

replication is semiconservative, before the helicase enzyme started its job; DNA had 2 strands joined together by hydrogen bonds (McClean, 1997).

As it was mentioned the cell cycle requires four steps before the cell division which is; G1 where the cell gets bigger, S phase the step for DNA synthesis and G2 which is post DNA synthesis, then the final step mitosis (McClean, 1997). DNA requires two things to be completed, first one is DNA template second one is 3' OH group (Sturm, 2011). DNA exists on the nucleus (Ophardt, 2003). To complete the process of DNA replication from the double strand of 2 strands to 4 strands of 2 new daughter strands, there are some enzymes needed to complete the replication, first one is helicase this enzyme sticks to the two strands and separates them out (Ophardt, 2003). Second one is DNA polymerase which has three different activities, DNA polymerase I was the first enzyme discovered with polymerase activity, then DNA polymerase III is involved with bacterial DNA replication (Ophardt, 2003). In addition DNA polymerase I has 3 activities firstly 5' to 3' elongation secondly 3' to 5' exonuclease (proof reading) activity and lastly 5' to 3' exonuclease (reparability) DNA polymerase I has very important functions for the replication as well as DNA polymerase III which performs the 5' to 3' polymerase function (Ophardt, 2003).

DNA replication begins when a helicase enzyme opens and breaks the hydrogen bonds between the two complementary strands of DNA. DNA polymerase III adds new nucleotides to 3' ends of the chain. Leading strand is synthesis of one strand of the DNA, proceeds continuously in the 5' to 3' direction (Sturm, 2011). On the other side synthesis of the

Figure 1: Daughter strand being elongated

complementary strand known as the lagging strand is more complex than the leading strand. DNA polymerase can add new deoxyribonucleotides only to a free 3' OH, and then RNA primase attaches to the DNA and synthesizes a short RNA primer.

DNA polymerase III then adds deoxyribonucleotides to the 3' end of the RNA primer. DNA polymerase I replaces DNA polymerase III, removes the RNA and replaces it with DNA. After that the enzyme called DNA ligase will come and form phosphodiester bond between