

CHAPTER 12 DNA

12.1 The Role of DNA in Heredity

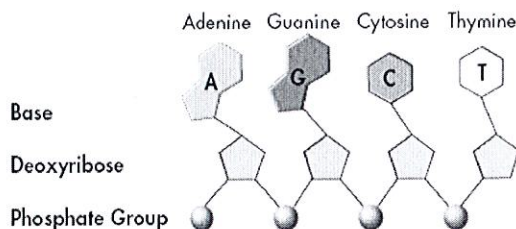
- _____ needed for traits and cell processes
- _____ information needed for new cells
- _____ information from generation to generation

12.2 The structure of DNA

- The DNA molecule must give directions to make proteins which are needed to regulate the various functions of each cell
- What kind of structure could serve this purpose without varying from cell to cell?
- Understanding the structure of DNA has been the key to understanding how genes work.

Components of DNA

- ⊙ Made of _____ (___ parts)
 - _____ (deoxyribose)
 - _____ group
 - _____ (nitrogenous base)
 - _____ (adenine)
 - _____ (thymine)
 - _____ (cytosine)
 - _____ (guanine)



- The nucleotides in a strand of DNA are joined by _____ formed between the _____ and _____ groups.
- The bases stick out _____ from the nucleotide chain.
- The nucleotides can be joined together _____, any sequence of bases is possible

Solving the structure of DNA

- ⊙ Chargaff discovered that the percent of _____ and _____ in DNA were the same.
 - The percent of guanine and cytosine are also equal.
 - The observation that $[A] = [T]$ and $[G] = [C]$ became known as one of "_____."

- ⊙ Rosalind Franklin (1950) – used _____ (aimed X-rays at DNA and looked at the scatter pattern) to find clues about the structure
 - Showed DNA has _____ strands
 - The DNA strands are twisted around each other like a spring (helix shaped)
 - The bases are in the center



- ⊙ _____ – built models of DNA
 - Discovered the _____ structure (2 strands twist around each other like staircases)
 - Explained Franklin's and Chargaff's earlier discoveries
 - Discovered that _____ bonds hold the DNA strands together
 - Weak forces that enable the DNA to _____
- ⊙ Base pairing
 - _____ pairs with **thymine** and _____ pairs with **cytosine**

12.3 DNA replication

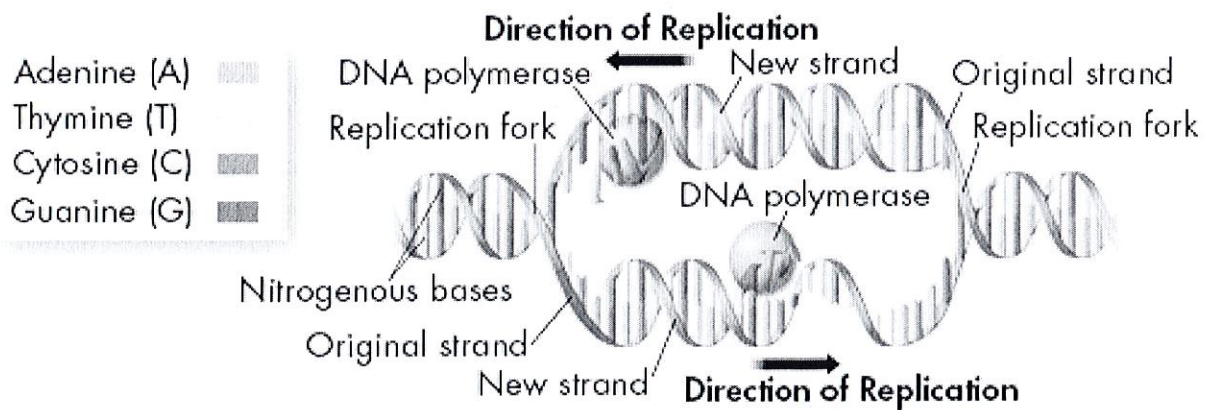
DNA replication

- ⊙ Before a cell divides, it duplicates its DNA in a copying process called _____
 - This process ensures that each resulting cell has the same complete set of DNA molecules

- ⊙ How does the double helix structure of DNA make replication (copying) possible?????
 - Each strand of the double helix has all the information needed to reconstruct the other half by the mechanism of base pairing.
 - Because each strand can be used to make the other strand, the strands are said to be _____

- ⊙ The process of DNA Replication
 - The DNA molecule _____ into two strands and then produces two new _____ strands following the rules of _____.
 - Each strand of the double helix of DNA serves as a _____, or model, for the new strand.
 - The two strands of the double helix _____, or “unzip,” allowing two replication forks.
 - New _____ are _____ following the rules of base pairing (A-T and C-G) to the newly forming strand.

- ⊙ Results of DNA Replication
 - Each DNA molecule has _____ and _____ (semi-conservative).
 - The result of replication is two DNA molecules _____ and to the _____ molecule.



DNA Replication and enzymes

- DNA replication is carried out by enzymes. They first “unzip” a molecule of DNA by breaking the hydrogen bonds between base pairs and unwinding the two strands of the molecule
- _____ = enzyme that _____ individual _____ to produce a new strand of DNA and _____ the new strand

Telomeres

- The tips of chromosomes are known as _____
- Telomeres are _____. DNA may be _____ from telomeres each time a chromosome is replicated.
- An enzyme (_____) adds short, repeated DNA sequences to telomeres, _____ the chromosomes and making it less likely important gene sequences will be lost during replication.