

06 - 4. DNA & RNA structure

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© SPM Course Assembly' may be affected more than others. Mathematical ability may also be lower than expected. This specific profile persists into adulthood. Females with a 45X karyotype (Turner syndrome) may have higher verbal skills if their only X chromosome is paternally derived instead of being maternal origin (most commonly it is maternal). This suggests the existence of an imprinted gene that is inactive if carried on a maternally derived X chromosome.

4. DNA & RNA structure Genetic information is stored in the form of double-stranded DNA. DNA and RNA are the most important nucleic acids in the cellular machinery. These nucleic acids are composed of many nucleotides. Nucleotides are phosphorylated versions of nucleosides. Each nucleoside consists of two components: A nitrogenous base and a pentose sugar. Each strand of DNA is made up of a deoxyribose-phosphate backbone and a series of purine (adenine (A) and guanine (G)) and pyrimidine (thymine (T) and cytosine (C)) bases of the nucleic acid. The length of DNA is generally measured in numbers of base-pairs (bp). Each nucleotide is a base joined to a sugar-phosphate unit. The two strands of DNA are held together by hydrogen bonds between the bases. There are only four possible pairs of nucleotides - TA, AT, GC and CG. The two strands twist to form a double helix structure for DNA. RNA is single stranded in human cells. A gene is a sub-portion of DNA. It contains codes for a polypeptide sequence. The length of each gene is variable depending on the size of the polypeptide coded. A set of three adjacent nucleotides is called as a codon; each codon codes for a specific amino acid. There are only 20 amino acids of which around 10 are 'essential' (i.e. those aminoacids not found in food and so need to be synthesized), but 64 possible codon combinations that make up the genetic code. This means that most amino acids are encoded for by more than one triplet; other codons are used as signals for 'initiating' or 'terminating' polypeptide-chain synthesis. The polypeptide coding sequences in a DNA are called exons; these are interrupted by intervening EXON INTRON

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