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1] highlight the steps in DNA replication ;

1) The first major step for the DNA Replication to take place is the breaking of hydrogen bonds between bases of the two antiparallel strands. The unwinding of the two strands is the starting point. The splitting happens in places of the chains which are rich in A-T. That is because there are only two bonds between Adenine and Thymine (there are three hydrogen bonds between Cytosine and Guanine). Helicase is the enzyme that splits the two strands. The initiation point where the splitting starts is called origin of replication. The structure that is created is known as Replication Fork.

2) One of the most important steps of DNA Replication is the binding of RNA Primase in the the initiation point of the 3'-5' parent chain. RNA Primase can attract RNA nucleotides which bind to the DNA nucleotides of the 3'-5' strand due to the hydrogen bonds between the bases. RNA nucleotides are the primers for the binding of DNA nucleotides.

3) The elongation process is different for the 5'-3' and 3'-5' template. The 3'-5' proceeding daughter strand -that uses a 5'-3' template- is called leading strand because DNA Polymerase a can read the template and continuously adds nucleotides complementary to the nucleotides of the template, for example Adenine opposite to Thymine.

4) In the lagging strand the DNA Pol I -exonuclease- reads the fragments and removes the RNA Primers. The gaps are closed with the action of DNA Polymerase and adds complementary nucleotides to the gaps and DNA Ligase which adds phosphate in the remaining gaps of the phosphate - sugar backbone.

5) The last step of DNA Replication is the Termination. This process happens when the DNA Polymerase reaches to an end of the strands. We can easily understand that in the last section of the lagging strand, when the RNA primer is removed, it is not possible for the DNA Polymerase to seal the gap. So, the end of the parental strand where the last primer binds isn't replicated.

These ends of linear chromosomal DNA consists of noncoding DNA that contains repeat sequences and are called telomeres.

6)The DNA Replication is not completed before a mechanism of repair fixes possible errors caused during the replication. Enzymes like nucleases remove the wrong nucleotides and the DNA Polymerase fills the gaps.

B] function of dna replication of enzymes ;

### 1)Helicase

DNA replication begins at places called origins, within the DNA molecule and the creation of replication forks. The process of strand separation is made possible because of the enzyme Helicase, which separates the two strands using the energy derived from ATP hydrolysis.

### 2)DNA Primase

One of the most crucial enzymes is DNA Primase. After the DNA strands are separated, to begin the creation of new molecules, through addition of complementary bases to the templates, a short RNA segment, called a 'primer' is required. These primers are synthesized by DNA primase enzymes, thus initiating the DNA replication process.

### 3) DNA Polymerase

The most important enzymes, that carry out the main task of aligning the complementary bases with template strands of unzipped DNA, are the DNA polymerases. They are a large family of enzymes that carry out the task of adding complementary base nucleotides, by reading the template strands. Besides the task of elongating the DNA molecule, they also carry out DNA proofreading and repair.

### 4)DNA Ligase

While Helicase works to unwind the DNA molecule, Ligase is the replication enzyme that binds the fragments together by addition of phosphates in the gaps that remain in the phosphate-ribose sugar backbone.