous therapies.
- b) A focus on making therapies more accessible and scalable through allogeneic therapies.
- c) The discontinuation of CRISPR-based therapies.
- d) Limiting the use of mRNA-based therapeutics to only vaccines.

Answer: b) A focus on making therapies more accessible and scalable through allogeneic therapies.

The provided text notes a "strong focus on making them [CGTs] more accessible and scalable through allogeneic therapies (using donor cells) rather than just autologous (patient's own cells)."

3.How is Artificial Intelligence (AI) a transformative force in biotechnology in 2025, according to the provided information?

- a) It is primarily used to automate farm machinery.
- b) It is accelerating drug discovery, streamlining diagnostics, and enabling precision medicine.
- c) Its use is limited to decoding ancient languages.
- d) It is only used to create realistic digital avatars.

Answer: b) It is accelerating drug discovery, streamlining diagnostics, and enabling precision medicine.

The passage highlights that AI is "accelerating drug discovery by predicting the effectiveness of new compounds, and streamlining diagnostics and patient care. It is also being used in precision medicine to tailor treatments to a patient's unique genetic makeup."

4.The "Trojan Horse" approach mentioned in the text involves using engineered bacteria to:

- a) Deliver antibiotics to fight bacterial infections.
- b) Introduce beneficial microbes into the gut.
- c) Deliver viruses that can kill cancer cells.
- d) Repair damaged nerve cells.

Answer: c) Deliver viruses that can kill cancer cells.

The prompt describes a new finding involving "the use of engineered bacteria to deliver viruses that can kill cancer cells in a 'Trojan Horse' approach."





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