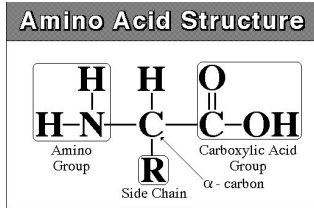


DNA

- DNA contains _____, sequences of _____ bases
- These Genes _____ for polypeptides (_____)
- Proteins are used to _____ cells and do much of the work inside _____

Genes & Proteins

- Proteins are made of _____ acids linked together by _____ bonds
- _____ different amino acids exist



- Polypeptides: Amino acid chains are called _____

DNA Begins the Process:

- DNA is found _____ the nucleus
- _____, however, are made in the _____ of cells by organelles called _____
- Ribosomes may be _____ in the cytosol or attached to the _____ of rough ER

Starting with DNA

- DNA 's code must be _____ and taken to the _____
- In the cytoplasm, this code must be read so amino acids can be _____ to make polypeptides (proteins)
- This process is called _____ **SYNTHESIS**

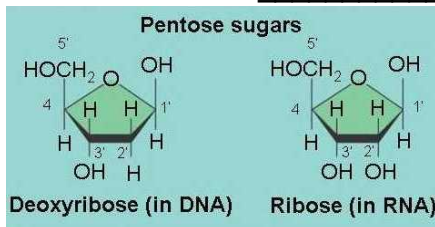
PRACTICE:

-What macromolecule builds cells? _____
 What are proteins made of? _____
 How many amino acids exist? _____
 A chain of amino acids is a: _____
 Where are proteins made? _____

RNA

Roles of RNA and DNA:

- DNA is the _____ PLAN
- RNA is the _____ of the Master Plan



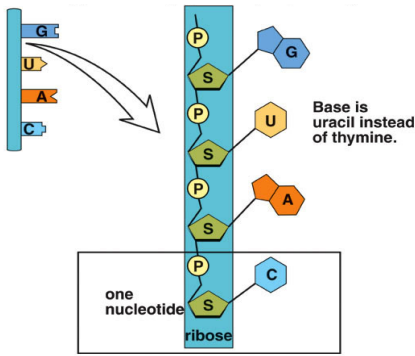
RNA versus DNA:

RNA

- RNA has a _____ ribose
- RNA contains the _____ uracil (U)
- RNA molecule is _____-stranded
- DNA is double-_____

DNA:

- has a sugar _____
- has thymine (T)
- is _____-stranded



Three Types of RNA:

- **Messenger RNA (mRNA)** copies _____ code & carries the _____ information to the ribosomes
- **Ribosomal RNA (rRNA)**, along with _____, makes up the ribosomes
- **Transfer RNA (tRNA)** transfers _____ acids to the ribosomes where proteins are _____

1. Messenger RNA:

- _____ Straight chain of _____
- Made in the _____
- Copies DNA & leaves through _____ pores
- Contains the Nitrogen Bases A, G, C, _____ (no T)
- Carries the information for a _____ protein
- Made up of 500 to 1000 nucleotides long
- Sequence of _____ bases called codon
- AUG - methionine or start _____
- UAA, UAG, or UGA - _____ codons

2. Ribosomal RNA (rRNA):

- rRNA is a single strand 100 to 3000 nucleotides long
- Globular in _____
- Made inside the _____ of a cell
- Associates with _____ to form ribosomes
- Site of _____ Synthesis

The Genetic Code

- A codon designates an _____ acid
- An amino acid may have more than _____ codon
- There are 20 amino acids, but 64 possible codons
- Some codons tell the _____ to *stop* translating

Remember the Complementary Bases:

On DNA: A-T C-_____

On RNA: _____-U C-G

3. Transfer RNA (tRNA)

- Clover-leaf shape
- Single stranded molecule with attachment _____ at one end for an amino acid
- Opposite end has _____ nucleotide bases called the anticodon
- The 3 bases of an anticodon are complementary to the 3 bases of a _____
- Example: Codon ACU Anticodon UGA

PRACTICE:

What sugar is found in RNA? _____

What are the 4 nitrogenous bases in RNA? _____

DNA has _____ strand(s), RNA has _____ strand(s).

The type of RNA that transfers amino acids to ribosomes is _____.

The type of RNA that makes up the ribosome. _____

The type of RNA that copies DNA's code. _____

What is a sequence of three nitrogen bases called? _____

What is a sequence of three nitrogen bases called ATCGGCTAA ? _____

Transcription and Translation

Pathway to Making a Protein:

DNA-----mRNA-----tRNA (ribosomes)-----Protein

Protein Synthesis:

- The production or synthesis of _____ chains (proteins)
- **TWO PHASES:**
TRANSCRIPTION & TRANSLATION
- mRNA must be processed _____ it leaves the nucleus of eukaryotic cells

I. Transcription:

- The process of copying the sequence of one strand of _____, the template strand
- _____ copies the template strand
- Requires the enzyme RNA _____
- During transcription, RNA polymerase _____ to DNA and separates the DNA strands
- RNA Polymerase then uses _____ strand of DNA as a template to assemble _____ into RNA
- _____ are regions on DNA that show where RNA Polymerase must bind to begin the Transcription of RNA
- Called the TATA box
- Specific base _____ act as signals to stop
- Called the termination _____

mRNA Processing

- After the DNA is transcribed into _____, editing must be done to the nucleotide chain to make the RNA functional
- _____, non-functional segments of DNA are snipped out of the chain

mRNA Editing

- _____, segments of DNA that code for proteins, are then rejoined by the _____ ligase
- A guanine _____ cap is added to the 5" end of the newly copied mRNA
- A _____ A tail is added to the 3' end of the RNA
- The newly processed mRNA can then leave the _____

mRNA Transcript

- mRNA leaves the nucleus through its pores and goes to the _____

II. TRANSLATION

-the process of _____ the mRNA into a polypeptide chain

-Ribosomes read mRNA three bases or 1 _____ at a time and construct the proteins

Ribosomes:

- Made of a large and small _____
- Composed of _____ (40%) and proteins (60%)
- Have two sites for tRNA attachment --- P and A

Step 1- Initiation

- mRNA _____ start codon AUG attaches to the small _____ subunit
- _____ subunit attaches to large ribosomal subunit

Step 2 - _____

- As ribosome moves, two _____ with their amino acids move into site A and P of the ribosome
- _____ bonds join the amino acids

End Product -The Protein

- The end products of protein _____ is a primary structure of a protein
- A sequence of _____ acid bonded together by _____ bonds