

# DNA Replication Tutorial

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## **Questions – Before you begin (1-6 ARE NOT PART OF THE TUTORIAL)**

- 1) What kind of molecule is DNA? What are the monomers of this type of molecule?
- 2) What are the 3 parts of a nucleotide? Which parts make up the sides of the molecule? Which parts make up the “rungs of the ladder” (in other words, the interior of the molecule)?
- 3) What are the names of the nitrogen bases in DNA? What are the base pairing rules for these bases?
- 4) If the total percentage of bases in a molecule of DNA totals 100%, and a sample of DNA is found to contain 22% adenine by weight, what are the percentages of the other 3 bases?
- 5) Why does DNA need to be replicated?
- 6) What is meant by 3-primed and 5-primed ends of a DNA strand?

## **Section 2 – The Replication Factory**

- 7) Why is DNA replication said to be “semi-conservative?”

## **Section 3 – DNA Replication Proteins**

- 8) List the jobs of the following proteins in DNA replication:
  - a) Helicases
  - b) SSB (Single-stranded binding) protein
  - c) Primase
  - d) DNA Polymerase
  - e) Sliding clamp
  - f) RNase H
  - g) DNA ligase.

## **Section 4 – Strand Separation**

- 9) How is the double stranded DNA molecule unwound?
- 10) What is the replication fork?
- 11) When DNA strands are separated, what prevents them from going back together?

## **Section 5 – New Strand Synthesis**

- 12) Why is primase needed to begin DNA replication?
- 13) Why are two DNA polymerases needed in replicating DNA
- 14) Why does one of the DNA polymerases have to stop and restart DNA replication? (i.e. what impedes its progress?)
- 15) What is the difference between the leading and the lagging strand?
- 16) What is an Okazaki fragment?

## **Section 6 – The Lagging Strand**

- 17) How are the Okazaki fragments linked together to finish the lagging strand so it is one complete DNA strand?