**Okerewa Alice**

**Bch304 assignment**

**17/sci03/007**

**Question : Discuss the role of telomeres and telomerase in replication of linear DNA**

As DNA polymerase alone cannot replicate the ends of chromosomes, telomerase aids in their replication and prevents chromosome degradation.

**telomere**: either of the repetitive nucleotide sequences at each end of a eukaryotic chromosome, which protect the chromosome from degradation

**telomerase**: an enzyme in eukaryotic cells that adds a specific sequence of DNA to the telomeres of chromosomes after they divide, giving the chromosomes stability over time

Telomere Replication

The ends of the linear chromosomes are known as telomeres: repetitive sequences that code for no particular gene. These telomeres protect the important genes from being deleted as cells divide and as DNA strands shorten during replication.

In humans, a six base pair sequence, TTAGGG, is repeated 100 to 1000 times. After each round of DNA replication, some telomeric sequences are lost at the 5′ end of the newly synthesized strand on each daughter DNA, but because these are noncoding sequences, their loss does not adversely affect the cell. However, even these sequences are not unlimited. After sufficient rounds of replication, all the telomeric repeats are lost, and the DNA risks losing coding sequences with subsequent rounds.

The discovery of the enzyme telomerase helped in the understanding of how chromosome ends are maintained. The telomerase enzyme attaches to the end of a chromosome and contains a catalytic part and a built-in RNA template. Telomerase adds complementary RNA bases to the 3′ end of the DNA strand. Once the 3′ end of the lagging strand template is sufficiently elongated, DNA polymerase adds the complementary nucleotides to the ends of the chromosomes; thus, the ends of the chromosomes are replicated.

**Telomerase is important for maintaining chromosome integrity: The ends of linear chromosomes are maintained by the action of the telomerase enzyme.**