**ODOMENE JUSTICE**

**17/SCI03/006**

**Discuss the role of telomeres & telomerase in the replication of linear DNA.**

Telomeres are either of the repetitive nucleotide sequences at each end of a eukaryotic chromosome, which protect the chromosome from degradation.

Telomerase is 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.

Linear chromosomes have an end problem. After DNA replication, each newly synthesized DNA strand is shorter at its 5′ end than at the parental DNA strand’s 5′ end. This produces a 3′ overhang at one end (and one end only) of each daughter DNA strand, such that the two daughter DNAs have their 3′ overhangs at opposite ends. In the absence of additional cellular processes, nucleases would digest these single-stranded 3′ overhangs. Each daughter DNA would become shorter than the parental DNA, and eventually entire DNA would be lost. To prevent this shortening, the ends of linear eukaryotic chromosomes have special structures called telomeres. These telomeres protect the important genes from being deleted as cells divide and as DNA strands shorten during replication.

Telomerase is typically active in germ cells and adult stem cells, but is not active in adult somatic cells. As a result, telomerase does not protect the DNA of adult somatic cells and their telomeres continually shorten as they undergo rounds of cell division.