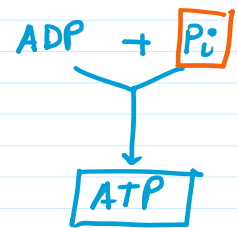
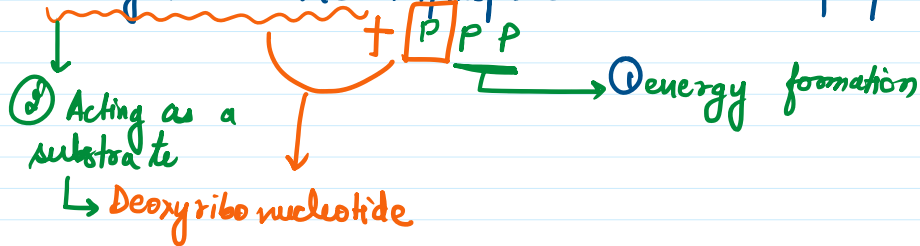


#. DNA replication

• DNA replication is an energy expensive process.

= Deoxyribonucleoside triphosphate serve dual purpose:-

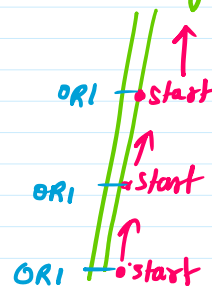


• DNA replication occur during S-phase of cell cycle.
[Synthesis phase]

Prokaryotic DNA act as a single replicating unit or replicon.

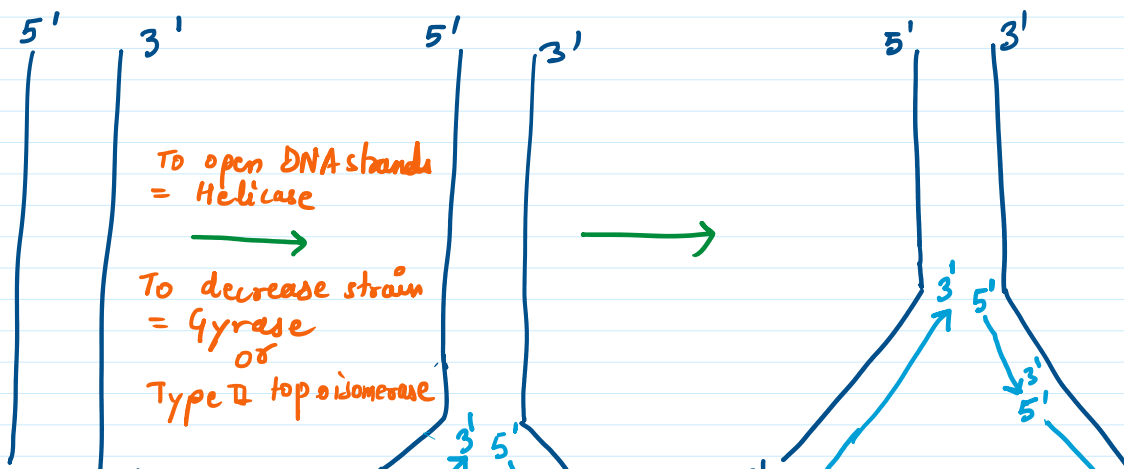


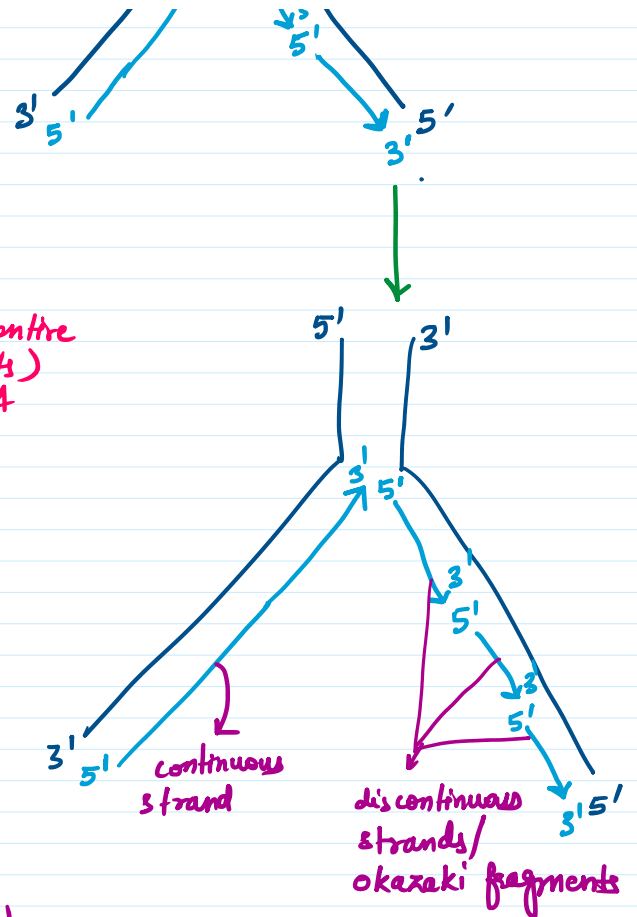
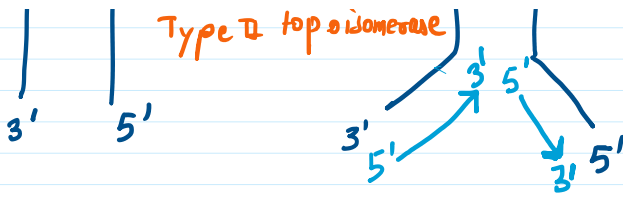
Eukaryotic DNA molecule has several replicating units or replicon.



• The intertwined strands of DNA separate from a particular point called Origin of Replication (ORI).

• In the absence of ORI replication will not occur.

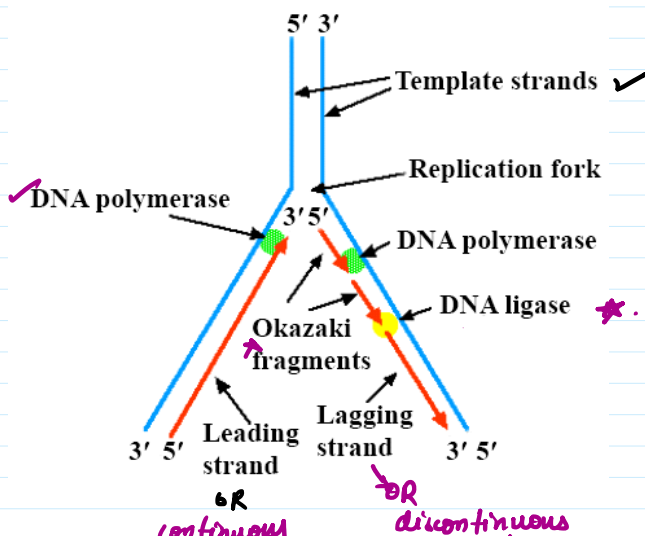
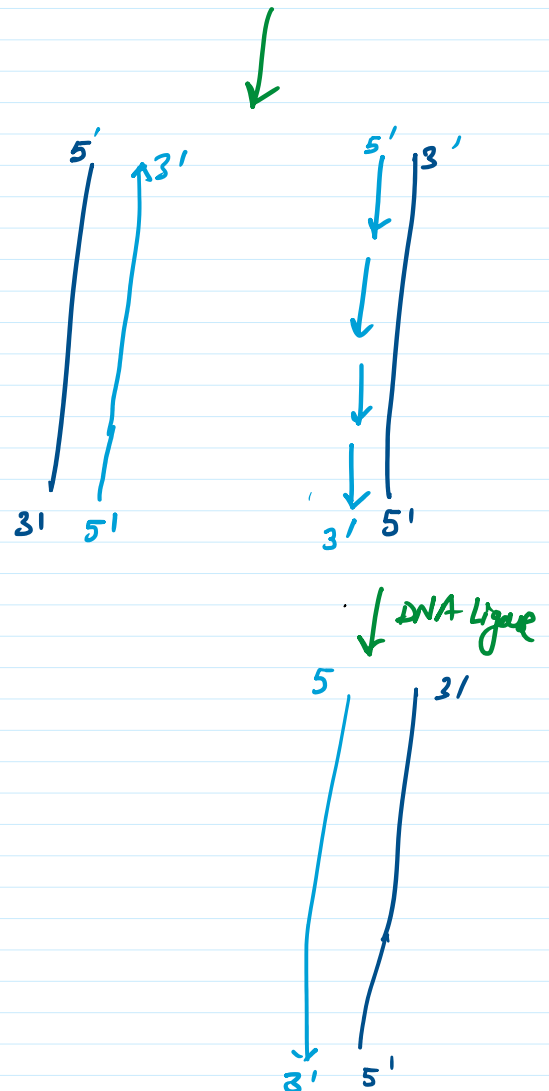




- Since, 2 strands cannot be separated in its entire length (due to very high energy requirements) replication occurs with small opening of DNA helix. Y-shaped structure formed is called

Replication fork

- DNA dependent DNA polymerase catalyse the polymerisation of nucleotides only in direction $5' \rightarrow 3'$.
- Consequently on one of the template strand ($3'$ to $5'$) polarity the synthesis of DNA is continuous.
- while the other template strand (polarity $5'$ to $3'$) the synthesis of DNA is discontinuous.
- the discontinuously synthesised strands are later joined together by the enzyme DNA ligase.

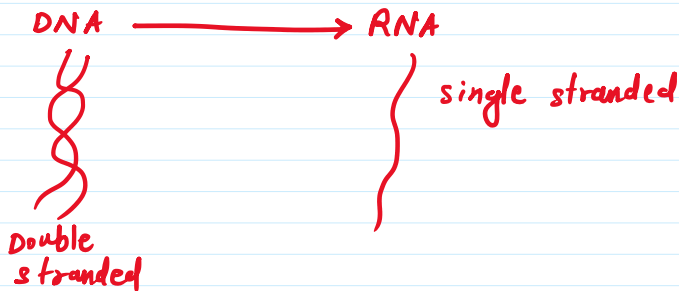


3' 5' strand strand 3' 5'
 continuous strand discontinuous strand

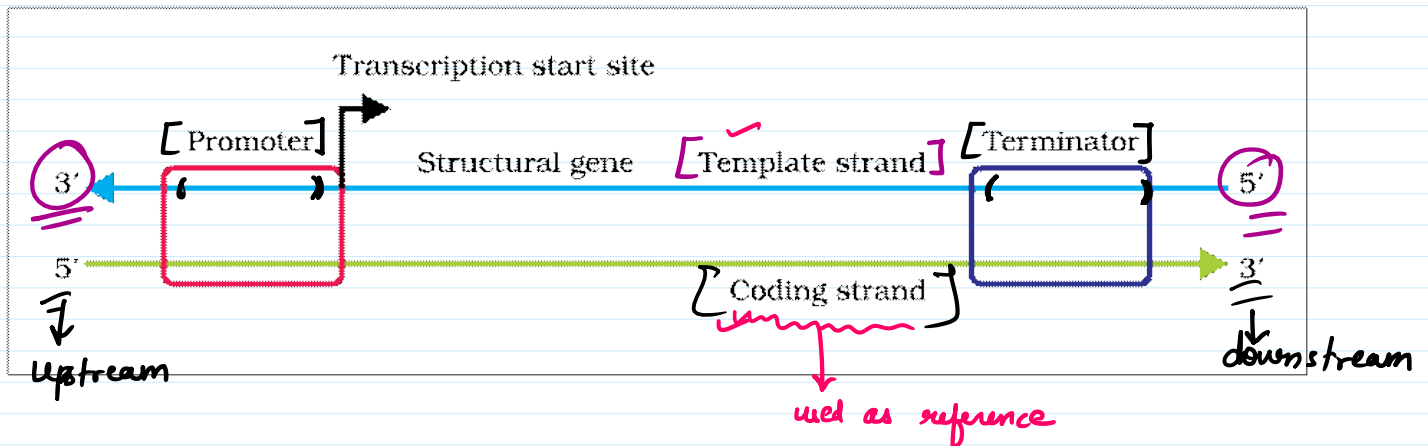
3' 5'

2000 dp replicate per sec.

Transcription



- DNA dependent RNA polymerase = polymerisation in direction 5' → 3'.



- A transcription unit in DNA has 3 regions:-

- A promoter
- Structural gene
 - Template strand = polarity 3' → 5'
 - Coding strand = polarity 5' → 3'
- A terminator

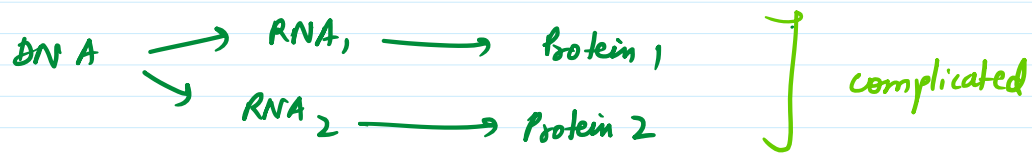
- the coding strand does not code for RNA, but reference points regarding transcription are made in relation to it.

- The promoter refers to a particular sequence of DNA located towards 5' end (upstream) of coding strand, where RNA polymerase become bound for transcription.

- The terminator refer to a sequence of DNA located towards 3' end (downstream) of coding strand, where the process of transcription would stop.

Only one of the strands of DNA act as template strand for RNA synthesis because of the following reasons =

① If both the strands code for RNA, 2 different RNA molecules & 2 different proteins will be formed, hence the genetic information transfer machinery would become complicated.



② Since the 2 RNA strands produced would be complementary to each other they would wind together to form a double stranded RNA without carrying out translation that means the process of transcription would become futile (waste).