



Bacterial Transcription

The Molecular Blueprint: High-yield
breakdown of RNA types and the
mechanics of transcription in prokaryotes.

The RNA Triad

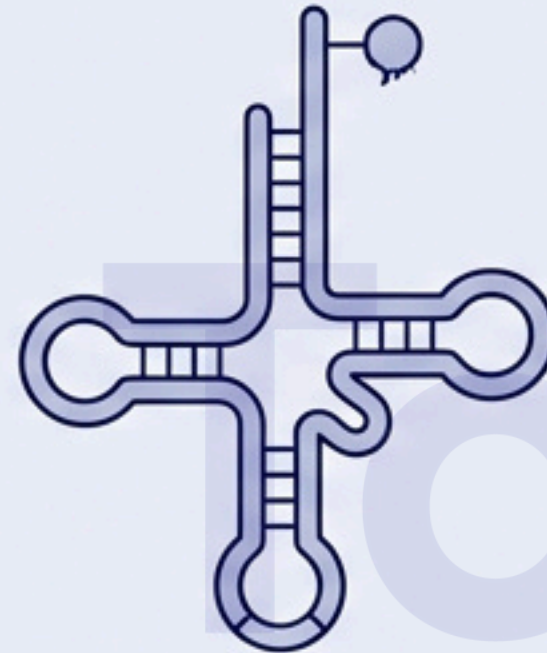
All three major types of RNA are strictly required to synthesise a protein in a bacterial cell.



mRNA (Messenger RNA)

Provides the Template

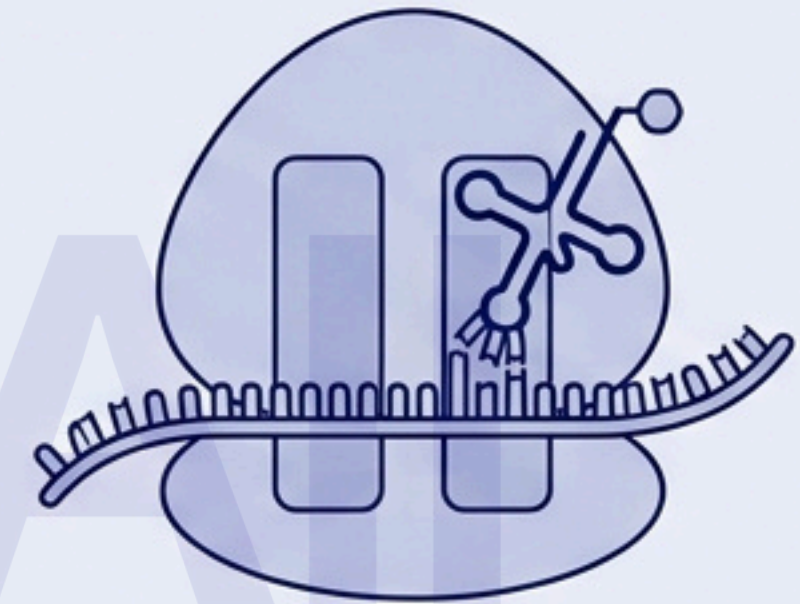
Carries the genetic blueprint from DNA to the ribosome.



tRNA (Transfer RNA)

The Adapter

Brings specific amino acids and reads the genetic code.



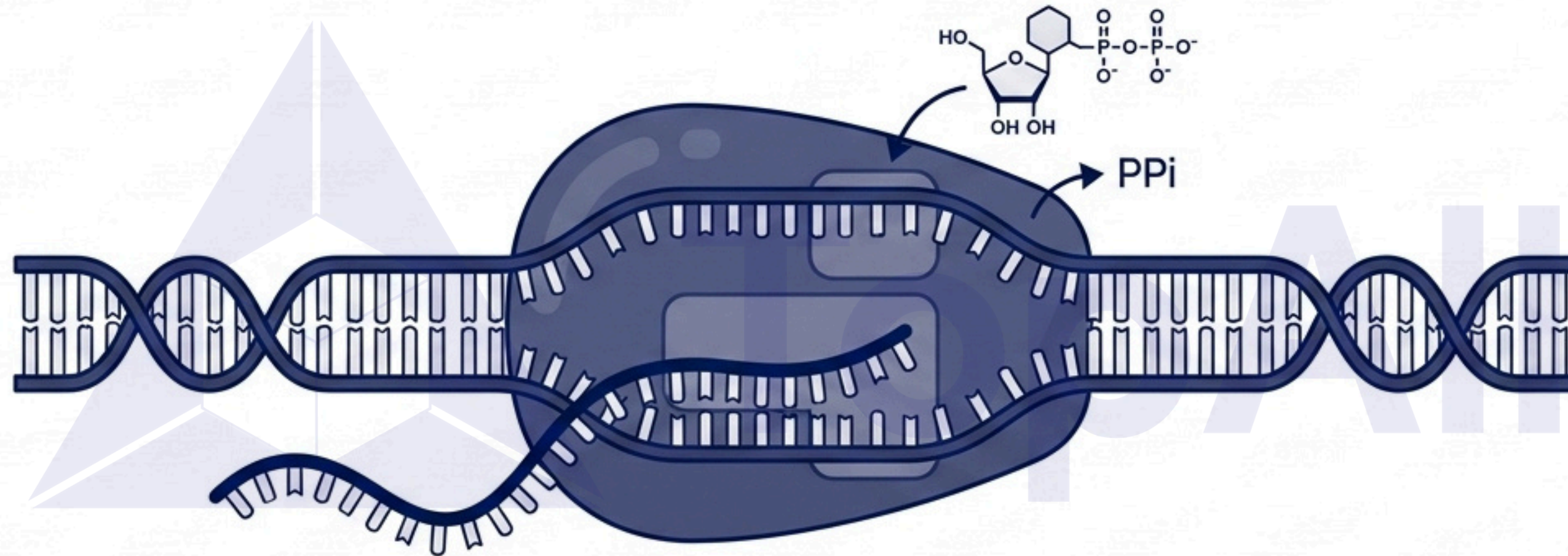
rRNA (Ribosomal RNA)

The Catalyst

Plays critical structural and catalytic roles (ribozyme) during translation.

The Engine of Transcription

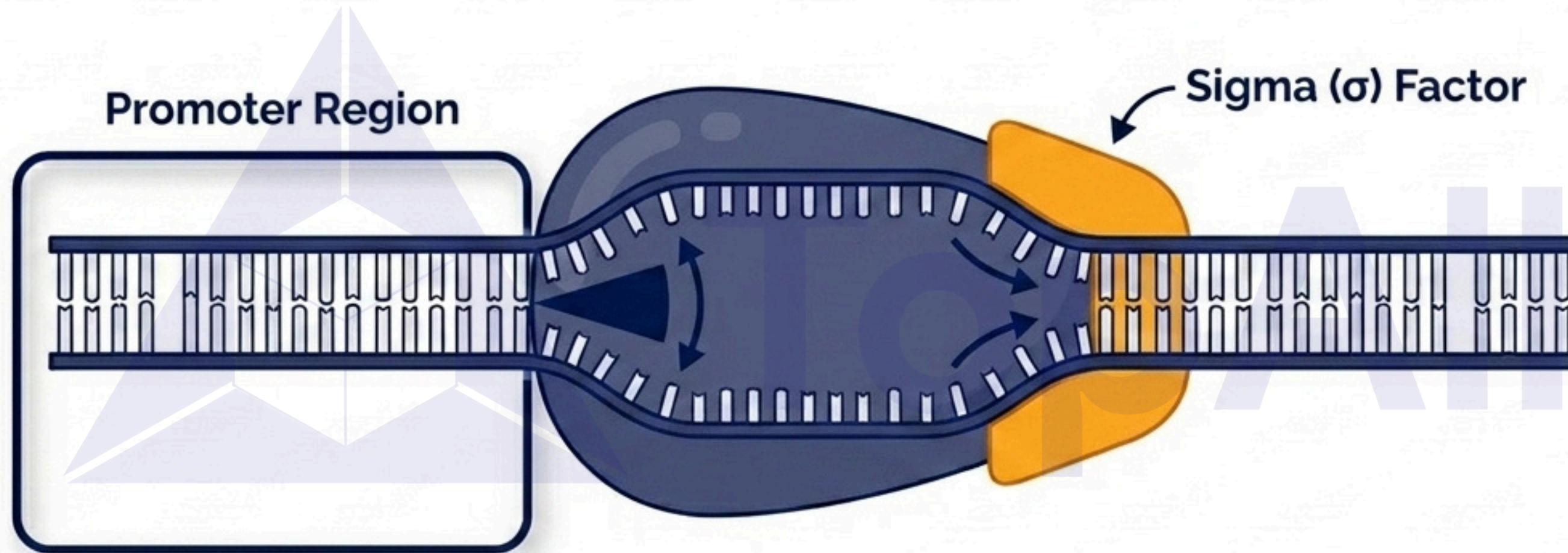
In bacteria, a single DNA-dependent RNA Polymerase catalyses the transcription of all three types of RNA (mRNA, tRNA, rRNA). It uses nucleoside triphosphates as substrates to build the polymer.



Core Limitation: The RNA polymerase on its own is **ONLY** capable of catalysing elongation. It cannot initiate or terminate transcription independently.

Phase 1: Initiation

The process begins at the Promoter region of the DNA. RNA polymerase must associate transiently with an initiation factor to alter its specificity and open the helix.





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



At prep.topall.app

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

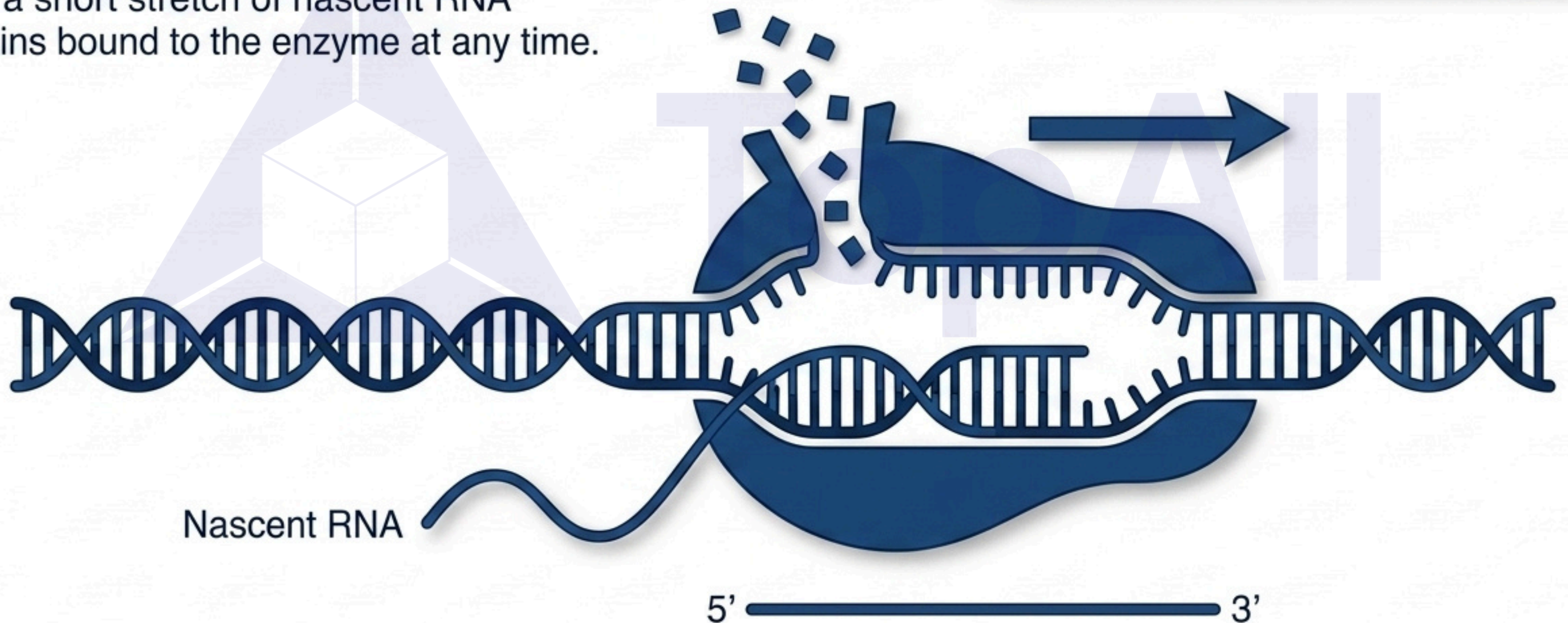


Phase 2: Elongation

The polymerase moves along the DNA, polymerising RNA in a template-dependent fashion following the rule of complementarity.

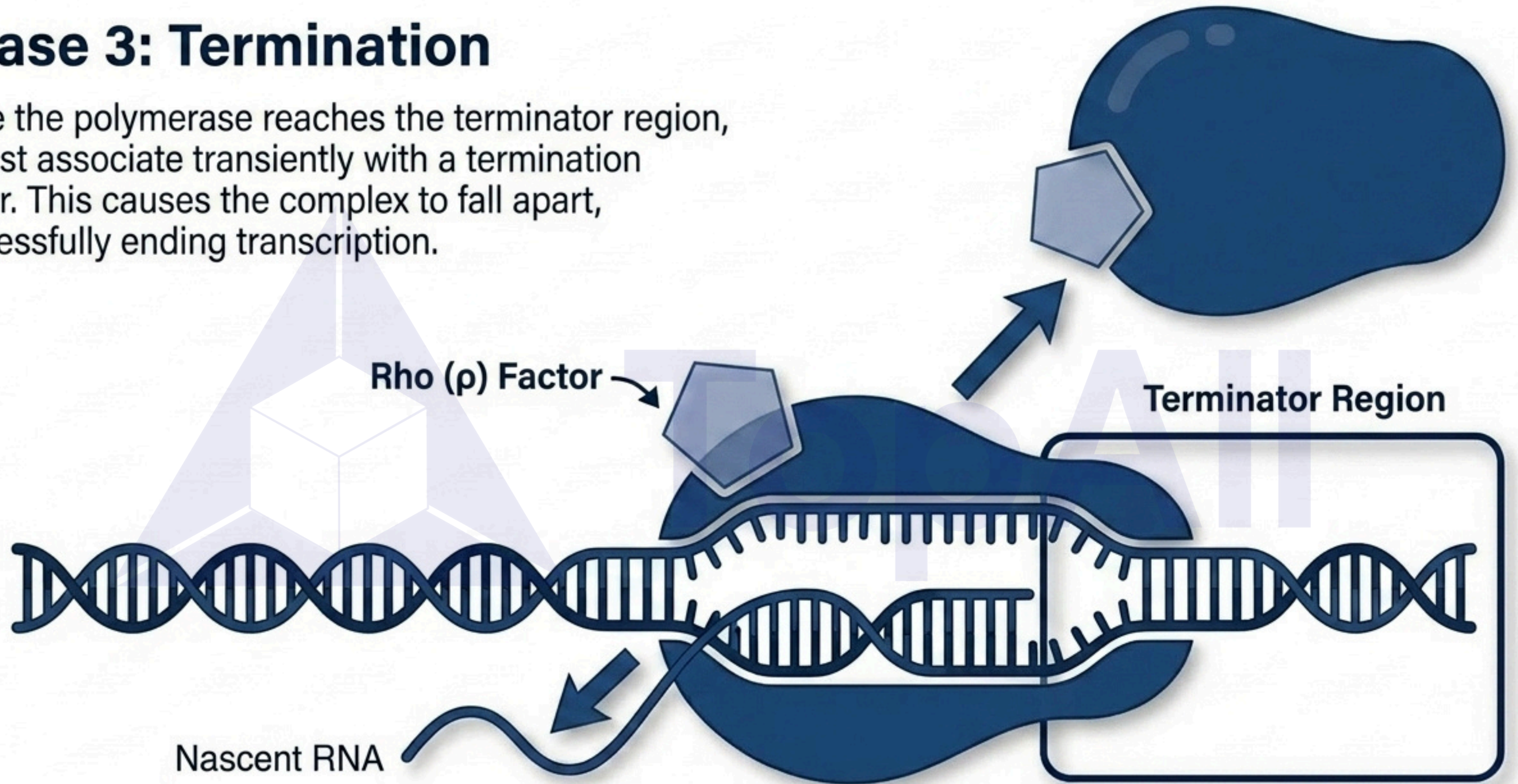
Only a short stretch of nascent RNA remains bound to the enzyme at any time.

Directionality Rule: The DNA-dependent RNA polymerase catalyses polymerisation in ONLY one direction: $5' \rightarrow 3'$. Therefore, the DNA template strand must have $3' \rightarrow 5'$ polarity.



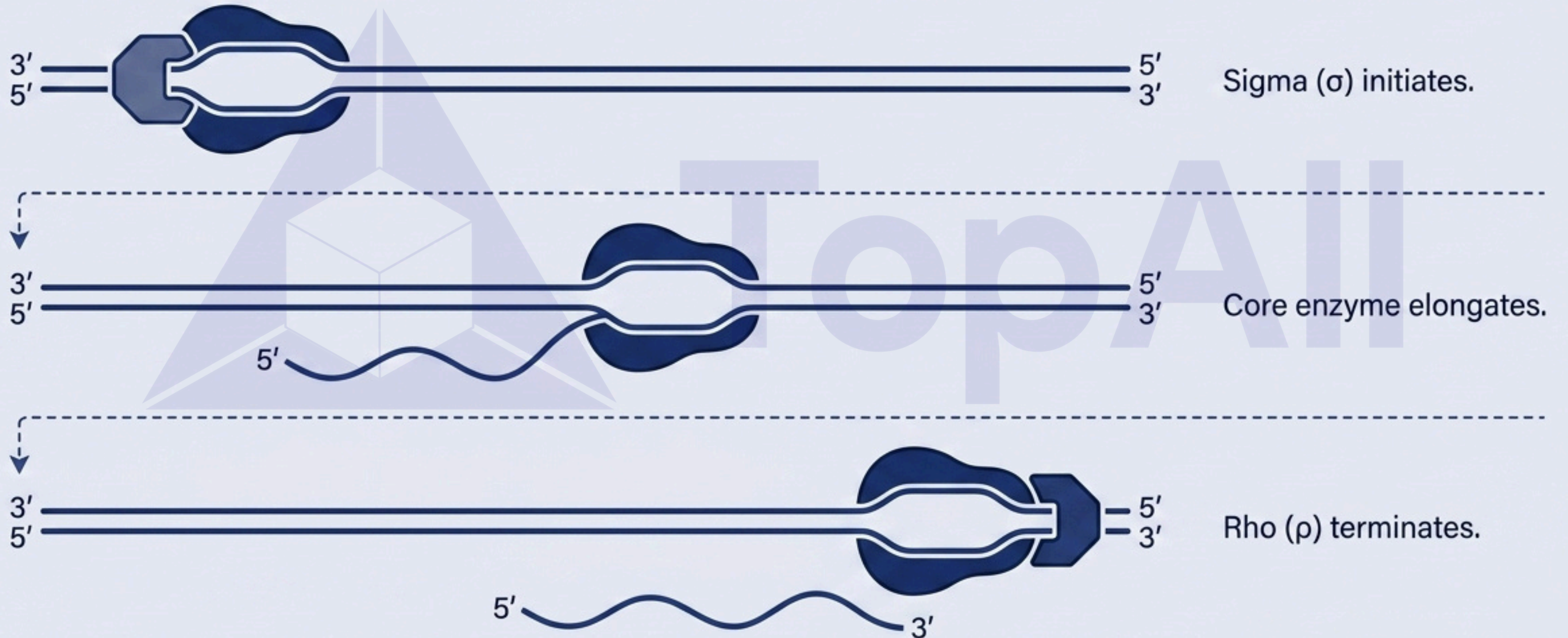
Phase 3: Termination

Once the polymerase reaches the terminator region, it must associate transiently with a termination factor. This causes the complex to fall apart, successfully ending transcription.



The Complete Transcription Cycle

Transient associations with σ and ρ factors drive the cycle of a single RNA polymerase.



The Bacterial Advantage

Because bacteria lack a separated nucleus and cytosol, their transcription system is exceptionally streamlined.



Zero Processing Required

Unlike eukaryotes, bacterial mRNA does not contain introns. It requires no complex processing (splicing, capping, or tailing) to become active.



Coupled Translation

Translation can begin much before the mRNA is fully transcribed. Transcription and translation occur simultaneously in the same compartment, vastly accelerating protein synthesis.



You've Learned the Theory.

Now Let's Test It.

Reading notes gets you knowledge.

Practicing MCQs gets you marks.

That's exactly what TopAll Pro is built for.

Try TopAll Pro Now

What TopAll Pro Does Differently

-  **Stuck? Snap it. Solve it. — Doubts AI**
Photo → step-by-step solution in seconds, 24/7
-  **Your AI Coach finds your blind spots**
Concept-level weakness detection — not just chapter-level
-  **4.5 Lakh+ questions. Never run out.**
13× more content than any other prep app in India
-  **Build your own test in 60 seconds**
Pick a chapter, set difficulty — AI does the rest instantly.
-  **AI Recommendation that helps you improve**
AI Recommendation Analysis your Tests and tell you where you need to improve.



Practice the moment you finish studying
Jump in while the concept is still fresh in your head

4.5L+
MCQs

1.5L+
Students

AI Powered
In-Depth Analysis