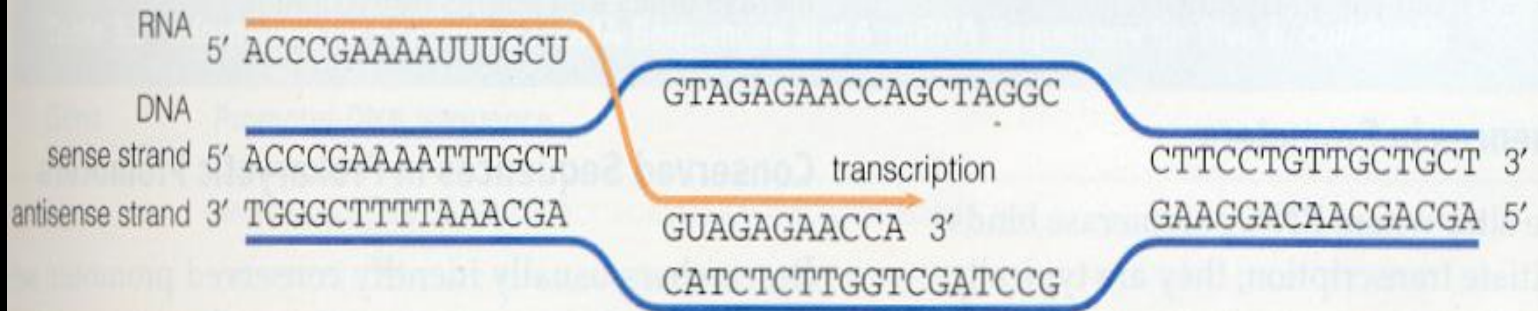


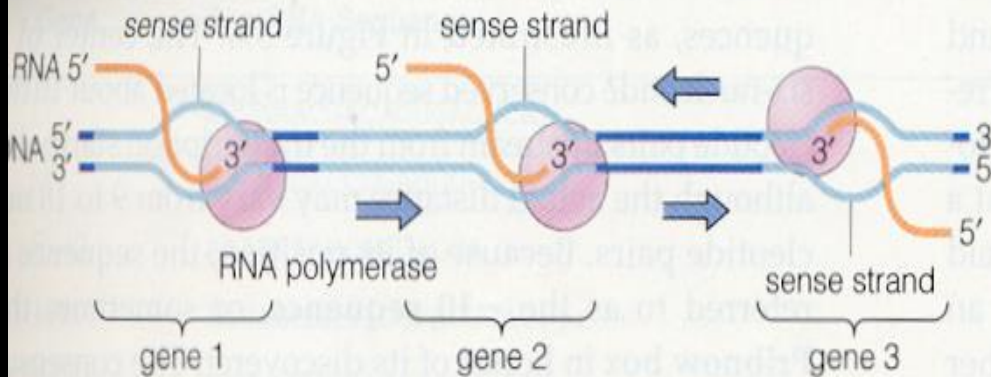
Figure 3.1 The central dogma of molecular genetics.

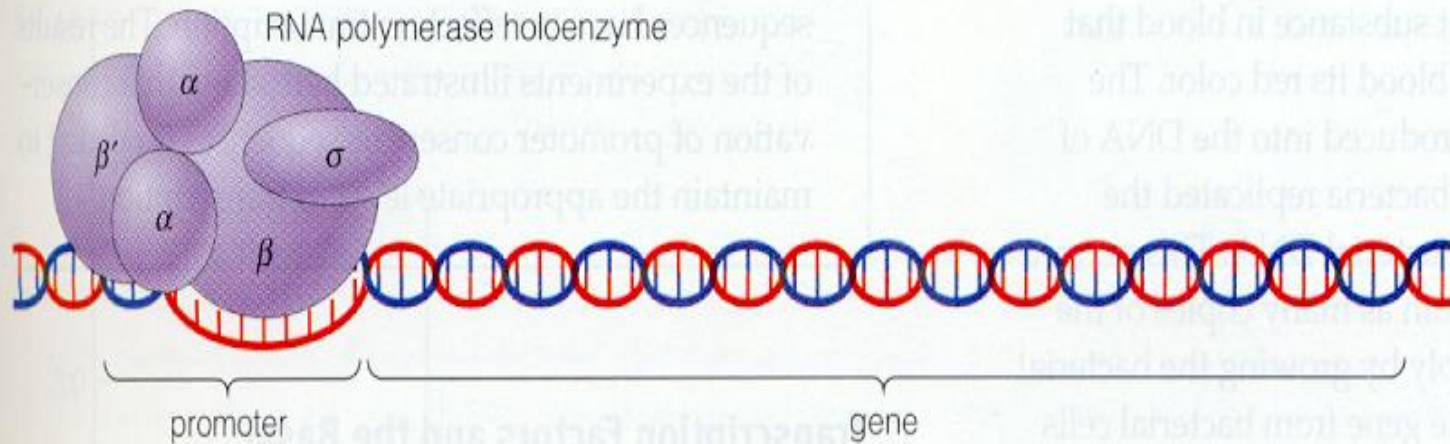
The RNA and the sense strand in the DNA have the same nucleotide sequence in the 5' → 3' direction (substituting U for T in the RNA).



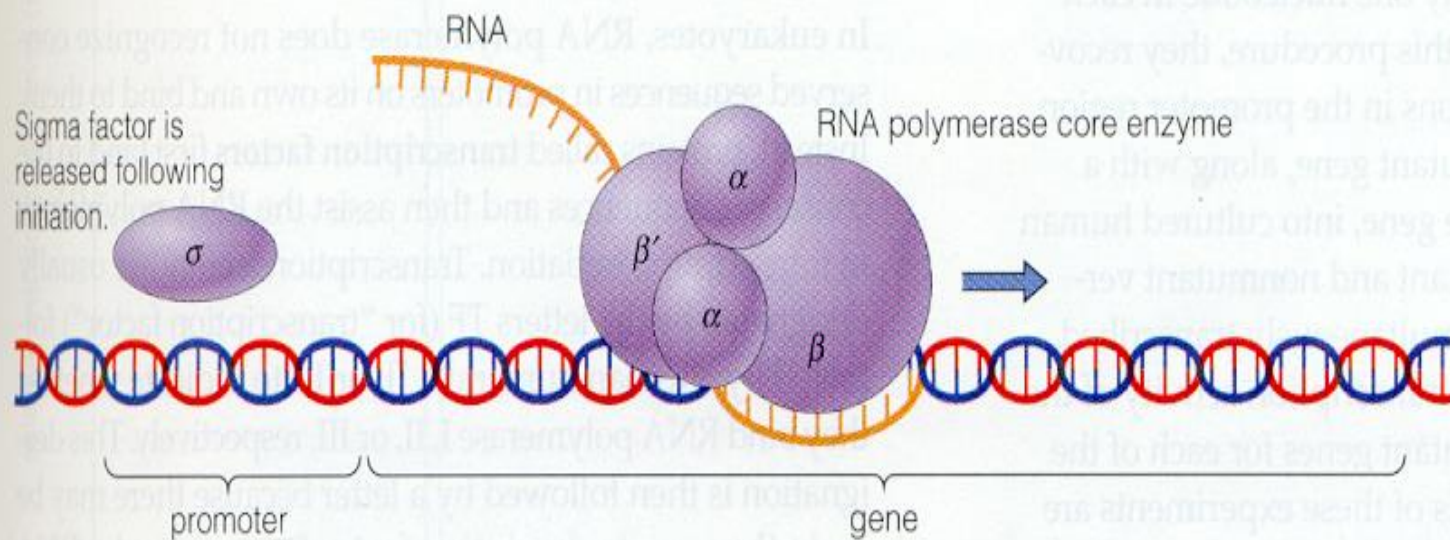
The antisense strand serves as the template for transcription.

Figure 3.4 The two strands of a gene.





a Initiation

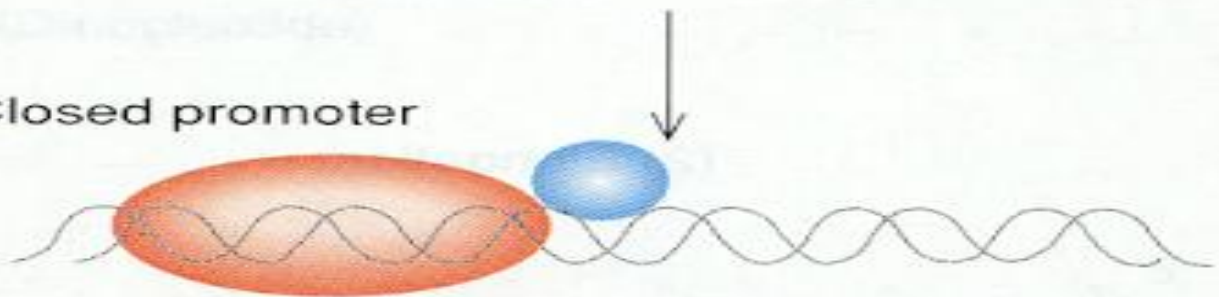


b Elongation

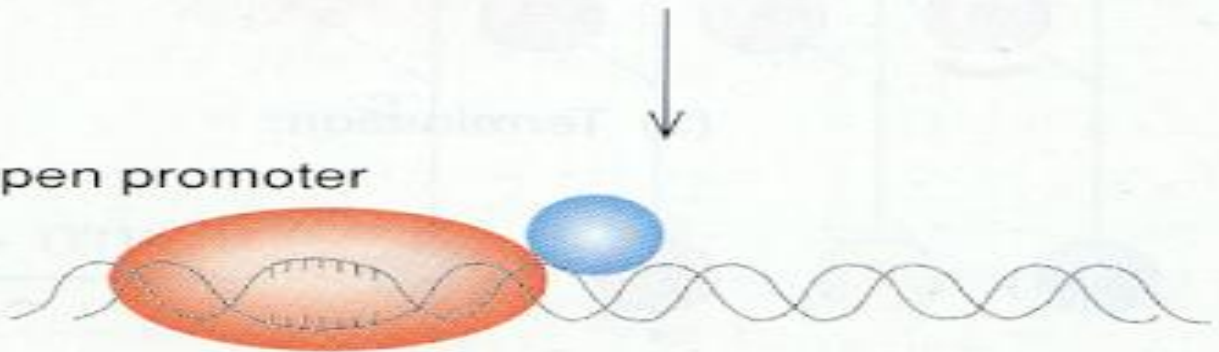
(a) RNA polymerase holoenzyme



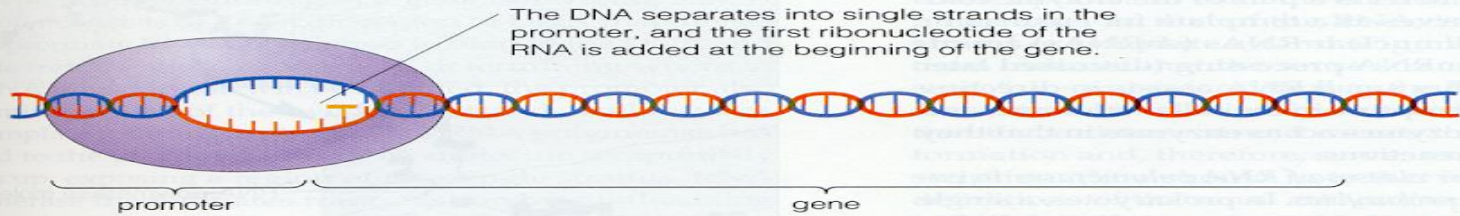
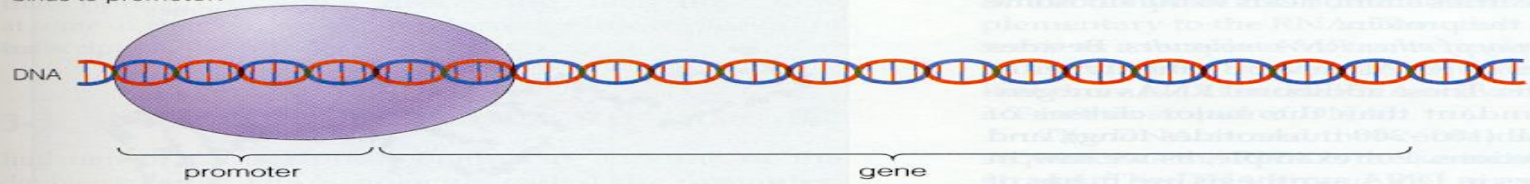
(b) Closed promoter



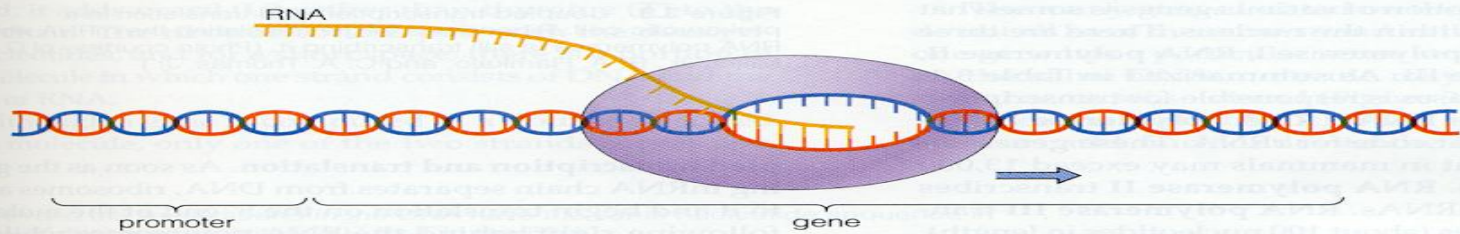
(c) Open promoter



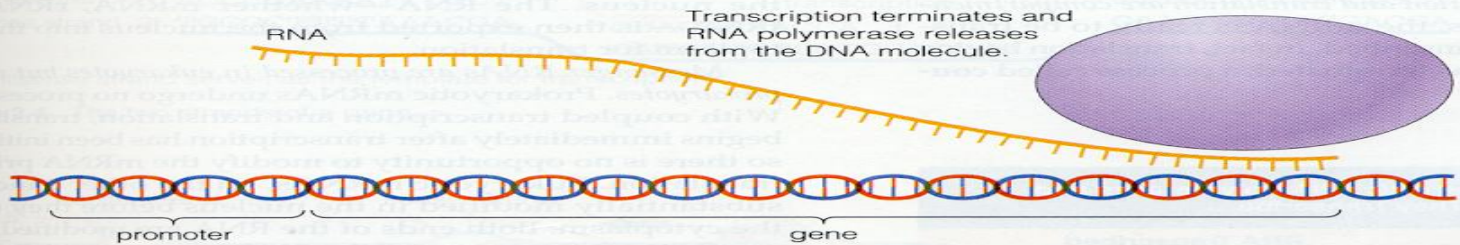
RNA polymerase binds to promoter.



a Initiation



b Elongation

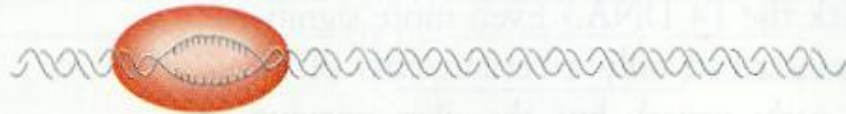


c Termination

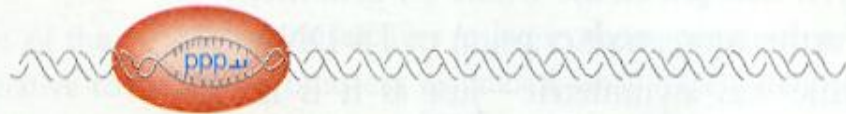
Figure 3.2 The three stages of transcription.

(1) Initiation:

(a) RNA polymerase binds to promoter:



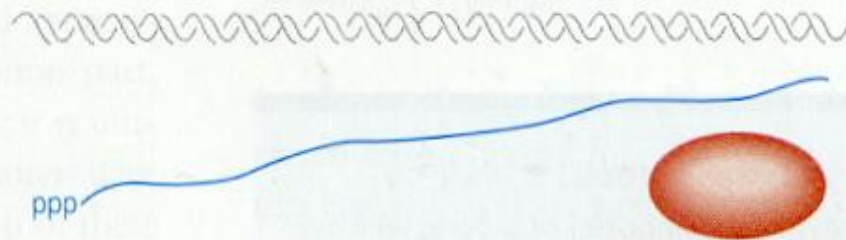
(b) First phosphodiester bond forms:

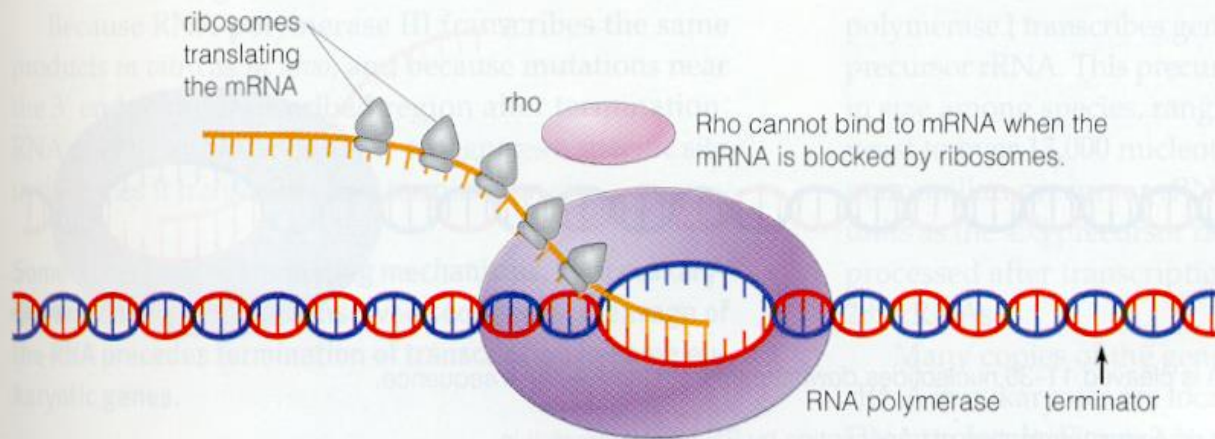


(2) Elongation:

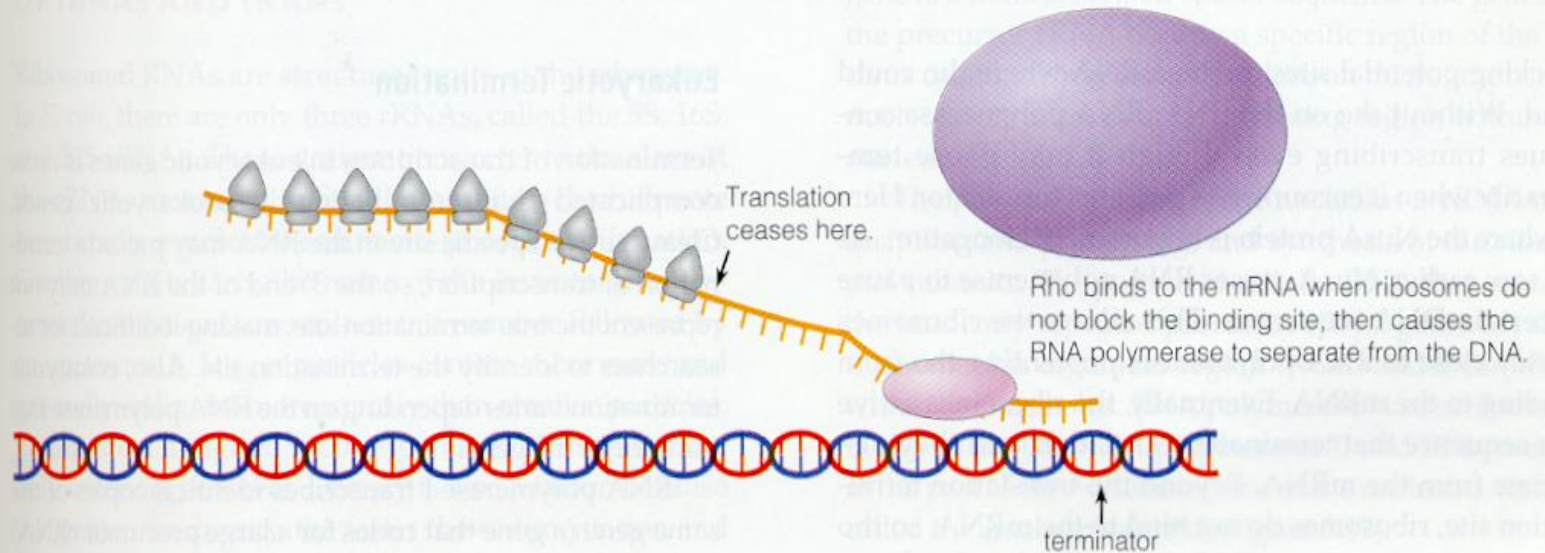


(3) Termination:





a Transcription continues as long as ribosomes cover potential binding sites for rho on the mRNA.



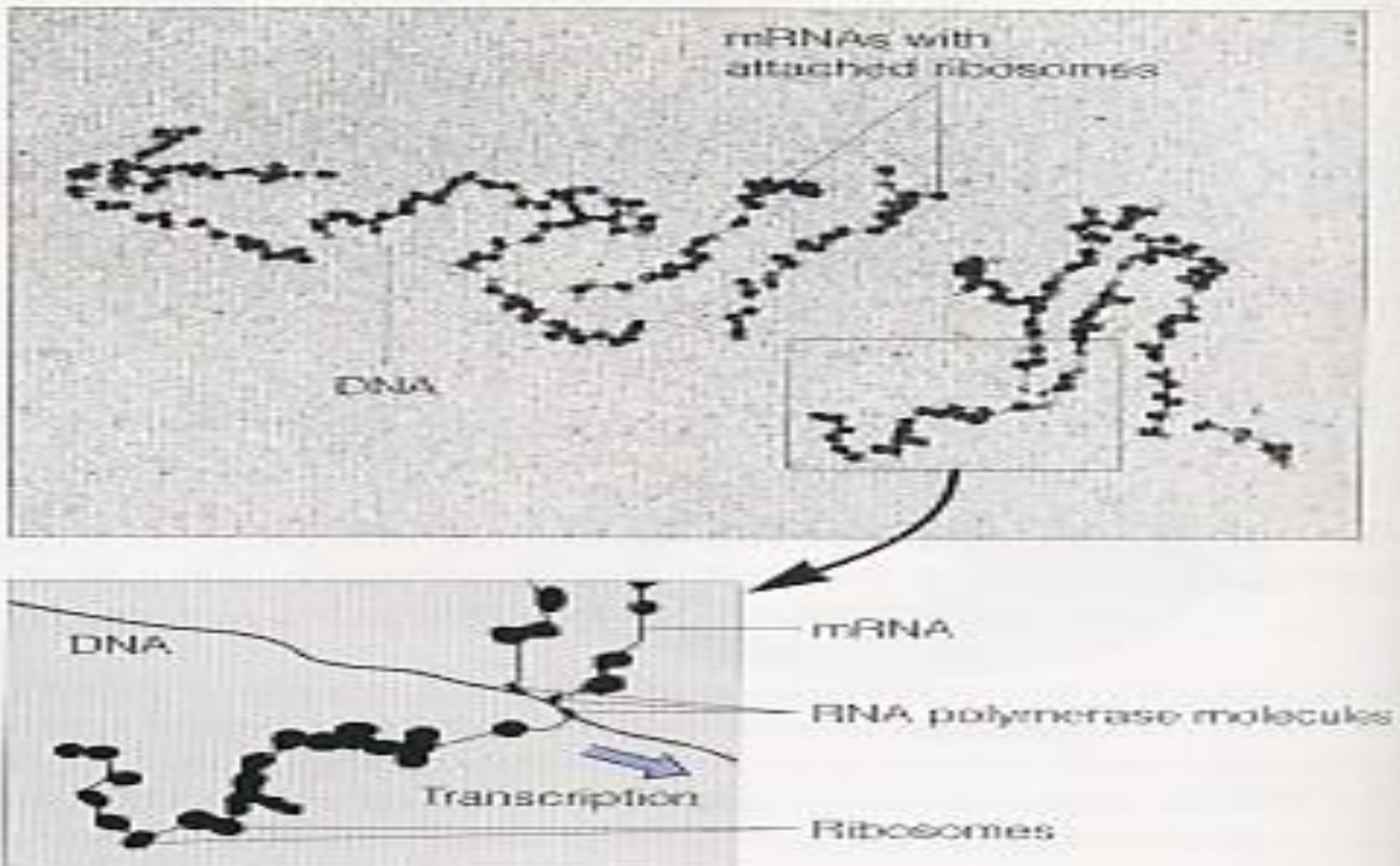


Figure 3.3 Coupled transcription and translation in a prokaryotic cell. Ribosomes begin translating the mRNA while RNA polymerase is still transcribing it. (Photo courtesy of O. L. Miller, Jr., B. A. Hamkalo, and C. A. Thomas, Jr.)

INACTIVE CHROMOSOME SEGMENT

ACTIVE CHROMOSOME SEGMENT

DIRECTION OF RNA SYNTHESIS

RNA POLYMERASE

POLYRIBOSOME

RIBOSOME

DIRECTION OF PROTEIN SYNTHESIS

MESSENGER RNA

