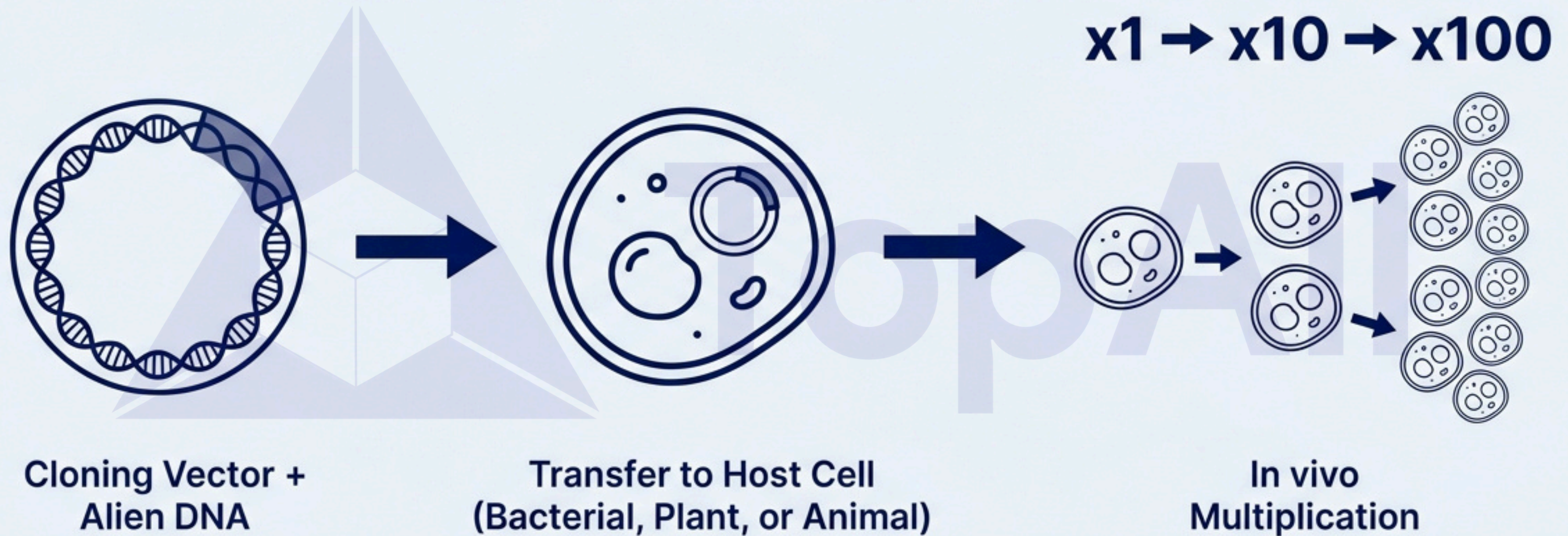


From Foreign Gene to Protein

Scaling up recombinant DNA technology for industrial production.



Alien DNA Multiplication



The Recombinant Protein



If any protein-encoding gene is expressed in a heterologous host,
it is called a recombinant protein.



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
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



The Scale-Up Challenge

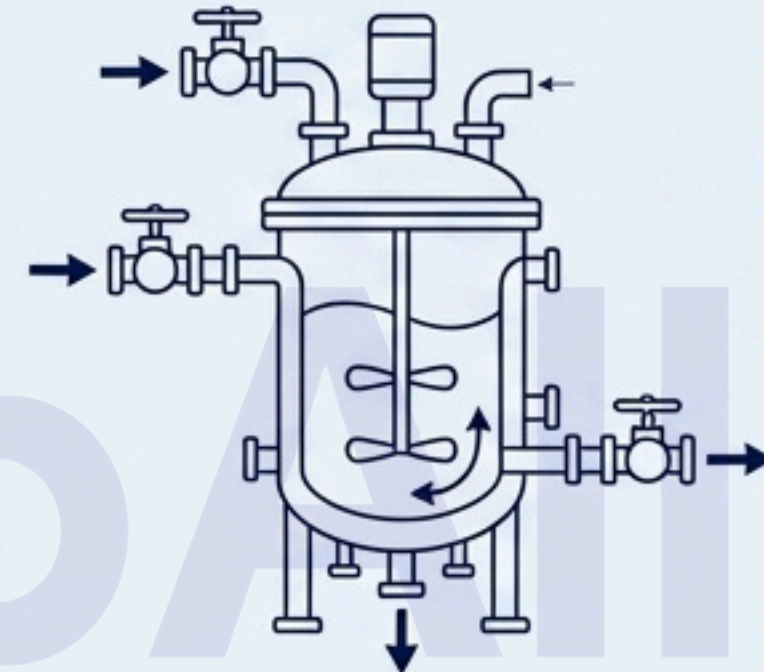
Small Laboratory Cultures



- Small volume capacity.
- Batch processing limits output.
- Cannot yield appreciable commercial quantities.



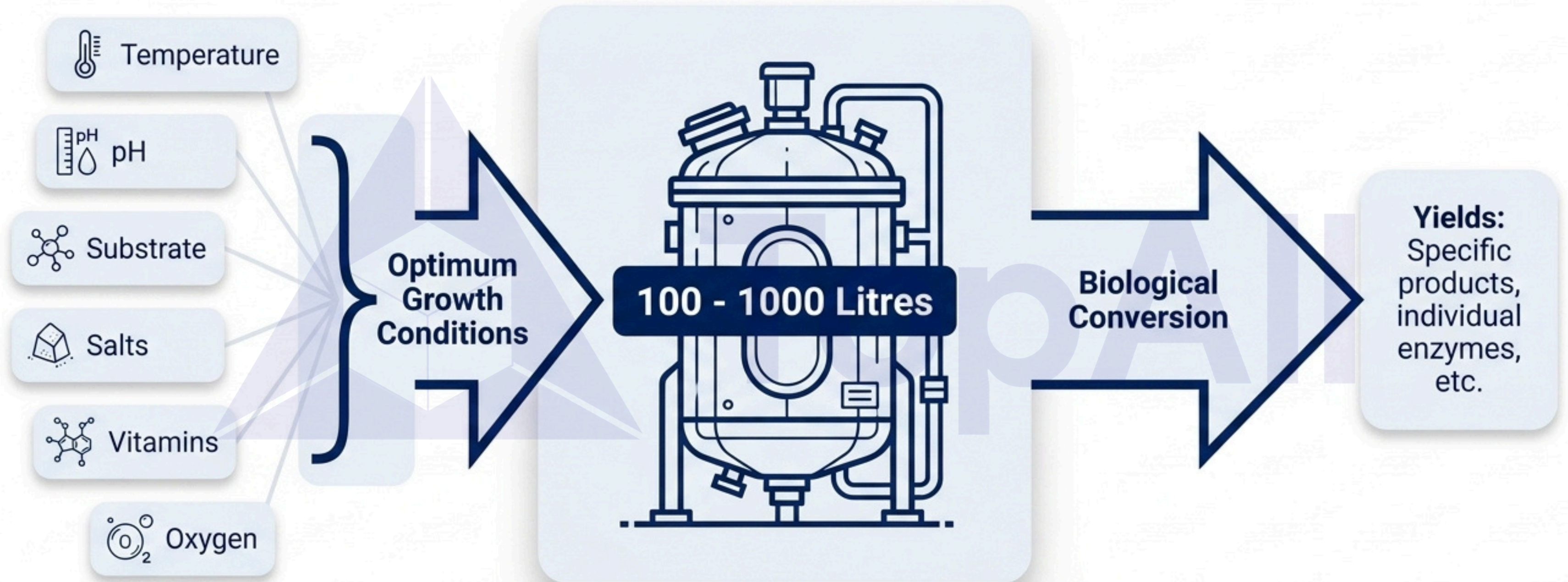
Large-Scale Continuous Culture



- Used medium continuously drained from one side.
- Fresh medium actively added from the other side.

Advantage: Maintains cells in their physiologically most active log/exponential phase for larger biomass and higher yields.

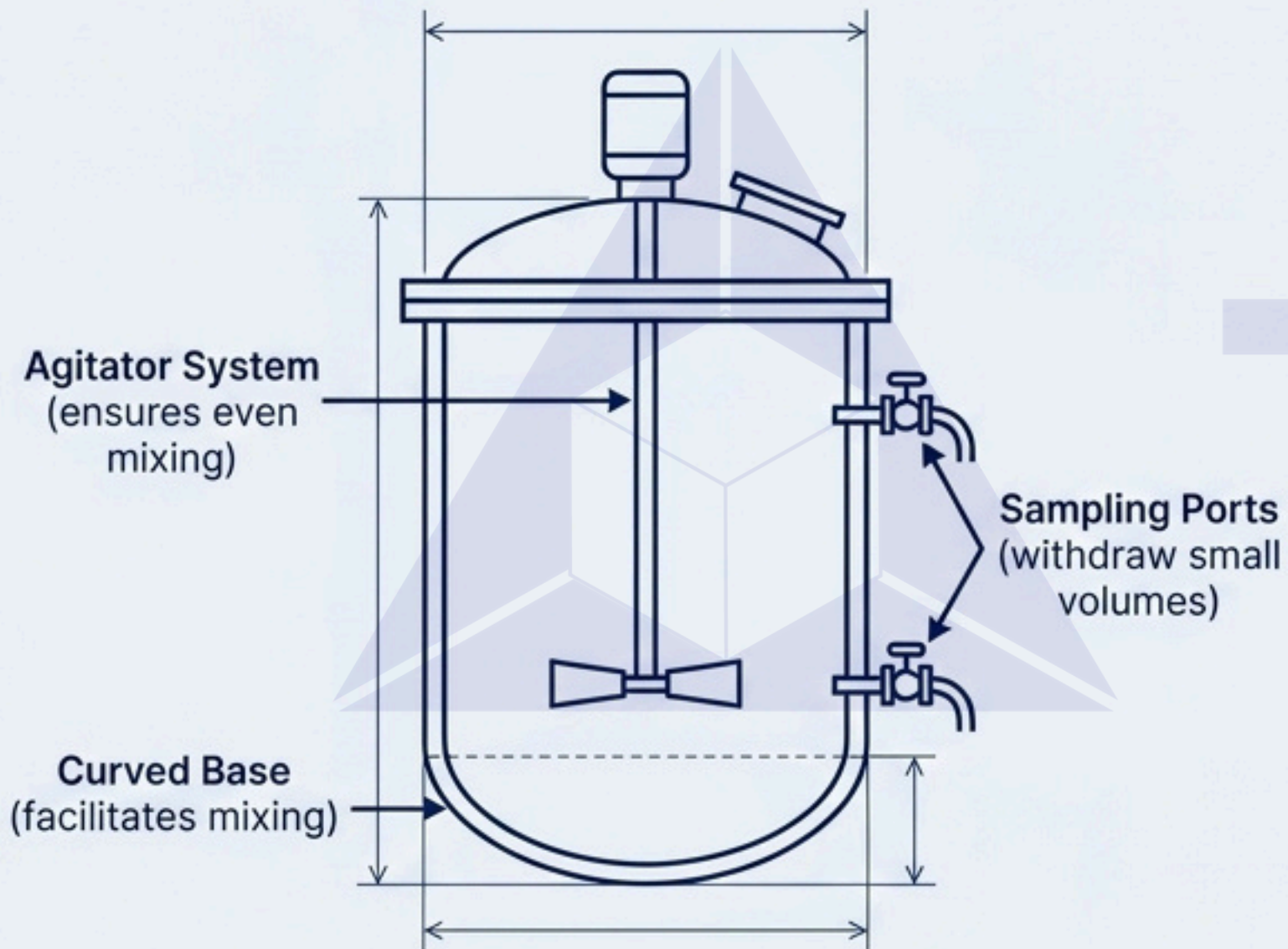
The Role of the Bioreactor



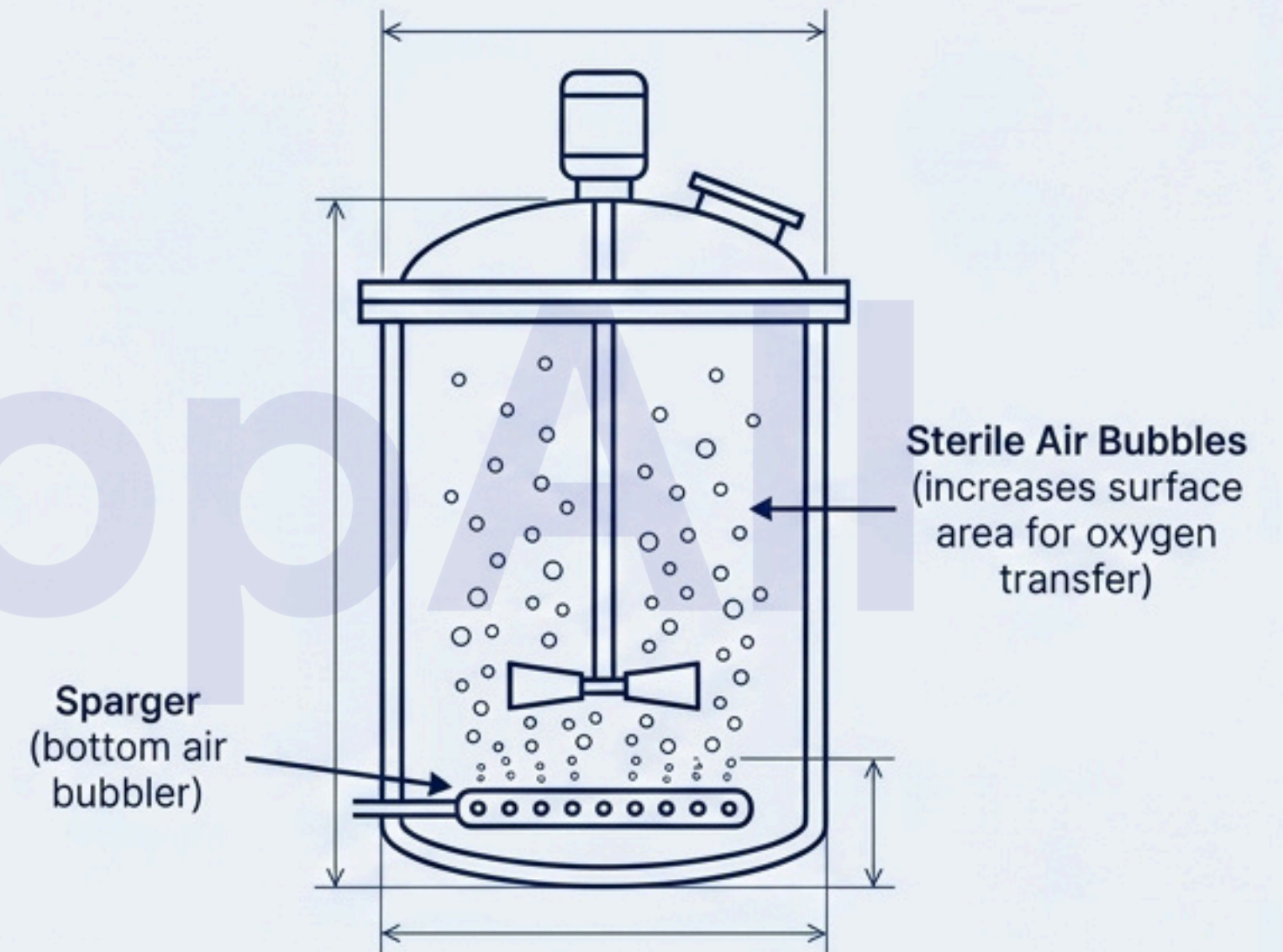
Bioreactors are vessels where raw materials are biologically converted using microbial, plant, animal, or human cells.

Engineering the Environment: Stirred-Tank Bioreactors

Simple Stirred-Tank



Sparged Stirred-Tank



Common Systems: Temperature Control | pH Control | Oxygen Delivery | Foam Control

NEET Key Takeaways: High-Yield Facts



Definitions

- **Heterologous Host:** The cell used as a factory to express a foreign gene.
- **Recombinant Protein:** The ultimate product formed when a protein-encoding gene is expressed in a heterologous host.

The Scale-Up Metric

- **100 - 1000 Litres:** The standard volume range for industrial bioreactors.
- **Active log/exponential phase:** The exact physiological state maintained by continuous culture systems to ensure larger biomass.

The 6 Optimum Conditions

- ✓ Temperature
- ✓ pH
- ✓ Substrate
- ✓ Salts
- ✓ Vitamins
- ✓ Oxygen



You've Learned the Theory.

Now Let's Test It.

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