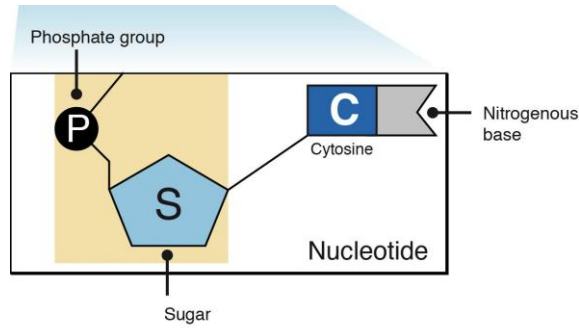


DNA, RNA, Protein Synthesis

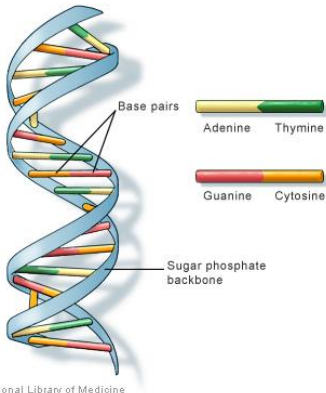
Components of DNA

Nucleotide: monomer of DNA

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



Structure of DNA



U.S. National Library of Medicine

- 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

PERCH

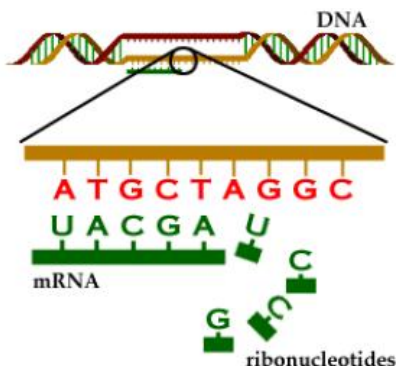
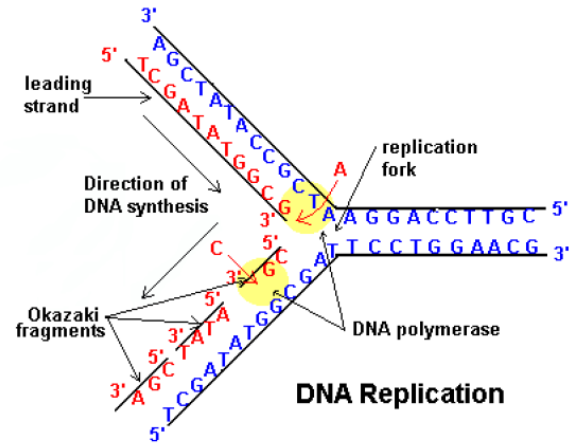
 AGG CCG GCT CCA ACC AGG CCG

HIPPOPOTAMUS

 AGG CCC GCA CCA ACC GAT CAC

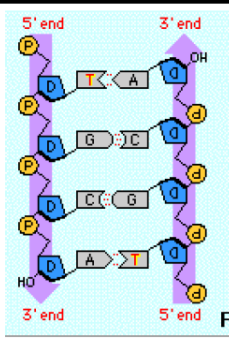
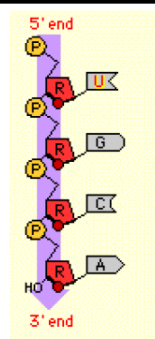
Replication

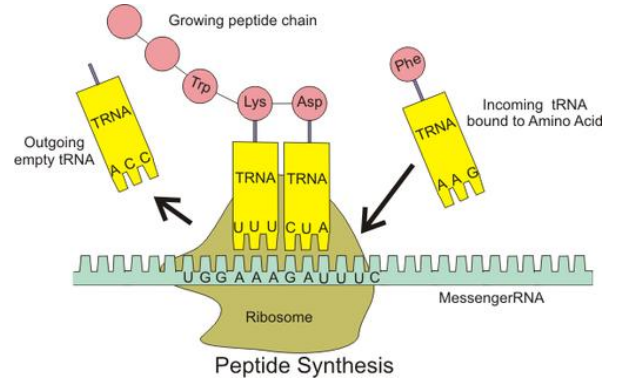
1. The double helix unwind
2. The hydrogen bonds between the nitrogen are broken to separate the two strands
3. Each original strand is used as a template to build a new strand. Complementary base pairing occurs : A-T and C-G
4. Two molecules of DNA are produced: half original and half new. This is known 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	<i>Sugar</i>	Ribose
Adenine (A) Thymine (T) Cytosine (C) Guanine (G)	<i>Nitrogen Bases</i>	Adenine (A) Uracil (U) Cytosine (C) Guanine (G)
Two	<i>Number of strands</i>	One
Nucleus	<i>Location</i>	Nucleus and cytoplasm
	<i>Diagram</i>	



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:

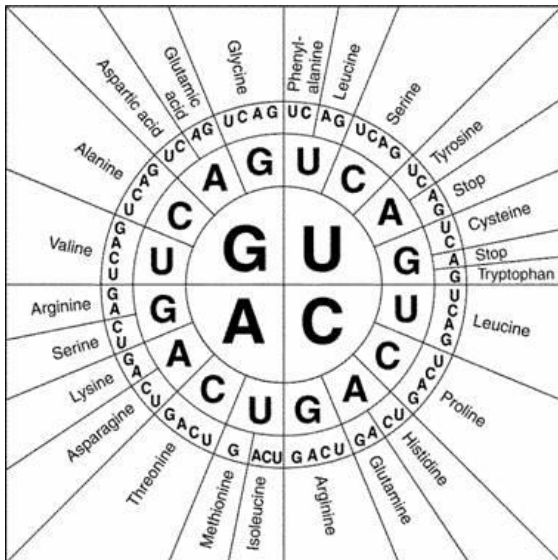
- Messenger RNA (mRNA); copy of DNA's message to code protein; contains codons (3 base sequences)
- Transfer RNA (tRNA): carries amino acids to the ribosomes; contains anti-codons (3 base sequences that pair up with mRNA)
- Ribosomal RNA (rRNA): makes up structure of ribosome
- Anti-codon on tRNA pairs 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



		Second base of codon						
		U	C	A	G			
U	UUU	Phenylalanine	UCU	Serine	UAU	Tyrosine	UGU	Cysteine
	UUC	phe	UCC	ser	UAC	tyr	UGC	cys
	UUA	Leucine	UCA	STOP codon	UAA	STOP codon	UGA	STOP codon
	UUG	leu	UCG	STOP codon	UAG	STOP codon	UGG	Tryptophan
C	CUU	Leucine	CCU	Proline	CAU	Histidine	CGU	Arginine
	CUC	leu	CCC	pro	CAC	his	CGC	arg
	CUA		CCA		CAA	glu	CGA	
	CUG		CCG		CAG	gin	CGG	
A	AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	AGU	Serine
	AUC	ile	ACC	thr	AAC	asn	AGC	ser
	AUA		ACA		AAA	Lysine	AGA	Arginine
	AUG	Methionine (start codon)	ACG		AAG	lys	AGG	arg
G	GUU	Valine	GCU	Alanine	GAU	Aspartic acid	GGU	Glycine
	GUC	val	GCC	ala	GAC	asp	GGC	gly
	GUA		GCA		GAA	glu	GGA	
	GUG		GCG		GAG		GGG	