

Name: _____

Period: _____

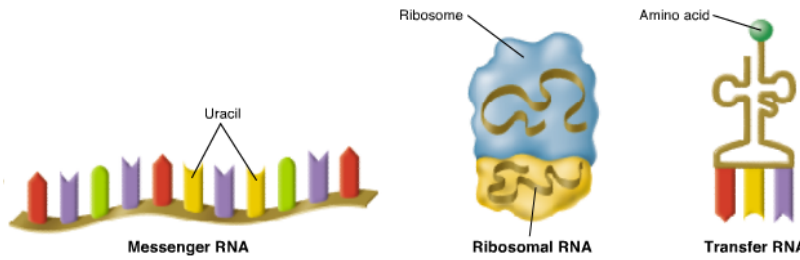
Chapter 12–3; 12-4 Notes: Protein Synthesis & Mutations

DNA	vs.	RNA
<ul style="list-style-type: none"> ■ Double stranded ■ Sugar = _____ ■ _____ ■ Location: ■ _____ ■ Same copy in the cell all the time 		<ul style="list-style-type: none"> ■ Single stranded ■ Sugar = _____ ■ _____ ■ Location: ■ _____ ■ Disposable copies

RNA

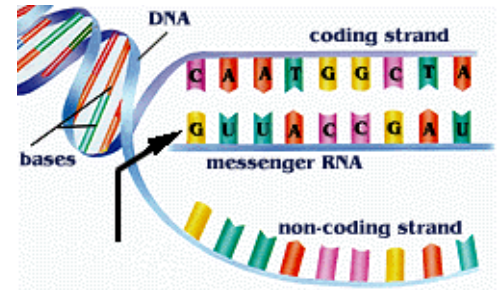
- Function:
- three main types of RNA:

Types of RNA



mRNA

- RNA molecules that carry copies of the DNA instructions = mRNA
- **messenger RNA** (_____) = serve as “messengers” from _____ to the rest of the cell

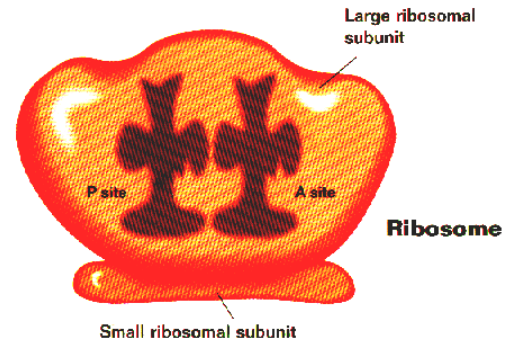


rRNA

- _____ are made up of several dozen proteins, as well as a form of RNA known as **ribosomal RNA** (rRNA).

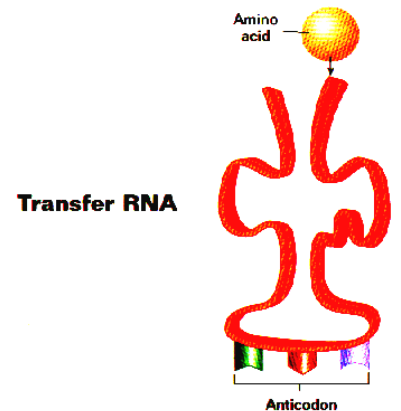
tRNA

- During the construction of a protein:
 - as specified by coded messages in mRNA.
- These RNA molecules are known as **transfer RNA** (tRNA).



Transcription (DNA → mRNA)

- RNA molecules are produced by copying part of the nucleotide sequence of DNA into a _____
- required enzyme = _____
- General summary of transcription:



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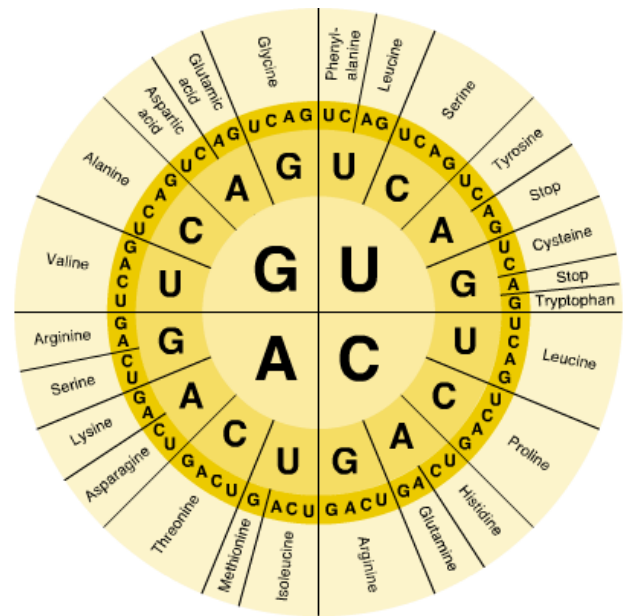
Where does RNA start?

RNA Editing

- _____ = intervening sequence of DNA; does not code for a protein
- _____ = expressed sequence of DNA; codes for a protein
- How is RNA formed? What happens?

The Genetic Code

- Proteins =
- polypeptide =
- properties of proteins are determined by:
- The “language” of mRNA instructions is called the genetic code
- RNA contains four different bases: _____
- Letters read “3” at a time = _____
- _____ = a group of three nucleotides on messenger RNA that specify a particular amino acid.



Translation (mRNA → tRNA → amino acid chain)

- Location:
- mRNA =
- Ribosome = reads the instructions of the mRNA

Steps of Translation

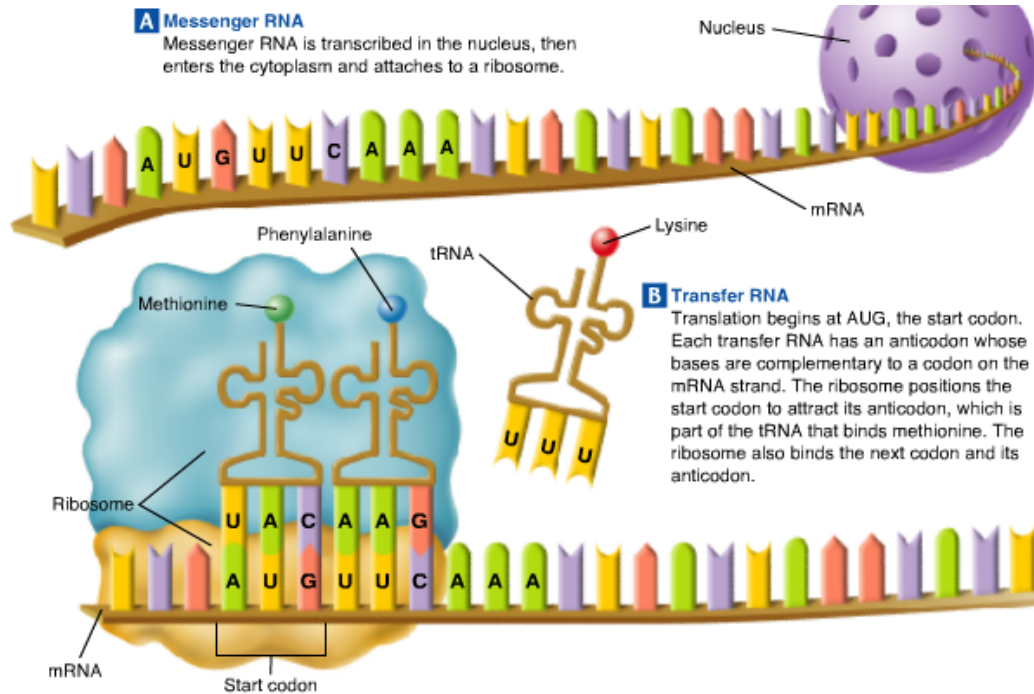
-
-
-
-
-
- Amino acids are bound together → _____
- Each tRNA carries:
- The three bases on tRNA = _____ (complementary to mRNA)
- The ribosome forms _____
- _____ breaks the bonds between tRNA and the amino acids
- When does translation end?

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What amino acids are made?

- Use the mRNA strand on the Genetic Code Chart
- DNA: TAC AAA CAC GGA CCA ACT (antisense strand)
- mRNA:
- tRNA:
- Amino acids:



12-4

Mutations

- What is a mutation and the types of mutations?

Gene Mutations

- _____ = Changes in one or a few nucleotides
- Include: _____

DNA: TAC **GCA** TGG AAT
 mRNA: AUG **CGU** ACC UUA
 Amino acids: **Met-Arg-Thr-Leu**

↓ **Substitution**

DNA: TAC **GTA** TGG AAT
 mRNA: AUG **CAU** ACC UUA
 Amino acids: **Met-His-Thr-Leu**

DNA: TAC GCA TGG AAT
 mRNA: AUG CGU ACC UUA
 Amino acids: **Met-Arg-Thr-Leu**

↓ **Insertion**

DNA: **TAT** CGC ATG GAA T
 mRNA: AUA GCG UAC CUU A
 Amino acids: **Ile-Ala-Tyr-Leu**

THE FAT CAT ATE THE RAT

↓ **Deletion**

~~T~~HE FAT C AT A TE T HE R AT

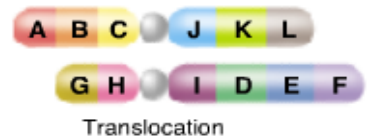
TEF ATC ATA TET HER AT

Name: _____

Period: _____

Types of Point Mutations

- _____ = one base is changed to another
 - Usually affects a single amino acid
- _____ = one base is inserted
- _____ = one base is deleted
 - More dramatic changes
 - Cause _____



Chromosomal Mutations

-
-

4 Types of Chromosomal Mutations

- Insertions =
- Deletions =
- Duplications =
- Inversions =
- Translocations =

Significance of Mutations

-