1.13 Deoxyribonucleic Acid, DNA

DNA is a molecule for life, and it contains instructions for telling our bodies how to develop and function. It is a long molecule **(two atoms joined together)** made up of four different nucleotides such as adenine **(A)**, thymine **(T)**, cytosine **(C)**, and guanine **(G)**. Nucleotides or bases are held together by a backbone made of phosphate and deoxyribose. There are four nucleotides and three letter codons, which code for one of twenty amino acids in living cells meaning $4^3 - 3 \text{ stop messages} = 61 \text{ three letter codons}$. The basic structure of the DNA is shown in the Fig. 3 below:

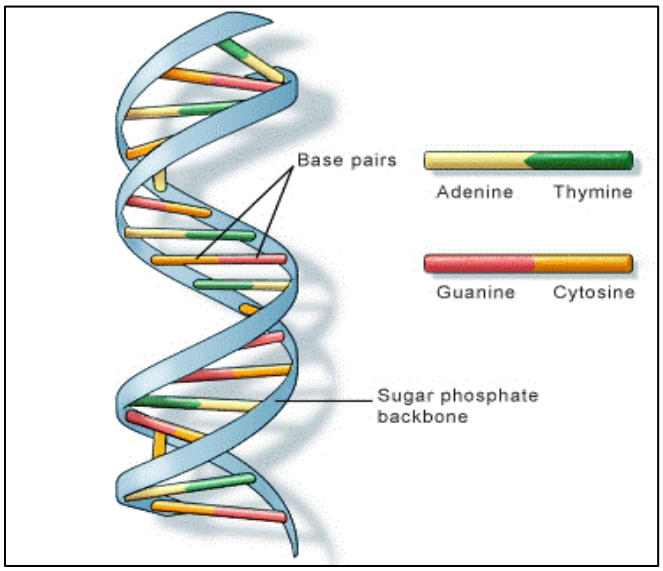

Fig. 3

The structure of DNA was discovered by James Watson and Francis Crick in 1953 and is organized into structures identified as chromosomes **(tiny structures made from DNA and protein)** inside the cell. Its shape is a double helix and on the outside of the double helix is the backbone which holds the DNA together. There are two sets of backbones that twist together where between the backbones are the nucleotides represented by the letters A, T, C, and G. A different nucleotide connects to each backbone and then connects to another nucleotide in the center. Specific sets of nucleotides can only connect A to T and G to C.

The human body have around 210 different types of cells where each cell does a different job to help the body function. Cells receive their instructions on what do to from the DNA **(responsible for the cell functionality inside the nucleus)**, which acts like a computer program or code and the cell is the computer or the computer hardware. The DNA code is held together by different letters of the nucleotides. As the cell reads the instructions on the DNA the different letters represent instructions that is every three letters make up a word known as codon. An example of string of codons is shown below:

GGC AAT…

Each string of the DNA contains sets of instructions known as genes. A gene instructs the cell on how to make a specific protein for performing various functions.

1.14 Self-Check Questions for the Deoxyribonucleic Acid, DNA Sub-Section

1. What is DNA standing for?
2. What are the four nucleotide names?
3. What is a codon?
4. How many three-letter codons are there?
5. What is the shape of the DNA?
6. Where does the cell receive its instruction from?