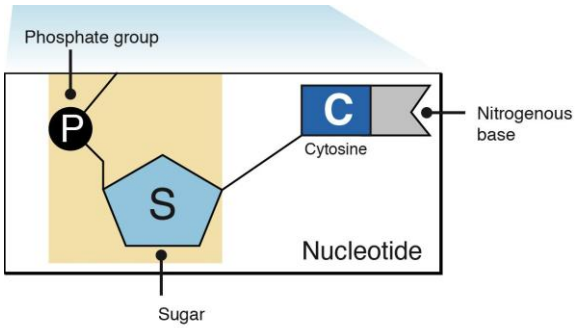
DNA, RNA, Protein Synthesis

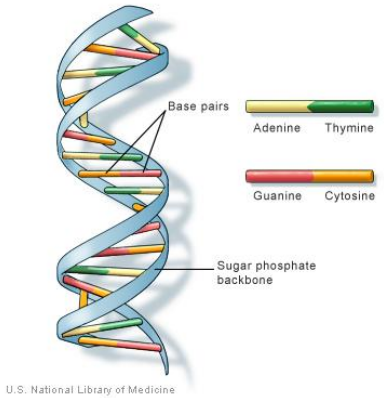
Components of DNA

Nucleotide: monomer of DNA

- Sugar-deoxyribose
- Phosphate Group
- Nitrogenous Base
  - -Adenine
  - -Thymine
  - -Cytosine
  - -Guanine



Structure of DNA



- Two Strands twist to form a double helix
- Backbone of alternating sugar and phosphate molecules
- Interior consist of base-pairs of nitrogen bases

(complementary base pairing)

A-T and C-G

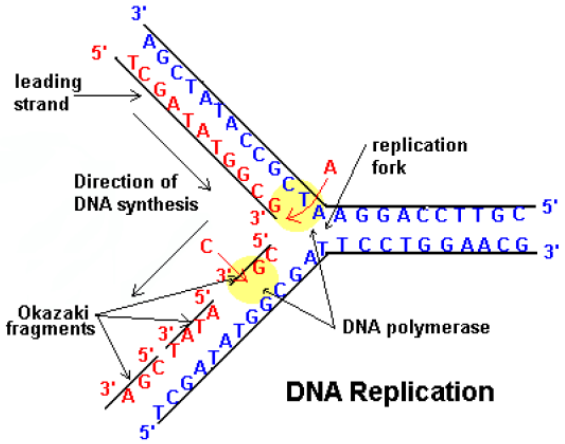
- Hydrogen bonds holds the nitrogen bases together

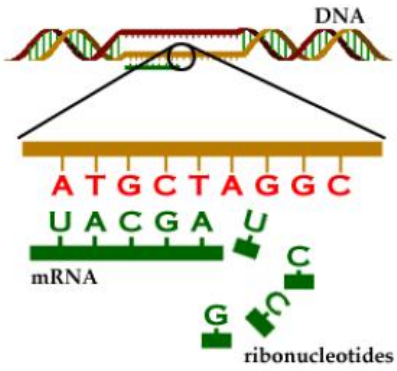
Genetic code is common to all organisms

- All living organisms contain A,T,C,G
- All living organisms use that DNA to make protein from the same 20 amino acids

Replication

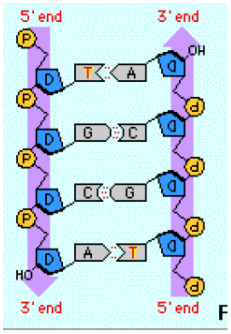
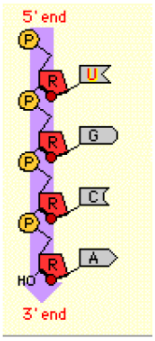
1. The double helix unwind
2. The hydrogen bonds between the nitrogen are broken to separate the two strands
3. Each original strand is used as a template to build a new strand. Complementary base pairing occurs : A-T and C-G
4. Two molecules of DNA are produced: half original and half new. This is known as semi-conservative replication.

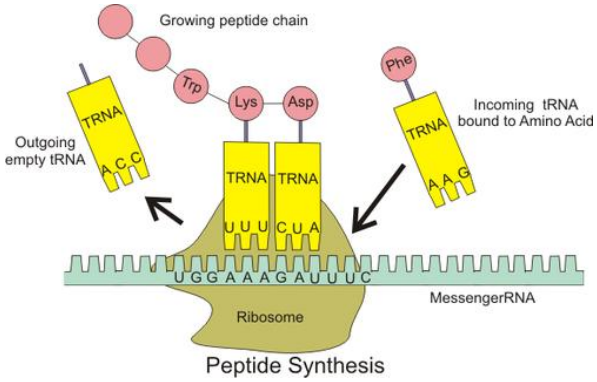




Transcription

- The use of DNA as a template to make RNA (Adenine match with Uracil)
- Occurs in the nucleus

DNA		RNA
Deoxyribose	*Sugar*	Ribose
Adenine (A) Thymine (T) Cytosine (C) Guanine (G)	*Nitrogen Bases*	Adenine (A) Uracil (U) Cytosine (C) Guanine (G)
Two	*Number of strands*	One
Nucleus	*Location*	Nucleus and cytoplasm
	*Diagram*	



Translation

1. The use of RNA to make protein
2. It occurs at the Ribosome in the cytoplasm of the cell
3. It requires the use of 3 types of RNA:

-Messenger RNA (mRNA); copy of DNA's message to code protein; contains codons (3 base sequences)
-Transfer RNA (tRNA): carries amino acids to the ribosomes; contains anti-codons (3 base sequences that pair up with mRNA)
-Ribosomal RNA (rRNA): makes up structure of ribosome
-Anti-codon on tRNA pairs with mRNA codon to bring proper amino acid into the ribosome. Amino acids are connected until a stop codon is reached.

Example

DNA: AAA-ATA-CGC-TAG

mRNA: UUU-UAU-GCG-AUC

Amino Acids: Phenylalanine-Tyrosine-Alanine-Isoleucine