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Innovative Learning Center
Tel Aviv University

Lesson 2 - Main Terms

UNIT	TERM	EXPLANATION
2.2	**condensation**	Formation of a chemical bond between two molecules and the consequent release of a water molecule.
2.2	**hydrolysis**	A reaction in which a chemical bond is broken within a molecule and a water molecule is consumed.
2.3	**nucleotide**	A molecule comprised of a nitrogen base, a 5-carbon sugar and a phosphate group. It is the monomeric unit of DNA and RNA, depending on the type of sugar. Deoxyribose is the sugar in DNA whereas ribose is the sugar in RNA.
2.3	**DNA (Deoxyribonucleic Acid)**	Deoxyribonucleic acid (DNA) is the polymer our genes are made of. DNA is made of two polynucleotide chains containing deoxyribose. The two strands form a double helix in which the chains run antiparallel to one another. The sugar-phosphate backbones face outward while the nitrogen bases face inward and base pair G to C and A to T.
2.3	**deoxyribose**	The five carbon sugar of DNA. Deoxyribose is missing a hydroxyl group at carbon 2.
2.3	**Chargaff's rules**	Erwin Chargaff was a biochemist that studied the nucleotide composition of DNA and formulated a set of rules – coined Chargaff's Rules: 1. The DNA composition for a given organism is defined, constant and reproducible. 2. This DNA composition for different animal species varies.

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		3. The DNA compositions for a given specie does not change over time, with age, or from organ to organ. 4. The concentration of G equals that of C and A equals T ,these pair ratios, G to C and A to T always equal 1.
2.5	**polymerase (DNA/RNA)**	An enzyme which synthesizes polymers. DNA polymerase produces new strands of DNA against DNA templates. RNA polymerase produces RNA against a DNA template. Most RNA viruses have a RNA polymerase able to produce RNA against RNA templates.
2.5	**chromosome**	The DNA double helix containing our genes is packaged with proteins and stored in the nucleus of the cell. The proteins protect our DNA and also coordinate the transcription of our genes. Humans have two sets of 23 chromosomes (one set from mother and the other from father). Of these chromosomes one set is special as it determines our sex; male or female. Females have two copies of Chromosome X. Males have one Chromosome X and another chromosome, Chromosome Y. Thus men have 22 pairs of chromosomes and a X:Y pair, whereas women have 22 chromosomes and a X:X pair.
2.5	**RNA (Ribonucleic Acid)**	A single stranded polymer of nucleotides, in which the 5 carbon sugar is ribose. RNA molecules use the nitrogen base uracil (U) instead of thymine (T) found in DNA, which base pairs with Adenine.
2.5	**mRNA**	Messenger RNA, the working copy of the DNA gene, translated on ribosomes to produce proteins.

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2.5	**ribose**	The five carbon sugar of RNA. Ribose has hydroxyl groups at carbons, 1, 2, 3, and 5. Carbon 1 binds the nitrogen base and carbon 5 the phosphate group of ribonucleotides.
2.7	**protein**	A polymer of amino-acids joined by peptide bonds. Proteins are the product of the translation of mRNA on ribosomes.
2.7	**amino-acid**	The monomer of proteins. Each amino acid contains a central carbon – called carbon alpha. Carbon alpha is linked to an amine group (NH2) and an acid carboxyl group (COOH), hence these monomers are called amino-acids. Carbon alpha also binds one of 20 different R groups (residues). Thus there are 20 different amino acids that can be hydrophobic, polar or even electrostatically charged.
2.7	**mutation**	An error in DNA which can lead to a change in a protein composition, structure and function. Mutations that create "Stop codons" can entirely prevent the production of the mutated protein.
2.7	**peptide bond**	The chemical bond that joins two amino acids. Peptide bonds are the product of a condensation reaction in which the amine of one monomer links with the carboxyl of the other along with releasing a molecule of water.
2.7	**codon**	A triplet of nucleotides that codes for a specific amino acid or STOP signal. There are a total of 64 possible codons (43 combinations).
2.7	**genetic code**	The set of 64 codons corresponding to the 20 natural amino acids + three Stop codons. The code is redundant – that is all amino acids have multiple codons, except for

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		Methionine and Tryptophan which have only one codon (AUG and UGG, respectively). Codons are read from 5' to 3'.
2.7	**STOP codon**	A codon that signals the termination of mRNA translation. Stop codons appear at the end of the reading frame of a mRNA and thus indicate that the Protein being translated has reached completion.