

- DNA that is spread out in the nucleus of a non-dividing cell so it can be read is called C H R O M A T I N.
2. The group of 3 nitrogen bases in the mRNA message that is read together is called a C O D O N.
 3. In dividing cells, the DNA is scrunched into C H R O M O S O M E S so it can be moved.
 4. The mRNA message tells the ribosomes which A M I N O A C I D to put in next when it makes a P R O T E I N.
 5. Adenine, thymine, guanine, cytosine, and uracil are all N I T R O G E N B A S E S.
 6. M E S S E N G E R RNA is copied from DNA in the N U C L E U S, edited, and transferred to R I B O S O M E S in the cytoplasm to be translated into a protein
 7. The process of making a DNA copy is called R E P L I C A T I O N.
 8. N U C L E I C A C I D S (like DNA and RNA) are made by joining N U C L E O T I D E subunits together in a chain.
 9. T R A N S F E R RNA has an A N T I C O D O N region that matches the codon on an m-RNA message.
 10. The process of making an RNA message from DNA is called T R A N S C R I P T I O N and it happens in the N U C L E U S.
 11. R I B O S O M A L RNA is made by the N U C L E O L U S and joins with P R O T E I N S to make ribosomes.
 12. Another name for protein synthesis is T R A N S L A T I O N.
 - * 13. S U B S T I T U T I O N S are chromosomal mutations in which one nitrogen base replaces another in the gene code.
 - * 14. 3n or 4n plants with P O L Y P L O I D Y are bigger and stronger, but humans with this condition don't survive.
 15. U R A C I L is the nitrogen base NOT found in D N A and T H Y M I N E is the nitrogen base NOT found in R N A.
 16. Nitrogen bases made with O N E ring are called P Y R I M I D I N E S and nitrogen bases made with T W O rings are called P U R I N E S.
 17. James W A T S O N and Francis C R I C K are the scientists who used Rosalind F R A N K L I N's X-ray images to figure out that DNA is shaped like a "twisted ladder" with P H O S P H A T E S and S U G A R S forming the sides of the ladder, N I T R O G E N bases forming the rungs, and H Y D R O G E N bonds acting as "glue" to hold the two sides together.
 18. In G R I F F I T H's mice-pneumonia experiment, lethal bacteria passed genetic material to harmless bacteria in a process called T R A N S F O R M A T I O N.
 19. According to C H A R G A F F's rules when making DNA, A D E N I N E always bonds with T H Y M I N E and C Y T O S I N E always bonds with G U A N I N E.
 20. Viruses that infect bacteria (like the one used in H E R S H E Y - C H A S E's blender experiment which proved DNA was the genetic material) are called B A C T E R I O P H A G E S.

REPLICATION, TRANSCRIPTION, & TRANSLATION REVIEW

REPLICATION

Use the DNA code provided and fill in the complementary DNA strand.

Which nitrogen base CAN'T you use during replication? uracil

ATTCGATGC
T A A G C T A C G

TACGGATCG
A T G C C T A G C

CAGTGACTT
G T C A C T G A A

TRANSCRIPTION

Use the DNA code provided to copy an m-RNA message.

Which nitrogen base CAN'T you use during transcription? thymine

ACTGGATAC
U G A C C U A U G

ACGGATCGT
U G C C U A G C A

TGACAGCTA
A C U G U C G A U

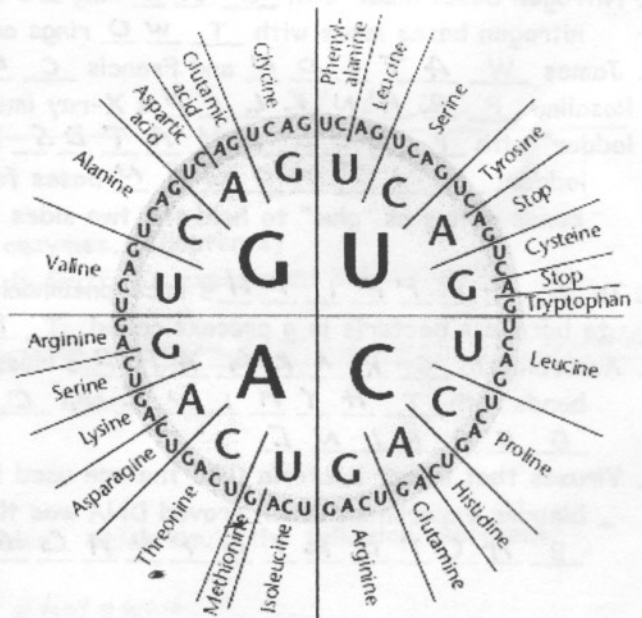
TRANSLATION:

USE the DECODING WHEEL to DETERMINE the AMINO ACID that corresponds to the m-RNA CODE GIVEN

Which amino acid has ONLY ONE codon that codes for it?

methionine / tryptophan

<u>mRNA CODE</u>	<u>AMINO ACID</u>
AAA	lysine
GCG	alanine
GAU	aspartic acid
CAA	glutamine
CAC	histidine
UUU	phenylalanine



Which two mRNA codes correspond to histidine?

CAU CAC

How many different mRNA codes correspond to Threonine? 4

Tell the amino acid sequence for the following mRNA message:

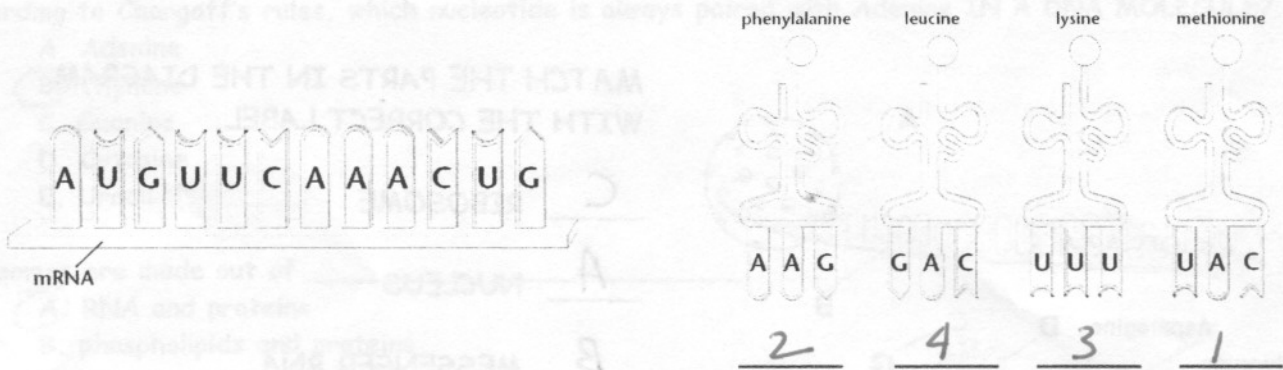
MRNA MESSAGE: AUG | CCA | UGG | CAU

amino acid sequence:

methionine - proline - tryptophan - histidine
 -start

Look at the m-RNA message below:

PUT A NUMBER under each of the t-RNA/amino acid complexes to show the correct sequence that they would attach as this message is read.



WHAT IS THE AMINO ACID SEQUENCE FOR THE PROTEIN THAT WOULD BE PRODUCED FROM THIS MESSAGE?

methionine - phenylalanine - lysine - leucine
 -start

FILL IN THE INFORMATION BELOW with the correct sequence

DNA code T T A C G C G C A

DNA code C C G A A T C G T

mRNA message A A U G C G C G U

mRNA message G G C U U A G C A

DNA code A C A G T C G G C

DNA code G A C C G A T G T

mRNA message U G U C A G C C G

mRNA message C U G G C U A C A

This process of protein synthesis is also called translation

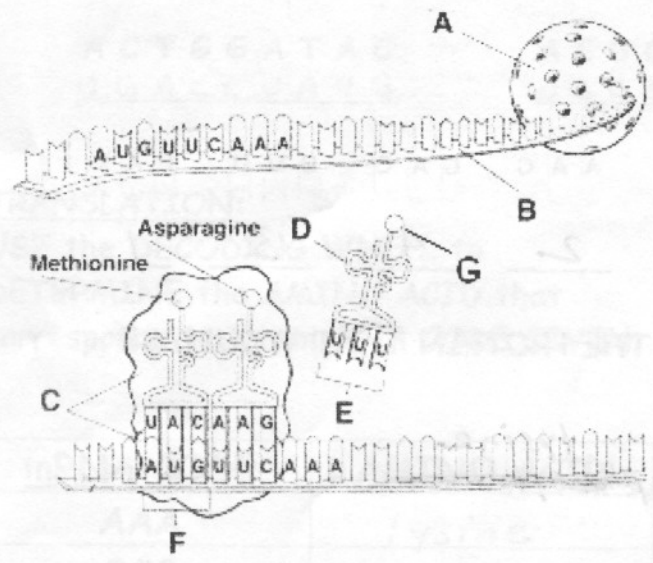
Another name for a protein chain is polypeptide

What if a mutation caused a change in the code so the message read UGG instead of UGC?
How would this affect the protein produced?

cysteine would be replaced with tryptophan
→ changes protein

What if a mutation caused a change in the code so the message read GGA instead of GGC?
How would this affect the protein produced?

both code for glycine, so there would be
no problem



MATCH THE PARTS IN THE DIAGRAM WITH THE CORRECT LABEL.

- C RIBOSOME
- A NUCLEUS
- B MESSENGER RNA
- E ANTICODON
- G AMINO ACID
- F CODON
- D TRANSFER RNA

What will happen to D after it drops off its amino acid?

goes back to cytoplasm to pick up another a.a.

What will happen to B after its message is read?

It may go to another ribosome to be read

DNA, RNA, and PROTEINS

Chapter 12

MULTIPLE CHOICE:

The three bases on the tRNA molecule that are complementary to one of the mRNA codons are called the _____.

- A. message matches
 B. anticodon
 C. promoter
 D. exon
 E. intron

B

According to Chargaff's rules, which nucleotide is always paired with Adenine IN A DNA MOLECULE?

- A. Adenine
 B. Thymine
 C. Guanine
 D. Cytosine
 E. Uracil

B

Ribosomes are made out of _____.

- A. RNA and proteins
 B. phospholipids and proteins
 C. glycoproteins and lipids
 D. DNA and proteins

A

DNA replication results in two DNA molecules, _____.

- A. each with two new strands
 B. one with two new strands and one with 2 original strands
 C. each with two original strands
 D. each with one new strand and one original strand

D

Which type(s) of RNA is/are involved in protein synthesis?

- A. t-RNA only
 B. R-RNA only
 C. r-RNA and m-RNA only
 D. all 3 kinds of RNA are involved in making proteins

D

Where in the cell does transcription take place?

- A. in the nucleus
 B. on ribosomes in the cytoplasm
 C. in Golgi bodies
 D. on the nucleosomes

A

Where in the cell does translation take place?

- A. in the nucleus
 B. on ribosomes in the cytoplasm
 C. in Golgi bodies
 D. on the nucleosomes

B

* DNA wraps around histones to form bead-like structures called _____.

- A. introns
- B. exons
- C. ribosomes
- D. nucleosomes

How many codons are needed to specify THREE AMINO ACIDS?

- A. 3
- B. 6
- C. 9
- D. 12

What did the Hershey-Chase blender experiment help prove?

- A. DNA is a double helix.
- B. Pneumonia causes dead mice.
- C. Histones are made of DNA.
- D. The genetic material is made of DNA.

The molecule that caused transformation in Griffith's pneumonia/mouse experiment was _____.

- A. DNA
- B. a bacteriophage
- C. a protein
- D. RNA

Nitrogen bases with only 1 ring are called _____.

- A. nucleosomes
- B. purines
- C. pyrimidines
- D. histones

MATCH THE PROCESS WITH ITS DESCRIPTION:

TRANSLATION	TRANSCRIPTION	REPLICATION
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TRANSCRIPTION Making an complementary RNA sequence from a DNA code (DNA → RNA)

REPLICATION Making a DNA copy of a DNA molecule (DNA → DNA)

TRANSLATION Making proteins from an RNA message (RNA → protein)

* * * * *

Use words from the word bank to match the following:

messenger-RNA transfer-RNA ribosomal-RNA

mRNA Carries the DNA code from nucleus to cytoplasm

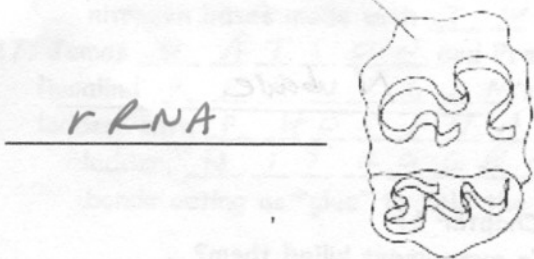
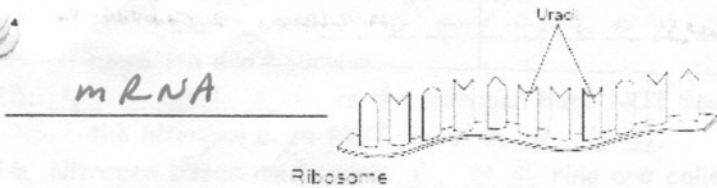
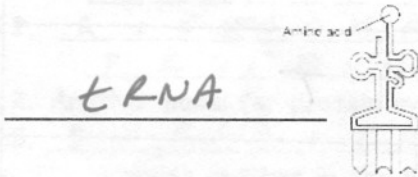
rRNA Made by the nucleolus

tRNA Adds the correct amino acid to the growing protein chain

rRNA Combines with proteins to form ribosomes

mRNA Has a CODON region

tRNA Has an ANTICODON region



COMPARE AND CONTRAST

	CHROMATIN	CHROMOSOMES
What are DNA/proteins doing?	DNA can be read - stretched out	going thru mitosis
Type of cell seen in?	Interphase	Mitosis

	DNA	RNA
Double / Single stranded?	double	single
Sugar used?	deoxyribose	ribose
List all nitrogen bases it has	A T C G	A U C G
Which nitrogen base is missing?	U	T
Location in cell?	nucleus	nucleus → ribosome

SHORT ANSWER:

Name the 3 parts of a nucleotide molecule:

sugar phosphate N base

THINK ABOUT IT: Use what you know about heat and enzymes. (Chapter 1)

Why do you think heating the lethal pneumonia bacteria in Griffith's experiment killed them?

denatured enzymes (broke down) - living organisms need enzymes to live.

USING ANALOGIES:



If a double helix is compared to a "twisted ladder", which would the following represent?

Sides of the ladder? sugar/phosphates

Rungs of ladder? N bases

Glue in the middle that holds the ladder together? H bonds