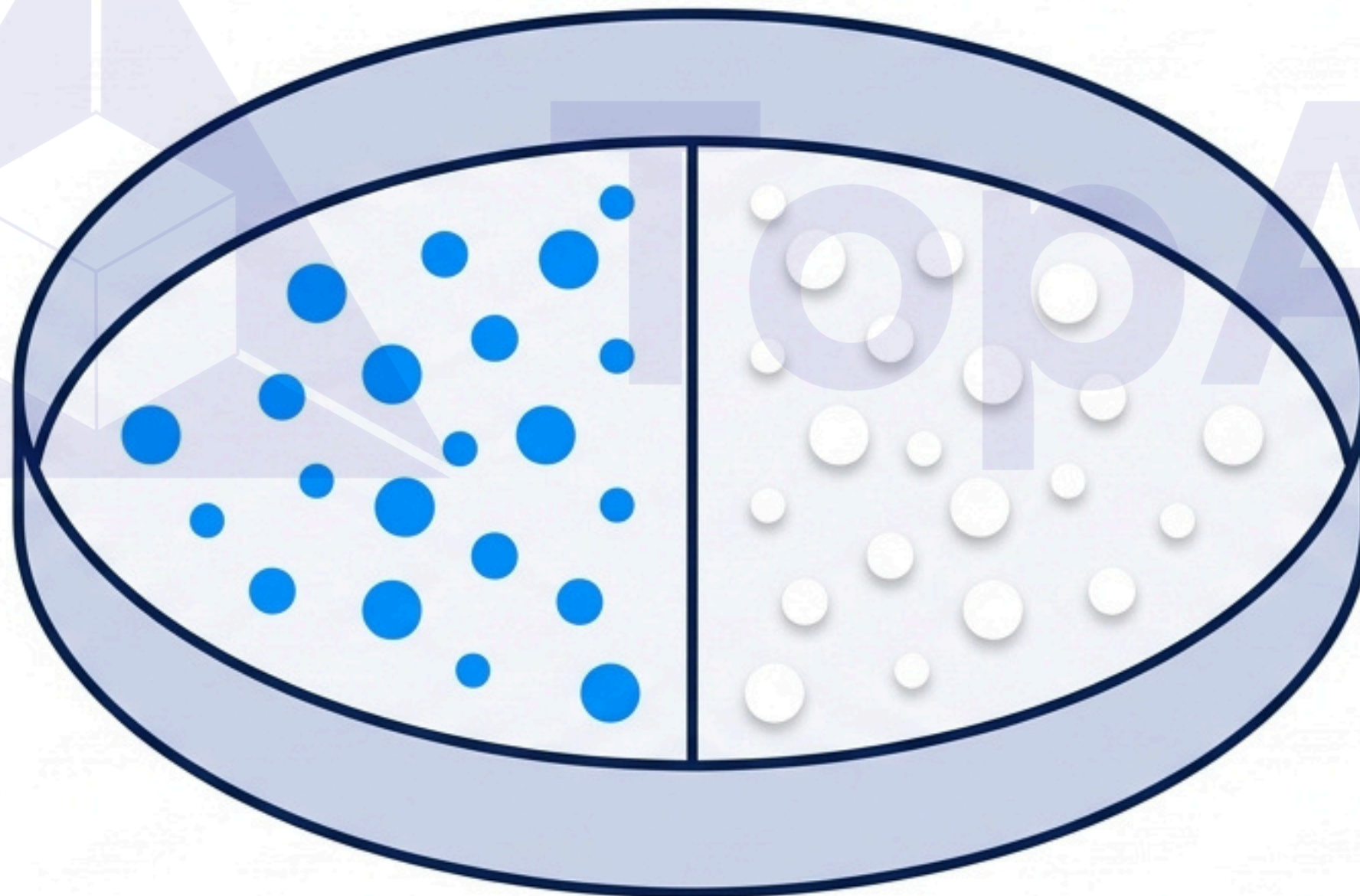


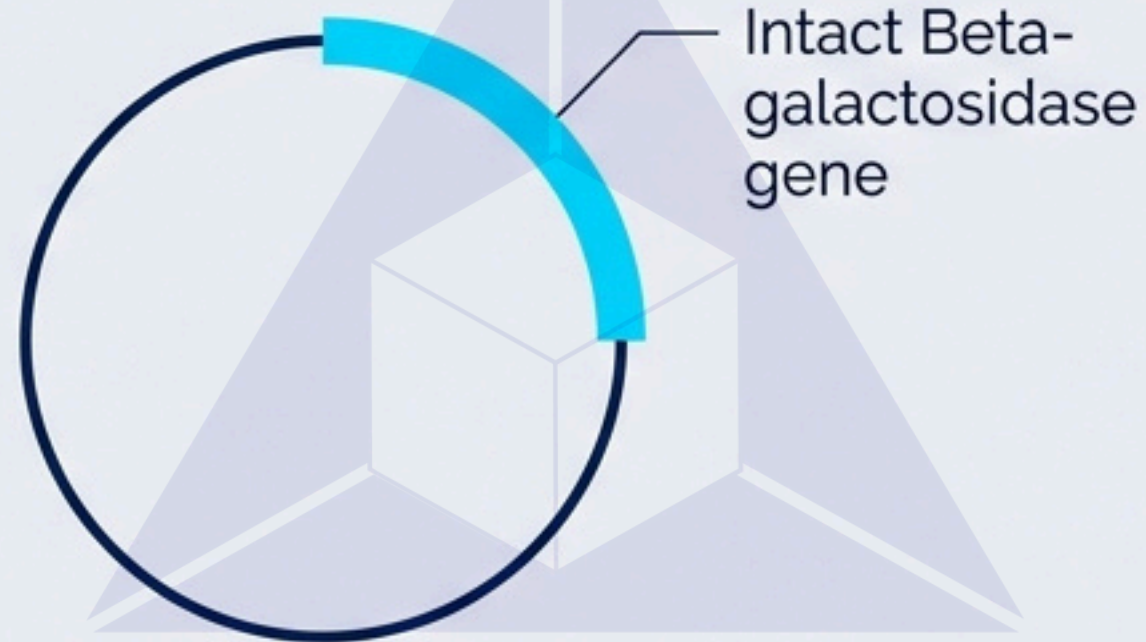
# Blue or White Colonies?

Mastering Insertional Inactivation in Recombinant DNA Technology



# The Beta-Galactosidase Marker

How the baseline screening system works.



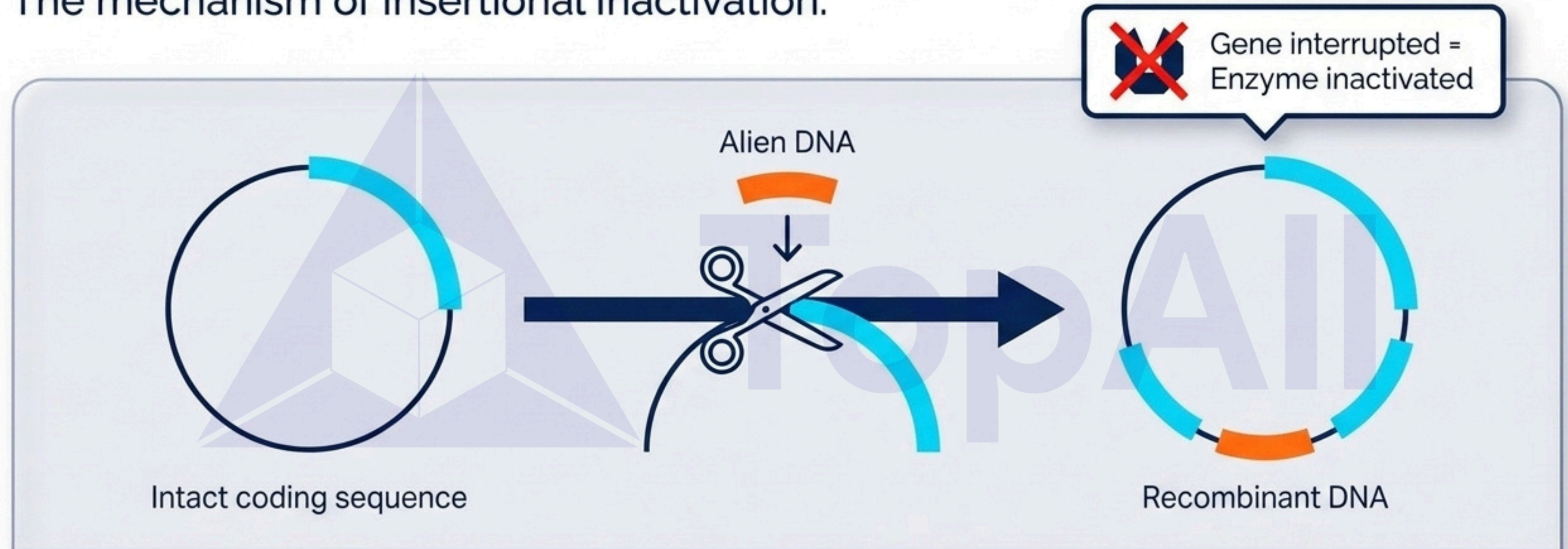
The plasmid contains a continuous coding sequence for the enzyme Beta-galactosidase.



When an active enzyme meets a chromogenic substrate in the culture medium, it produces a distinct blue color.

# Inserted DNA Inactivates the Gene

The mechanism of Insertional Inactivation.



The Goal: Insert alien DNA directly into the coding sequence of the marker gene.

The Result: The physical insertion breaks the gene sequence, destroying its ability to synthesize active Beta-galactosidase.



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## Key Highlights

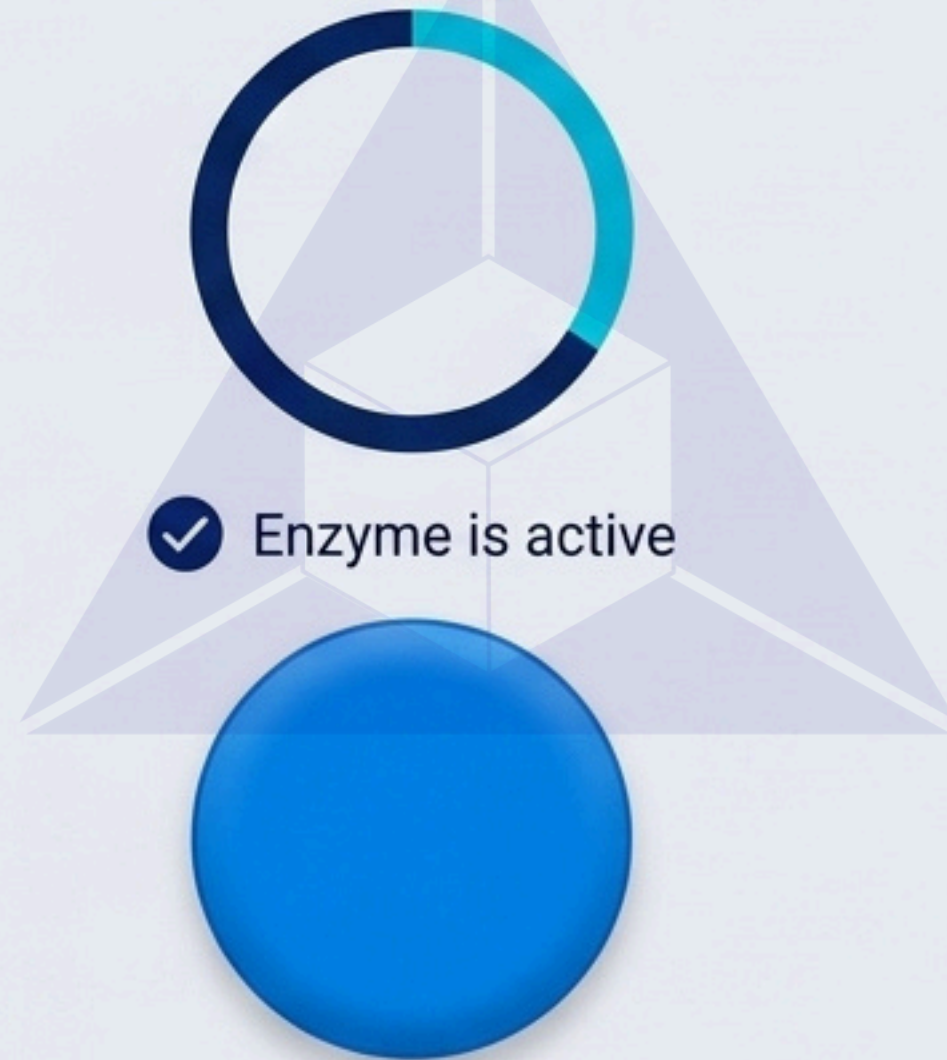
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# Visualizing the Results

Blue = Non-Recombinant | White = Recombinant

## Blue Colonies



Plasmid has no insert.  
Substrate is processed.

## White Colonies



Plasmid contains alien DNA insert.  
Substrate remains colorless.

# NEET Key Takeaway

High-Yield Summary for Exam Prep



- **Replaces older methods:** It bypasses the cumbersome process of simultaneous plating on two different antibiotic plates.



- **Insertional Inactivation:** Occurs when alien DNA is ligated directly within the Beta-galactosidase coding sequence, destroying enzyme function.



- **The Code to Remember:**



= Non-Recombinant  
(Intact gene)



= Recombinant  
(Inactivated gene)

A+



# You've Learned the Theory.

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