

# Biology Key Terms

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## DNA, RNA and Protein Synthesis

**Double helix** - the shape of the DNA molecule; consists of two nucleotide chains that wrap around each other to form a double spiral.

**Nucleotides** - The monomers that make up DNA and RNA; consists of a nitrogen base (A, C, T, U, or G), a sugar and a phosphate molecule

**Adenine (A)** - nitrogenous base found in DNA and RNA; pairs with T or U

**Guanine (G)** - nitrogenous base found in DNA and RNA; pairs with C

**Cytosine (C)** - nitrogenous base found in DNA and RNA; pairs with G

**Thymine (T)** - nitrogenous base found in DNA only; pairs with A

**Uracil (U)** - nitrogenous base found in RNA only; pairs with T

**Purines** - nitrogenous bases that have a double ring of carbon and nitrogen atoms; Adenine and Guanine

**Pyrimidines** - nitrogenous bases that have a single ring of carbon and nitrogen atoms; Cytosine, Thymine and Uracil

**Complementary** - matching, as in complementary bases: A, matches T or U; C matches G

**Semi-conservative replication** - specific type of replication in DNA that results in two, double stranded DNA molecules. Each new molecule has half of the original strand, and half that is a complementary (newly built) strand.

**Hydrogen Bonds** - weak attractions between molecules; hydrogen bonds hold the rungs of the DNA ladder together, but can be easily broken and reformed again

**Helicase** - enzyme that unwinds and unzips DNA

**Ligase** - enzyme that creates bonds between sugars and phosphates in a growing DNA or RNA strand as it is being built.

**DNA Polymerase** - enzymes that can bind to a single (unwound and separated) DNA strand, read it, and synthesize a new strand of complementary DNA; some are able to proofread their work.

**Protein synthesis** - the formation of proteins using information coded on DNA and carried out by RNA in the ribosome.

**Messenger RNA (or mRNA)** - a single uncoiled strand of RNA that transmits information from DNA to the ribosomes during protein synthesis.

**Transfer RNA (or tRNA)** - a single folded strand of RNA that bonds with and carries a specific amino acid.

**Ribosomal RNA (rRNA)** - a globular form of RNA that is the major constituent of the ribosomes.

**Transcription** - the process of forming a mRNA strand from a DNA strand in the nucleus

**RNA polymerase** - enzyme used in protein synthesis (translation) read a DNA gene and compose a complementary mRNA strand

**Codon**- a 3-nucleotide mRNA sequence that codes for one specific amino acid.

**Start codon** - mRNA transcription begins at a specific coding sequence referred to as the start codon.

**Stop codon** - a coding sequence that signals the end of the gene to be transcribed.

**Translation** - the formation of proteins in the cytoplasm using information coded on mRNA and carried out by the ribosome.

**Anticodon** - one end of a tRNA molecule that contains a set of three nucleotides that will compliment codons on the mRNA during translation; has a site for a specific amino acid on the opposite end

**Mutations** - A mutation is any change in the DNA's letter (nitrogenous base) sequence

**Point mutation** - a change in a single nitrogen base in DNA; may or may not cause a change in the amino acid depending on position of letter changed

**Frameshift mutation** - the addition or deletion of a nitrogen base, causing a shift in codons so that the gene sequence is nonsense.

**Mutagen** - anything that causes a mutation.

**Human Genome Project** - an international effort to determine all the base pairs of the human genome.

**DNA Fingerprinting** - Scientists utilize the genetic "fingerprints" where DNA is broken into pieces and examined for patterns.

**Gene therapy** - treats a genetic disorder by introducing a gene into a cell or by correcting a defect in a cell's genome

**Genetic engineering** - used to identify genes for specific traits or to transfer genes from one organism to another organism. It involves the making of recombinant DNA in a lab.

**Recombinant DNA** - a combination of DNA from two or more sources

**Genetically Modified Organisms (GMOs)** - Any organism whose DNA has been modified by genetic engineering.

**Cloning** - refers to any of a number of biotechnologies that aim to reproduce a genetic copy of an entire organism.