

## Tutorial 2: DNA Replication

Answer all questions below.

1. What is a gene, and why must it be duplicated before cell division?

Gene is the unit of heredity. Each of the gene is responsible for a single inherited property or characteristic of the organism (phenotype). The gene must be duplicated before cell division because each cell needs a complete set of genes.

2. Describe the basic structure of DNA as proposed by Watson and Crick.

The basic structure of DNA that proposed by Watson and Crick is that DNA is a double helix.

3. Explain the process of semiconservative replication in DNA replication.

The process of semiconservative replication in DNA replication starts with the parental strands which gets separates to be the template for formation of new strands. Then the parental strand receives a newly synthesized strands of DNA which means each set will have one old strand and one new strand.

4. What is the role of DNA helicase in DNA replication?

The role of DNA helicase in DNA replication is to unwind the double helix. DNA helicase only disrupt the hydrogen bonds holding the base pairs together and not to break the chain of DNA.

5. What is the significance of Okazaki fragments, and how are they joined together?

Okazaki fragments are placed with lagging strand which must be joined together to give a complete strand of DNA. The completion of lagging strand requires two enzymes which is DNA polymerase I for filling the gaps and DNA ligase for joining the gaps.

6. Why are RNA primers necessary during DNA replication?

RNA primers necessary during DNA replication because new strands starts with short stretch which is not DNA but of RNA primers. Primers are needed for DNA synthesis as no known DNA polymerase is able to initiate polynucleotide synthesis. Primase lays down a short RNA primer, before DNA polymerase elongates the strand.