

NEET Concept Deck | Chapter 9.1

Principles of Biotechnology

Core Techniques, Methodologies,
and Exam Insights



EFB Definition: The integration of natural science and organisms, cells, parts thereof, and molecular analogues for products and services.



Genetic Engineering

The Blueprint. Altering the fundamental chemistry of life.

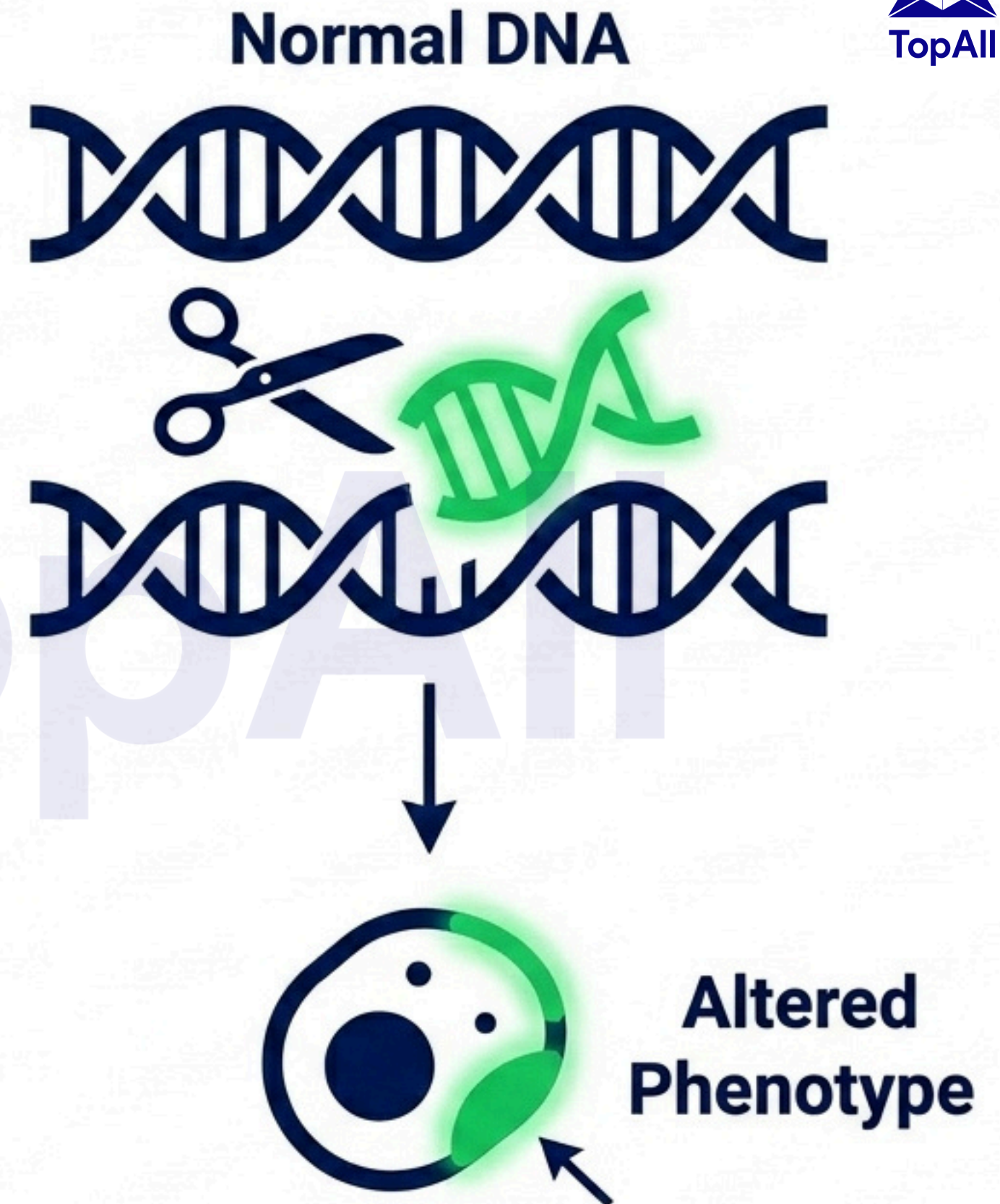


Bioprocess Engineering

The Factory. Scaling the altered lifeforms in sterile environments.

Core Technique 1: Genetic Engineering

- **Body:** Techniques to alter the chemistry of genetic material (DNA and RNA).
- **Mechanism:** Introduce modified genetic material into host organisms.
- **Result:** Changes the phenotype (observable characteristics) of the host organism.





You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



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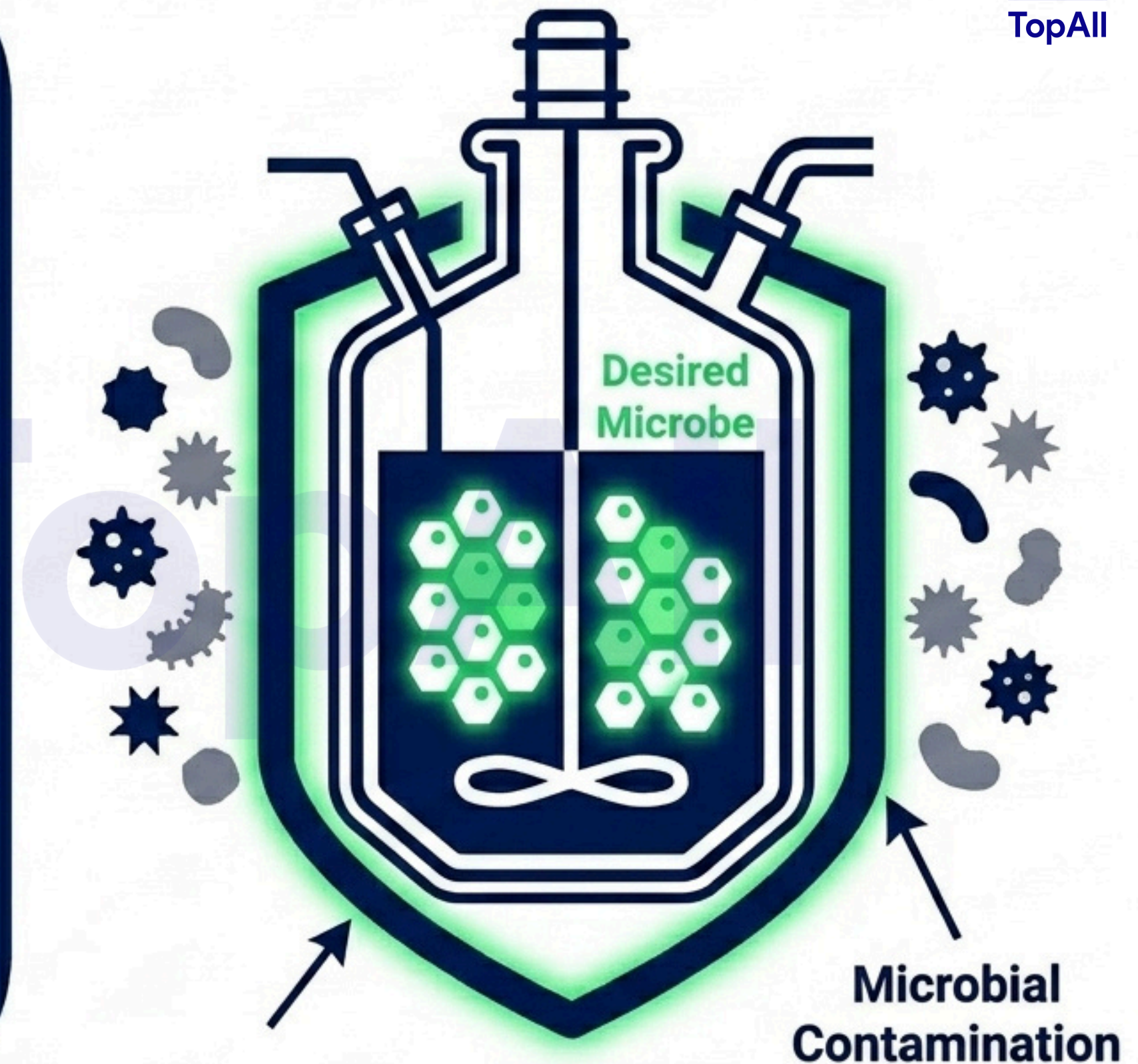
Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
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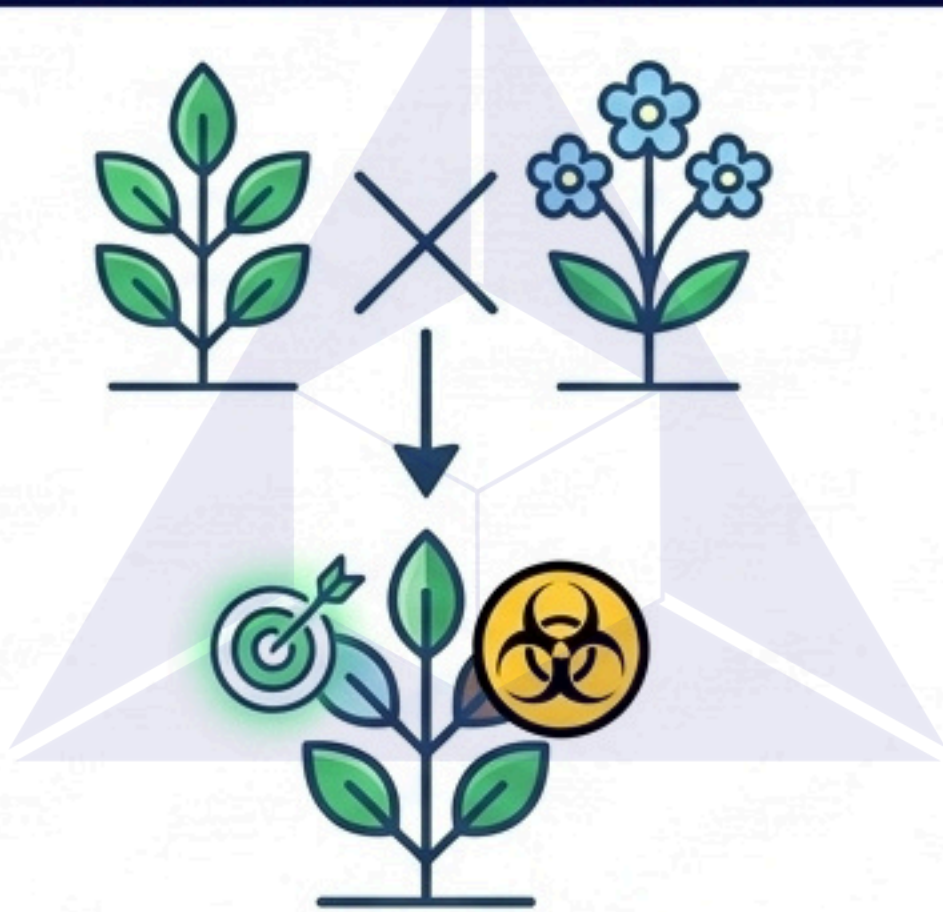
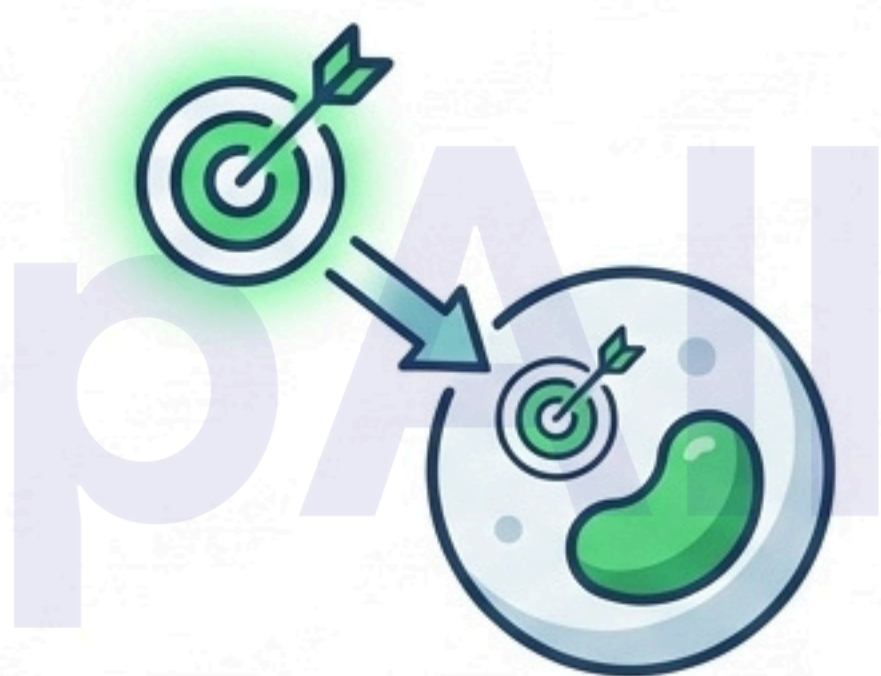


Core Technique 2: Bioprocess Engineering

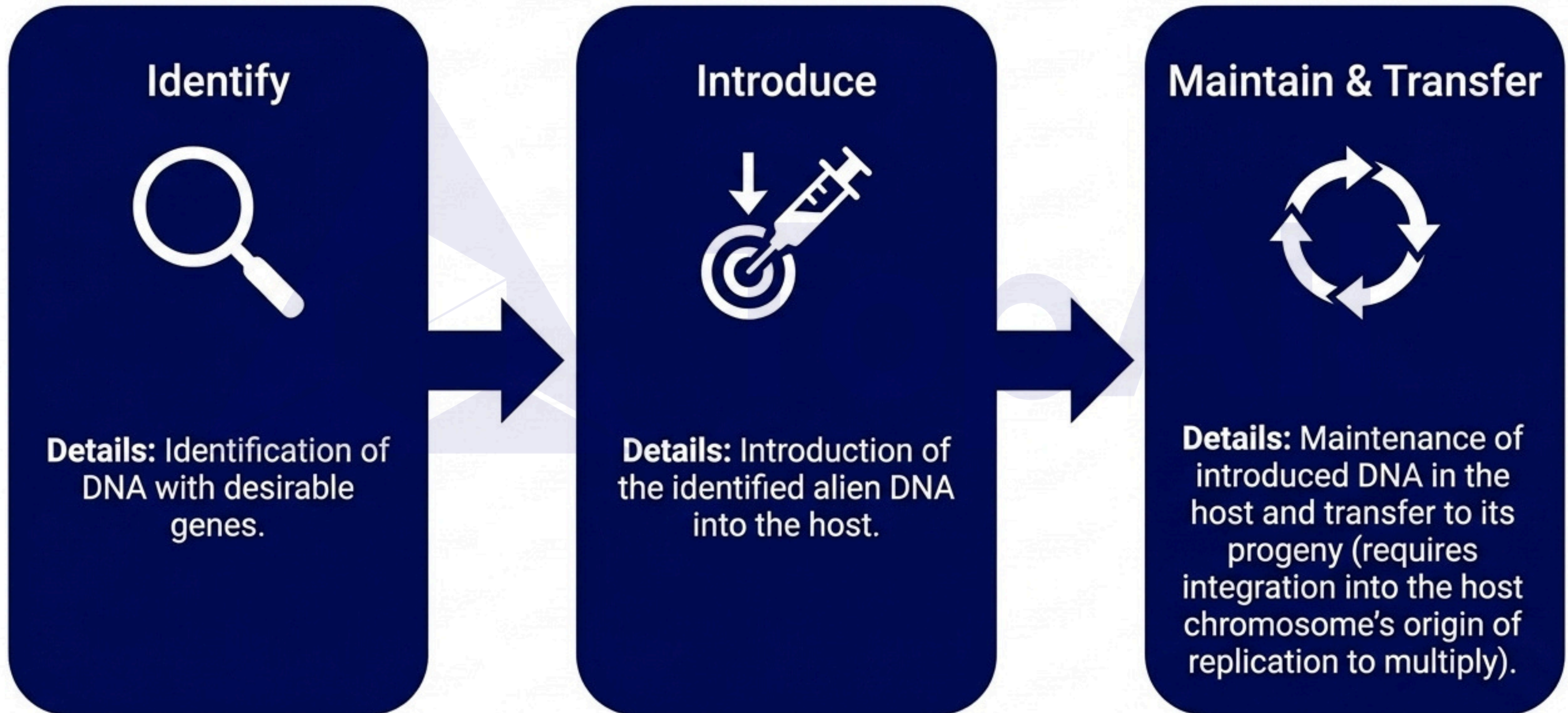
- **Body:** Maintenance of sterile (microbial contamination-free) ambience in chemical engineering processes.
- **Purpose:** Enables the growth of only the desired microbe or eukaryotic cell in large quantities.
- **End Products:** Manufacture of biotechnological products like antibiotics, vaccines, and enzymes.



The Evolutionary Leap: Overcoming Hybridization Limitations

Traditional Hybridisation	Genetic Engineering (Recombinant DNA)
 The diagram illustrates traditional hybridisation. At the top, two plants are shown: one with green leaves and one with blue flowers. They are connected by a large 'X' symbol, indicating a cross. An arrow points down to the resulting hybrid plant. This hybrid plant has green leaves and a yellow biohazard symbol on its stem, representing the inclusion of undesirable genes. A target icon with a green arrow is also shown next to the hybrid plant, indicating the desired genes.	 The diagram illustrates genetic engineering. At the top, a target icon with a green arrow is shown. An arrow points down to a cell, which contains a green nucleus. Inside the nucleus, a target icon with a green arrow is shown, indicating the isolation and introduction of specific genes without introducing undesirable genes.
Leads to the inclusion and multiplication of undesirable genes along with the desired genes.	Isolates and introduces only one or a set of desirable genes into the target organism without introducing undesirable genes.

The 3 Basic Steps of Genetic Modification



NEET Success Takeaway: 9.1 Keywords

Phenotype	The observable trait changed after introducing altered DNA/RNA into a host.
Sterile Ambience	The contamination-free condition required in bioprocess engineering.
Traditional Hybridisation	Flawed process that multiplies undesirable genes alongside desired ones.
Origin of Replication (ori)	The specific chromosome sequence required for an alien piece of DNA to replicate and multiply in a host.



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