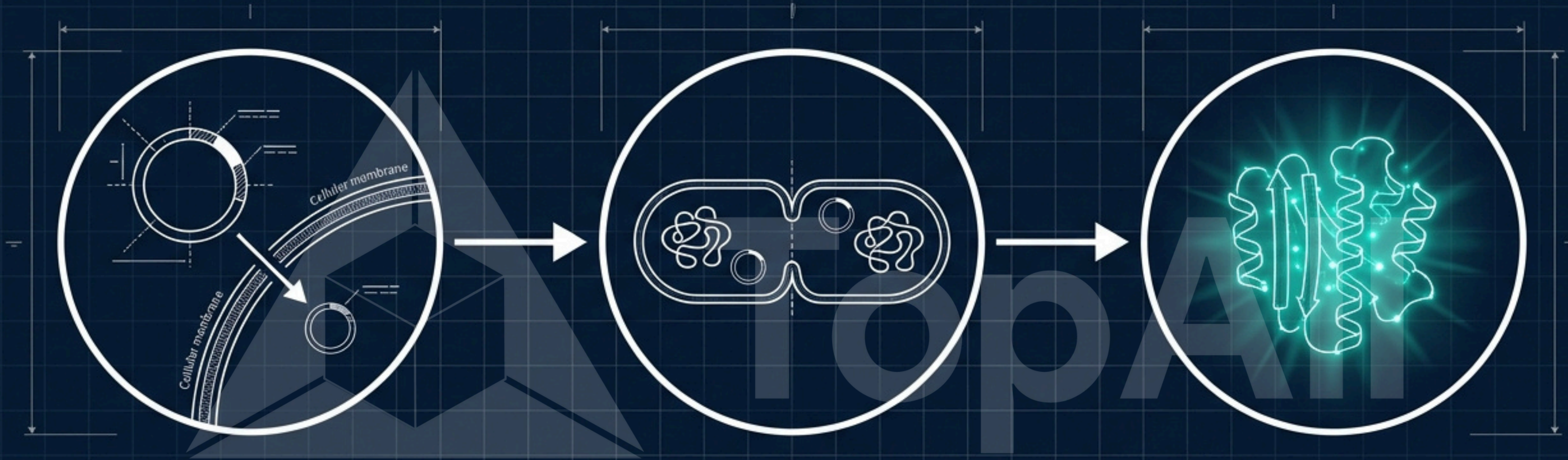




From Foreign Gene to Protein Product

Scaling up recombinant DNA technology for industrial production.

The Biological Assembly Line



Insertion

Vector delivers alien DNA into the host cell.

Multiplication

Alien DNA replicates alongside the host genome.

Expression

Host machinery translates the foreign gene into the **target protein**.

Defining the Recombinant Protein

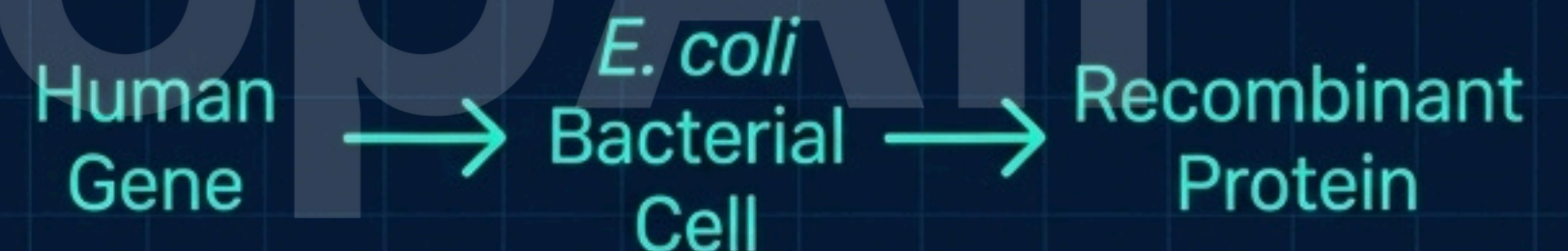
A protein-encoding gene that is expressed in a heterologous host (an organism that does not naturally produce this specific protein).

The Native Pathway



Standard biological expression.

The Recombinant Pathway



Biotechnological intervention
utilizing a heterologous host.



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

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



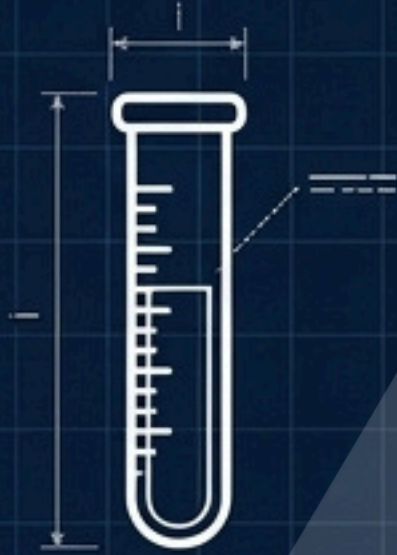
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Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The Necessity of Scaling Up



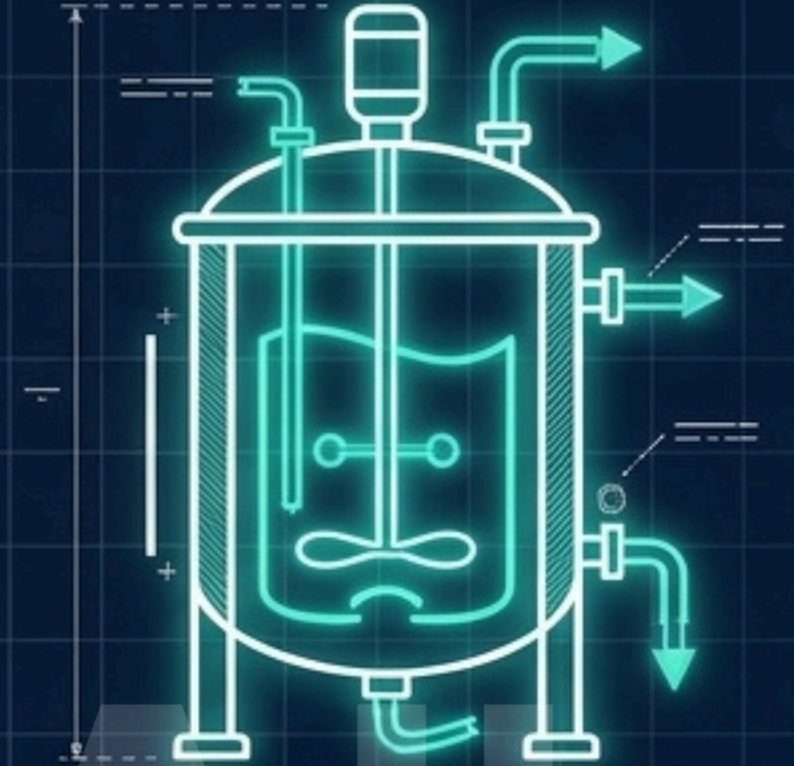
Small-Scale Lab Culture

- Low volume capacity.
- Used primarily for initial expression testing and basic extraction.
- Cannot yield appreciable commercial quantities.



Continuous Culture

- Used medium is actively drained while fresh medium is added.
- Keeps cells in their most active log/exponential phase.
- Produces higher biomass and greater yields.

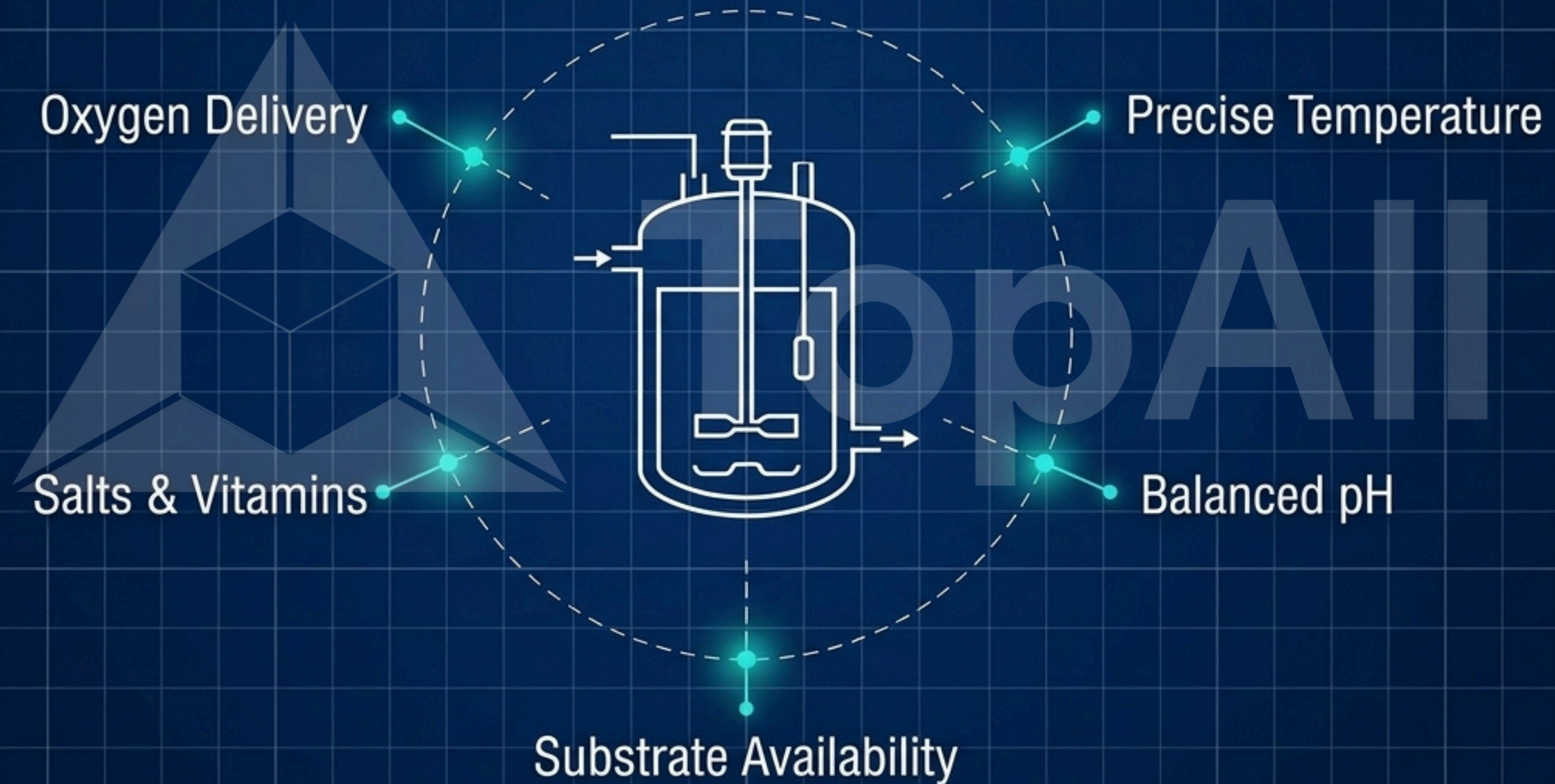


Large-Scale Bioreactors

- Capable of processing 100 to 1,000 Liters.
- Provides massive commercial yield.
- Maintains optimal conditions within a single controlled environment.

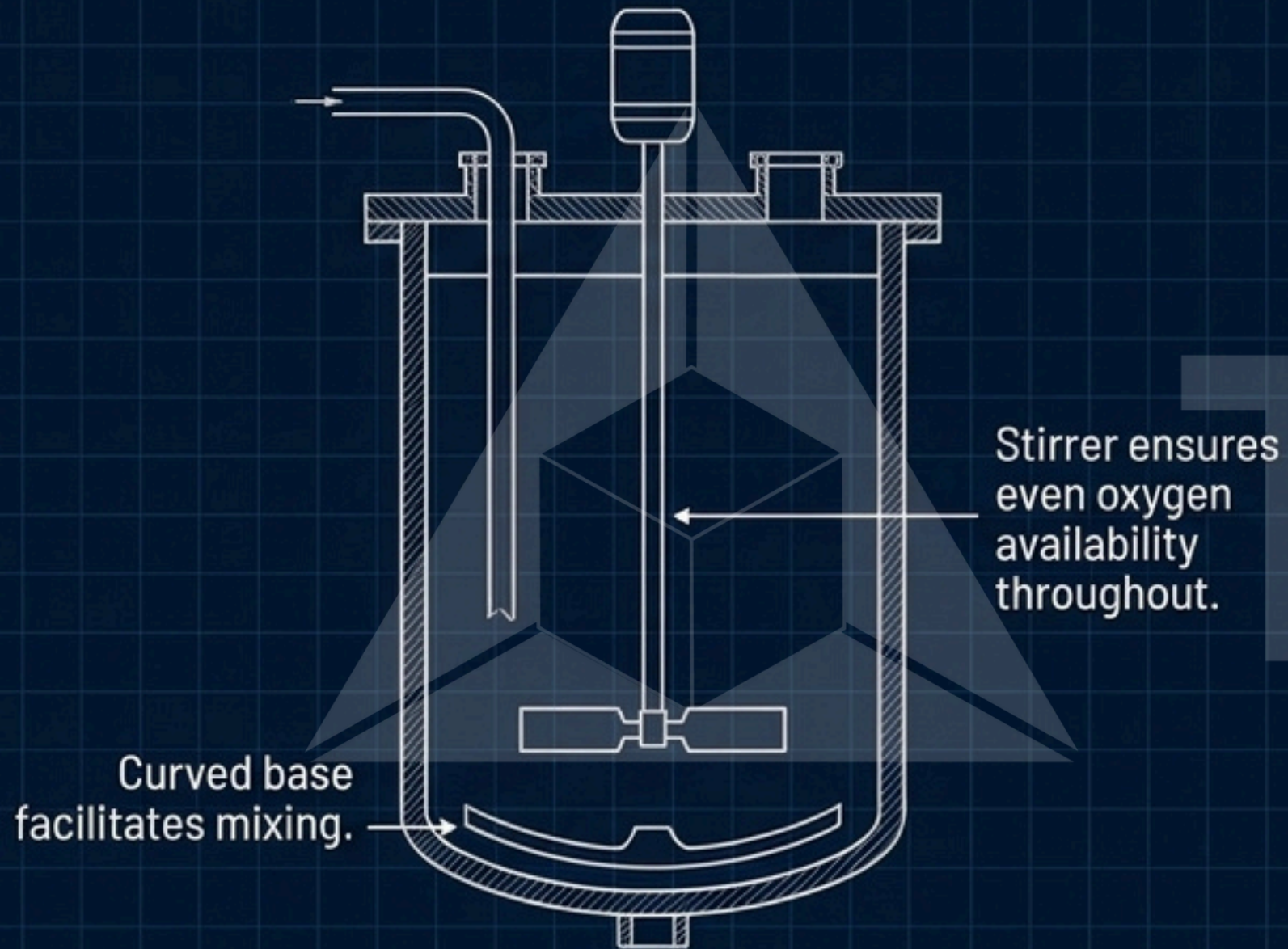
The Bioreactor: The Ultimate Optimizer

A vessel where raw materials are biologically converted into specific products by living cells.

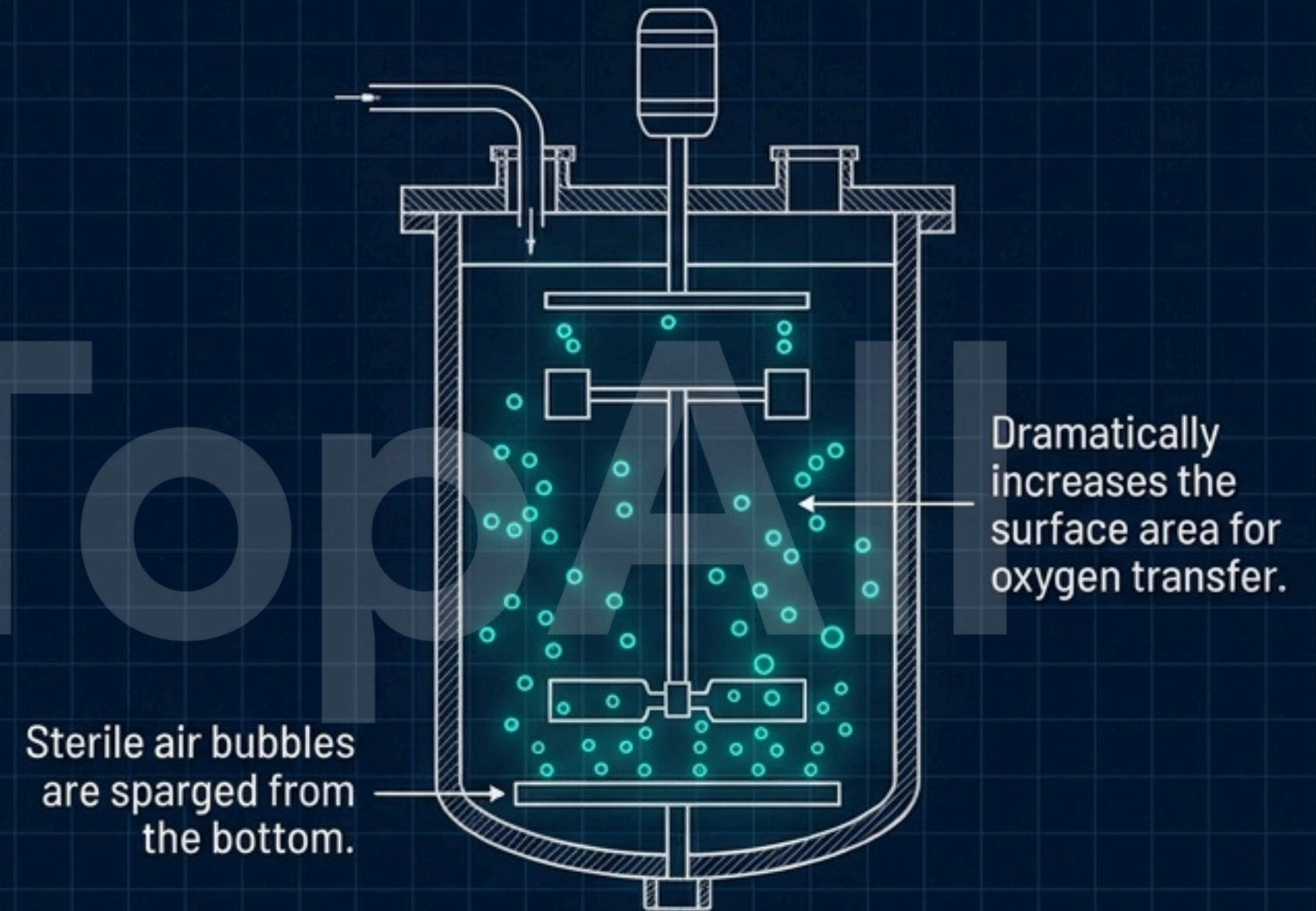


Bioreactor Engineering: Stirred-Tank Designs

Simple Stirred-Tank



Sparged Stirred-Tank



Shared Technical Components: Agitator system, foam control, temperature/pH control, and sampling ports to withdraw culture periodically.

✓ NEET Focus

Bioreactors maintain optimum physiological conditions to convert raw materials into specific biological products.

- **Scale:** Industrial bioreactors process massive volumes ranging from 100 to 1,000 Litres.
- **Growth Phase:** Continuous culture systems are designed to keep cells in the active log/exponential phase to maximize biomass and yield.
- **Final Step:** Downstream Processing (separation, purification, and clinical formulation) is strictly required after biosynthesis before the product is ready for market.



You've Learned the Theory.

Now Let's Test It.

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Practicing MCQs gets you marks.

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Jump in while the concept is still fresh in your head

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