

## Transcription:

The synthesis of mRNA complementary on a DNA strand is called transcription through the enzymatic action of RNA polymerase .

In the DNA double helix , one of the strands serves as a template to produce mRNA .

On the template strand a special region called promoter region is present .

The promoter region contain a set of nucleotide sequences which initiate transcription .These initiating region are called initiation site .

During transcription ,the sigma factors combines with the core enzyme to form RNA Polymerase .

The RNA polymerase attaches to the initiator site with help of  $Mn^{++}$  or  $Mg^{++}$ .

The RNA polymerase causes a local opening in the double helix . One of the unwound DNA Strands ,the polymerisation of new RNA occurs.

The first nucleotide triphosphate to be incorporated into the RNA chain is usually either ATP OR GTP .

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DNA), ribonucleosides (ATP, GTP, UTP, CTP), the enzyme RNA polymerase and divalent metal ions.

(2) RNA polymerase (Fig. 19.2) consists of a core enzyme, with subunits ( $\alpha$ ,  $\alpha$ ,  $\beta$ ,  $\beta$ ,  $\omega$ ) and a sigma ( $\sigma$ ) factor. The sigma factor initiates transcription of mRNA on the DNA template and the core enzyme continues transcription.

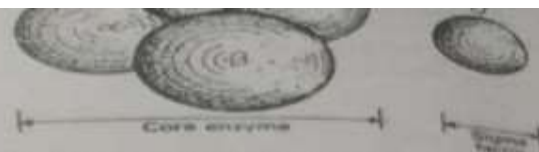


Fig. 19.2. Schematic representation of the enzyme RNA polymerase.

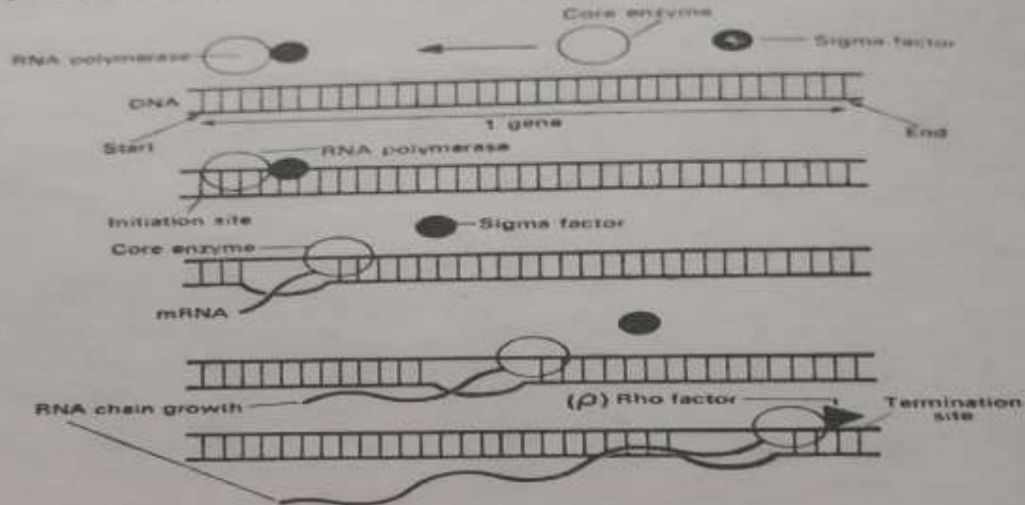


Fig. 19.3. Scheme of RNA synthesis.

- A. Sigma factors and core enzyme join to form RNA polymerase.
- B. RNA polymerase attaches to initiation site.
- C. DNA unwinds and core enzyme catalysis synthesis of mRNA. Sigma factor dissociates from core enzyme.
- D. The RNA chain grows longer.
- E. Termination of chain growth at termination site by rho factor.

The second nucleotide triphosphate is attached to first nucleotide triphosphate through the RNA polymerase

In this way ,nucleotide triphosphate are added one by one and the RNA chain grows and elongates .

As the transcription proceeds ,unwind part of the DNA strand reforms its original double helix .

the particular site of the DNA ,the transcription is stopped .This site is called termination site or pause site .

There is a poly AAAAAAAAAAAAAA.....sequence in the termination site .When RNA polymerase reach this site , the addition of nucleotide to the RNA is stopped .

The protein factors like rho and SF help to terminate the transcription .

The RNA produced by transcription is inactive , and is called pre -RNA or primary transcript or nascent RNA . It is active after processing

