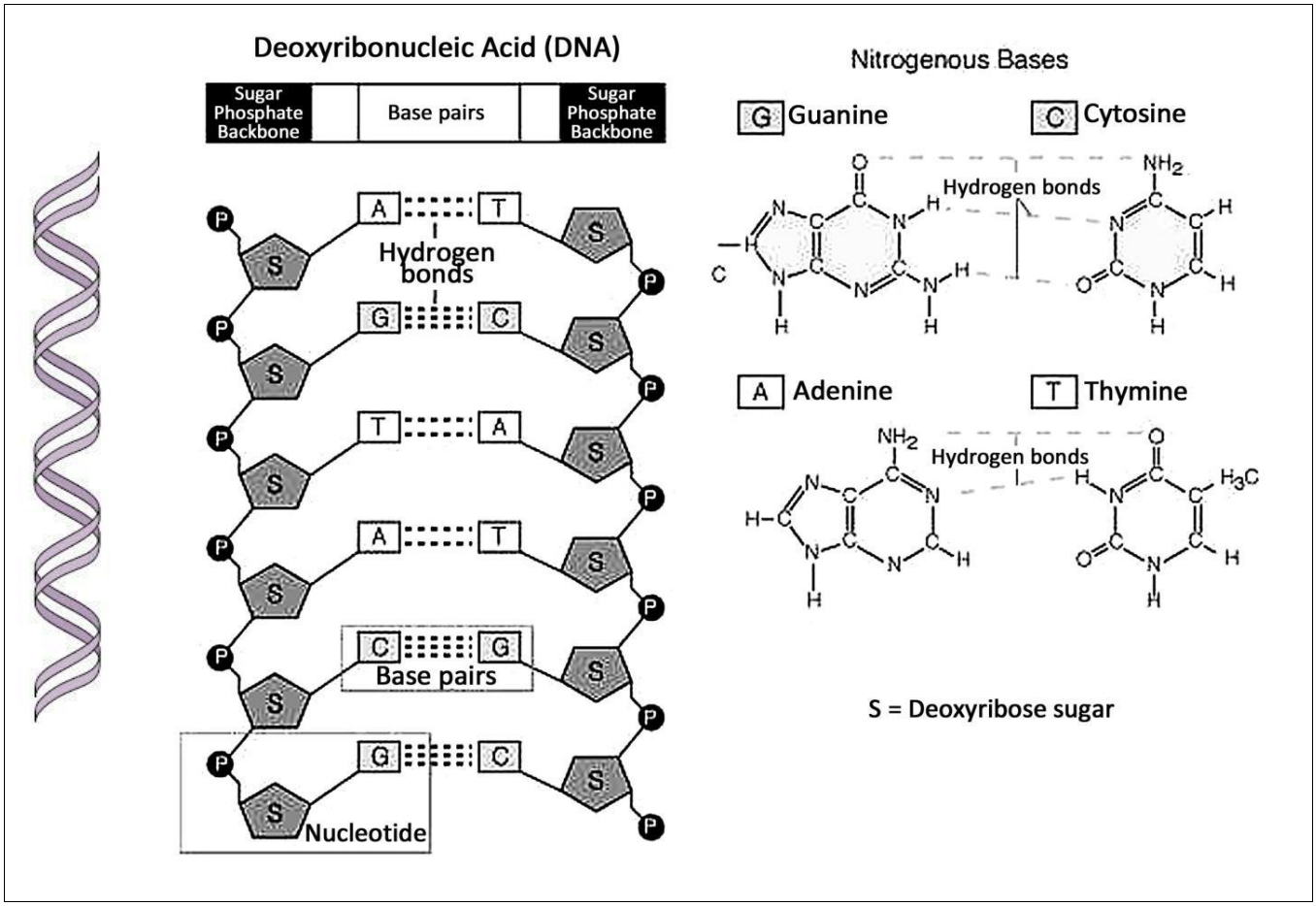
Introduction to Chapter 3

- Revise the structure of DNA & the gene expression mechanism.

The Structure & Chemical Components of DNA



1) Indicate the # of chains forming 1 DNA molecule.

2) Name the molecules forming the sides of the DNA molecule.

3) Name the molecules that form the steps (inside) of the twisted ladder.

4) Classify the nitrogenous bases into purines & pyrimidines.

5) Define a "nucleotide".

6) Name the bond between the molecules present in each of the sides of the DNA molecule.

7) Name the bond present between the molecules existing in the steps of the ladder.

8) Name the stage in which chromosomes are:

a. The most highly compacted (coiled).

b. The least compacted.

Gene Expression

Gene (DNA) → Transcription → mRNA → Translation → Protein (polypeptide chain)

Transcription

9) Make a comparative table of DNA & RNA.

10) Indicate the site of transcription.

11) Indicate whether the two DNA strands are transcribed during a transcription event. Name the strand involved in transcription. Name the strand not involved in transcription.

12) Indicate what the non-transcribed DNA strand will read if the transcribed DNA strand reads (ATACTGGAC). Indicate what will the mRNA read.

13) Compare mRNA to each of the DNA strands.

Translation

14) Indicate the site of translation.

15) Given that a codon is a mRNA codon which consists of 3 successive nucleotides, & it specifies an amino acid in a polypeptide chain.

a. Specify, based on the above definition for a codon, whether we call 3 successive n. bases of a DNA strand a "codon".

b. Referring to "genetic code" table / Doc.a on P.60 of your textbook, classify the codons into 3 groups according to their function.

Doc.1: Mutation & the Environment

- Define & classify mutation types according to their effect on the organism.
- Identify that mutations in germ cells are the ONLY ones transmitted to the offspring.

1) Define "mutation".

2) Pro.1 Specify whether mutations are always transmitted from 1 generation to another.

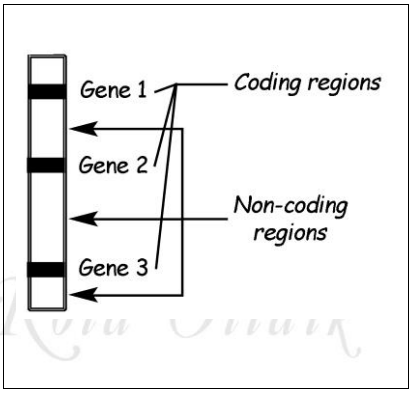
3) Pro.2 Referring to Part 1/ P. 58 of your textbook, specify whether mutations are always harmful.

4) Pro.3 Referring to Doc.b/ P.59 of your textbook, explain how the environment can affect the genome.

5) Pro.4 Name the environmental phenomenon that can enhance harmful UV rays reaching the earth. / Explain whether this phenomenon will have consequences on environmentally-induced cancers.

6) "Some mutations are referred to as unnoticed & others as noticed mutation". Explain this statement.

7) Every human cell has about 30,000 genes, or coding sequences, distributed over 23 pairs of chromosomes, & these genes constitute less than 5% of the DNA material. The remaining DNA are non-coding sequences, many of which are short repetitive sequences of DNA whose precise function, although subject to extensive studies, remains to be determined. Specify whether the mutation would be unnoticed if the mutation occurs in the non-coding region of DNA.



8) Specify the cause of having different forms of alleles in a population (Genetic polymorphism).