RNA

Section 11.2

RNA stands for Ribonucleic Acid

The main purpose of RNA is to: assemble amino acids into proteins - or protein synthesis. The overal process of protein synthesis is known as the CENTRAL DOGMA.

RNA differs from DNA in 3 ways:

1 they have different sugars - DNA has deoxyribose and RNA has ribose

2 DNA is made of a double stranded helix, RNA is a single strand helix

3 RNA contains uracil in the place of thymine

There are 3 types of RNA

1 Type Messenger abbreviated mRNA

Purpose: to uses DNA as a template (pattern) to transcibe the genetic code and to serve as instructions for protein synthesis.

Where is it found: Produced in the nucleus. Will exit the nucleus and move to the ribosomes.

2 Type Ribosomal abbreviated rRNA

Purpose: to translate the mRNA code and use that information to assemble amino acids into proteins.

Where is it found: Ribosomes. Actually the ribosomes ARE rRNA.

3 Type Transfer abbreviated tRNA

Purpose: Delivers amino acids to the ribosome for assembly

Where is it found: cytoplasm

Proteins are made of chains of amino acids

Which are joined together by peptide bonds

There are 20 different types of amino acids.

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The language of mRNA is the GENETIC CODE

The language is written in "words" that are 3 letters long.

These words are known as codons. Each sequence determines which amino acid will be added to the protein chain.

On a strand of mRNA, you have the sequence: **UCGCACGGU**

which produce the 3 codons **UCG** **CAC** **GGU**

which represent 3 different amino acids.

The codon UCG represents the amino acid serine.

The codon CAC represents the amino acid histidine.

The codon GGU represents the amino acid glycine.

Some amino acids serve other functions. They may provide instructions for making the protein.

AUG is a START CODON that tells when a new protein chain begins. It is also the codon for the amino acid methionine.

There are 3 stop codons. Which are UAA, UAG and UGA that indicate when the protein chain ends.

The steps of protein synthesis

Transcription

Definition: the production of mRNA from a DNA template

Where it occurs: nucleus

Overview of the process: DNA temporarily unzips, allowing a complementary single strand of mRNA to form. The DNA then zips back up and the mRNA leaves the nucleus and carries the instructions to the ribosomes

Translation

Definition: Decoding the mRNA strand to assemble amino acids into proteins.

Where it occurs: ribosomes

Overview of the process: The codons of the mRNA are are used to determine the sequence of amino acids that will be assembled to produce protein chains. tRNA brings the amino acids to the ribosomes for assembly where the rRNA assembles them