

# Discuss the mechanism of replication

[Science](#), [Biology](#)



Discuss the mechanism of replication; include all enzymes involved, RNA primers, and leading/ lagging strands. DNA is a double stranded molecule which is basic genetic component and the constituent of the chromosomes. During the process of cell duplication the two identical strands of DNA replicate individually to form identical copies of DNA during the process of cell division. The process is called DNA replication. The procedure onsets when both the old strands of the ds DNA unwind in the presence of enzyme DNA helicase. Each of the strands serve as a template where DNA polymerase acts and incorporates the corresponding nucleotide. If the template strand has Adenine then the DNA polymerase will incorporate Thymine in the newly formed strand, thereby Adenine pairs with Thymine and Guanine pairs with Cytosine. The formation of the two strands takes place in the opposite direction forming a Y-shaped replication fork as depicted in the figure. Nucleotides are the substrate molecules for DNA polymerase enzyme. DNA polymerase is capable of catalyzing the chain growth in the 5 to 3 direction as a result the DNA formed in one strand is continuous and is called leading strand while in other strand DNA is formed as fragments called Okazaki fragments and this strand is called lagging strand. The DNA polymerase adds a nucleotide at the 5 end only. The Okazaki fragments are joined together to form a continuous strand by DNA ligase enzyme.

However, DNA polymerase cannot synthesize DNA de novo for a given template, the job is done by the RNA polymerase which works only as long as DNA template is available. Thus, RNA polymerase works in DNA replication in eukaryotes where it is known as DNA primase. DNA primase is

capable of generating 10-nucleotide-long RNA primers, which are eventually replaced by DNA. This protects the lagging strand from being a combination of DNA and RNA and hence absolute DNA strand is synthesized. DNA polymerase anchors itself to both the newly formed strands. An RNAseH enzyme is used to remove the RNA primers from the Okazaki fragments while the DNA ligase seals the adjoining Okazaki fragments to form a continuous DNA strand. DNA topoisomerase are group of enzymes that play role in winding and unwinding of the DNA helix.

#### Work Cited

Das-Bradoo, S. & Bielinsky, A. " DNA Replication and Checkpoint Control in S Phase". Nature Education. 3(9): 50. 2010. Print.