

DNA, the genetic code and gene expression

What are the three parts of a mononucleotide?

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Which bond joins nucleotides in a polynucleotide?

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State the complementary base pairs in DNA.

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Two differences between DNA and RNA nucleotides?

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What does semi-conservative replication mean?

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What is the role of DNA polymerase?

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What do the template strands do in replication?

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Meselson and Stahl: result after one generation?

A phosphodiester bond, formed by condensation between a phosphate and a sugar.

A pentose sugar (deoxyribose or ribose), a phosphate group and a base.

RNA has ribose (not deoxyribose) and uracil (not thymine).

A-T (two hydrogen bonds); C-G (three hydrogen bonds).

Joins free nucleotides complementary to the template strand, forming phosphodiester bonds.

Each new DNA molecule has one original strand and one new strand.

One intermediate-density band (hybrid DNA), which refuted the conservative model.

Each acts as a template, so new nucleotides pair by complementary base pairing.

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Meselson and Stahl: result after two generations?

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Describe the genetic code.

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Define a gene.

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Why is the genetic code degenerate?

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What is transcription?

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What is the template (antisense) strand?

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Where does the mRNA go after transcription?

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What is translation?

Triplet code (three bases per amino acid), non-overlapping and degenerate.

Two bands: intermediate and light in equal amounts, which refuted the dispersive model.

64 possible triplets but only 20 amino acids, so most amino acids have more than one codon.

A sequence of bases on a DNA molecule that codes for a sequence of amino acids in a polypeptide chain.

The DNA strand copied by RNA polymerase; mRNA is complementary to it.

Making mRNA from the template strand of a gene, by RNA polymerase, in the nucleus.

Making a polypeptide at a ribosome using the codons of mRNA, with tRNA bringing amino acids.

Out of the nucleus through a nuclear pore to a ribosome in the cytoplasm.

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What is the start codon and what does it code for?

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Role of tRNA?

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How does translation end?

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Name three types of gene mutation.

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Why does an insertion or deletion usually have a large effect?

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Why do many mutations have no observable effect?

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How can mutations lead to cancer?

Its anticodon pairs with an mRNA codon and it carries the matching amino acid to the ribosome.

AUG; codes for methionine and starts translation.

Substitution, insertion, deletion (of bases).

At a stop codon (UAA, UAG, UGA): no tRNA matches, so the polypeptide is released.

The code is degenerate, or the change is in non-coding DNA, or the protein's function is unchanged.

It causes a frameshift: every codon after the change is altered.

Mutations in genes controlling cell division cause uncontrolled division, forming a tumour.