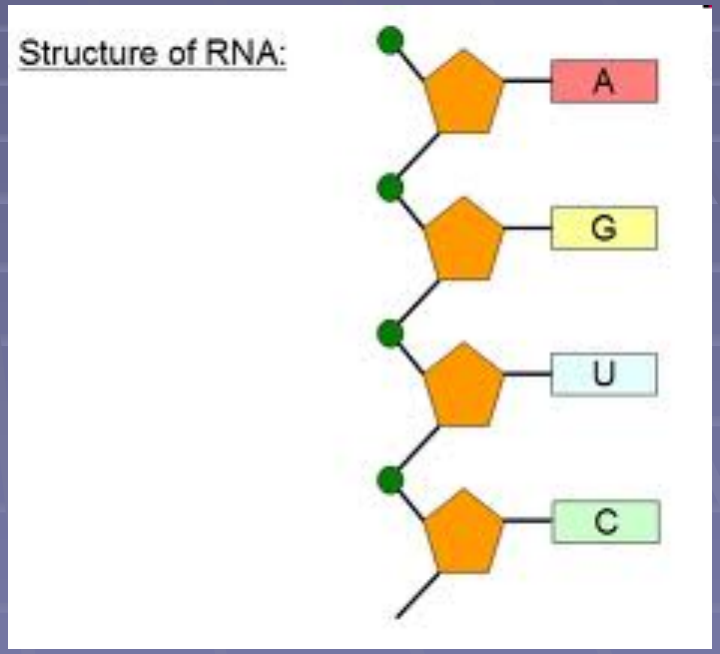
Chapter 12-3: RNA & Protein Synthesis

Essential Questions:

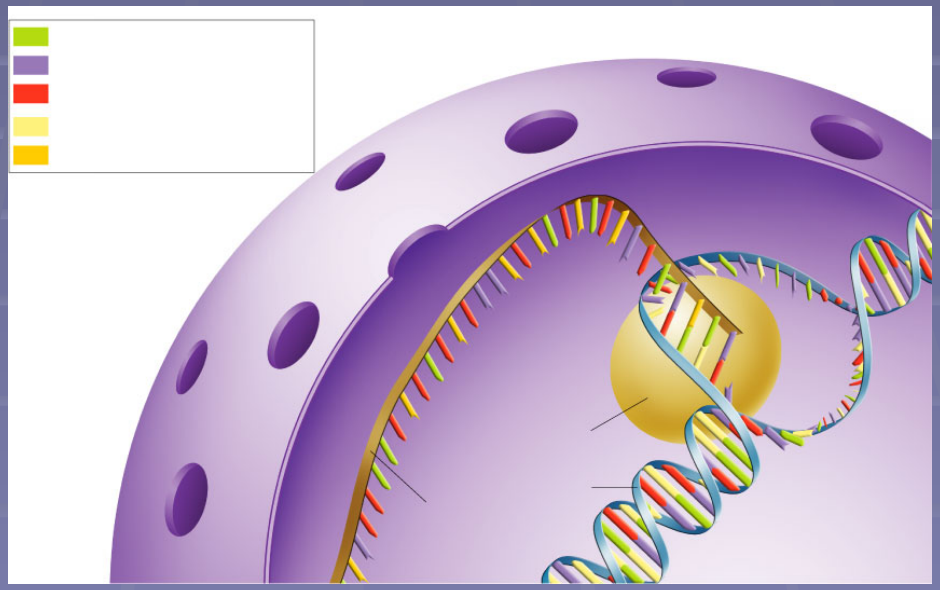
- What are 3 types of ***RNA?***
- What is the function of 3 types of RNA?
- What happens during ***transcription?***
- What happens during ***translation?***

How does a gene *work*?

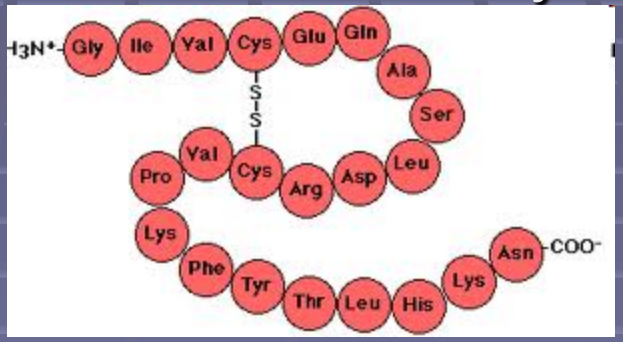
- Structure of RNA
  - *Ribose*, not deoxyribose
  - *Uracil* replaces thymine
  - Single, not double strand



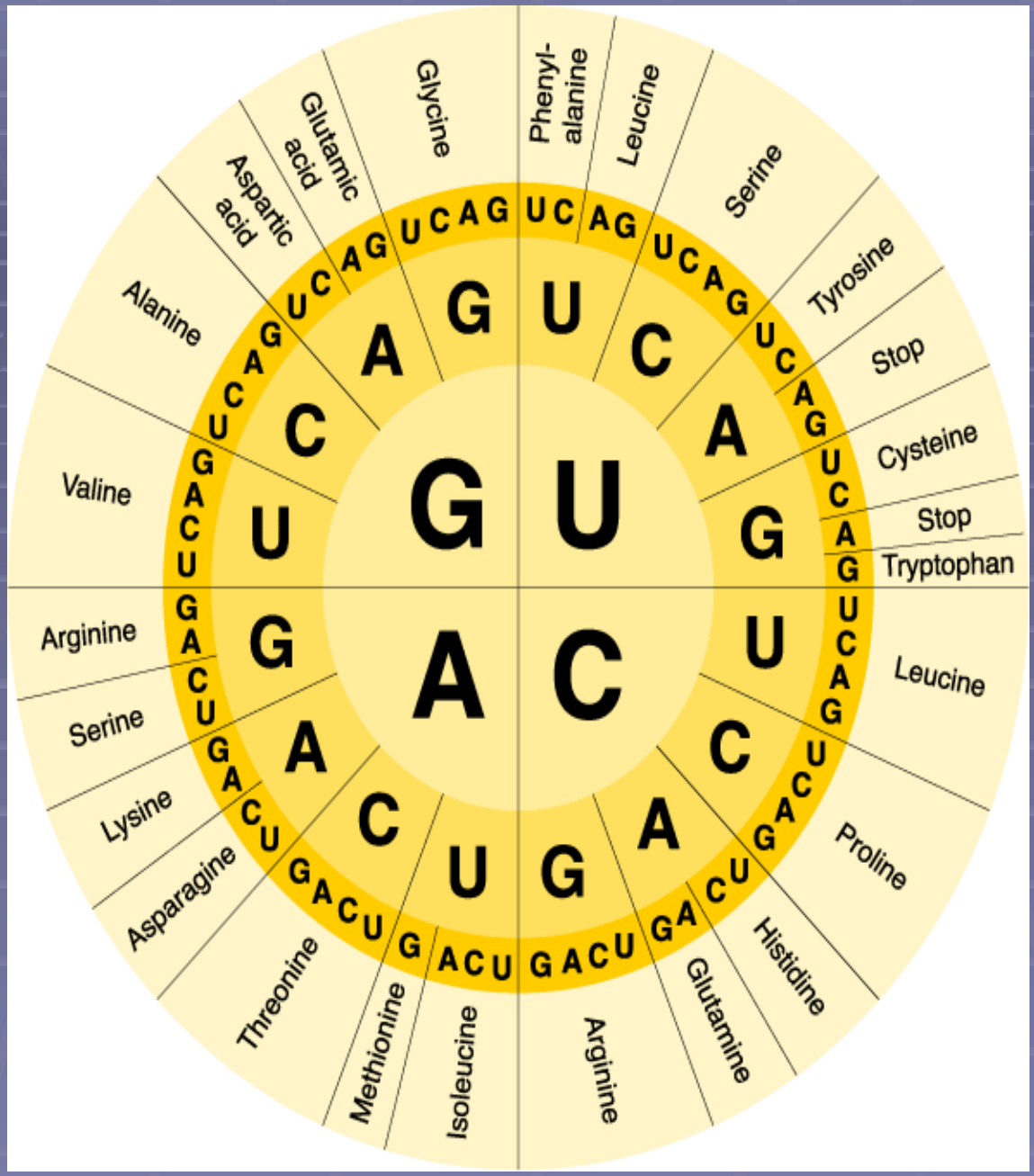
- Types of RNA
  - mRNA: messenger RNA
  - rRNA: ribosomal RNA
  - tRNA: transfer RNA
- Transcription
  - Enzymes separate DNA strand, uses 1 strand to make mRNA strand



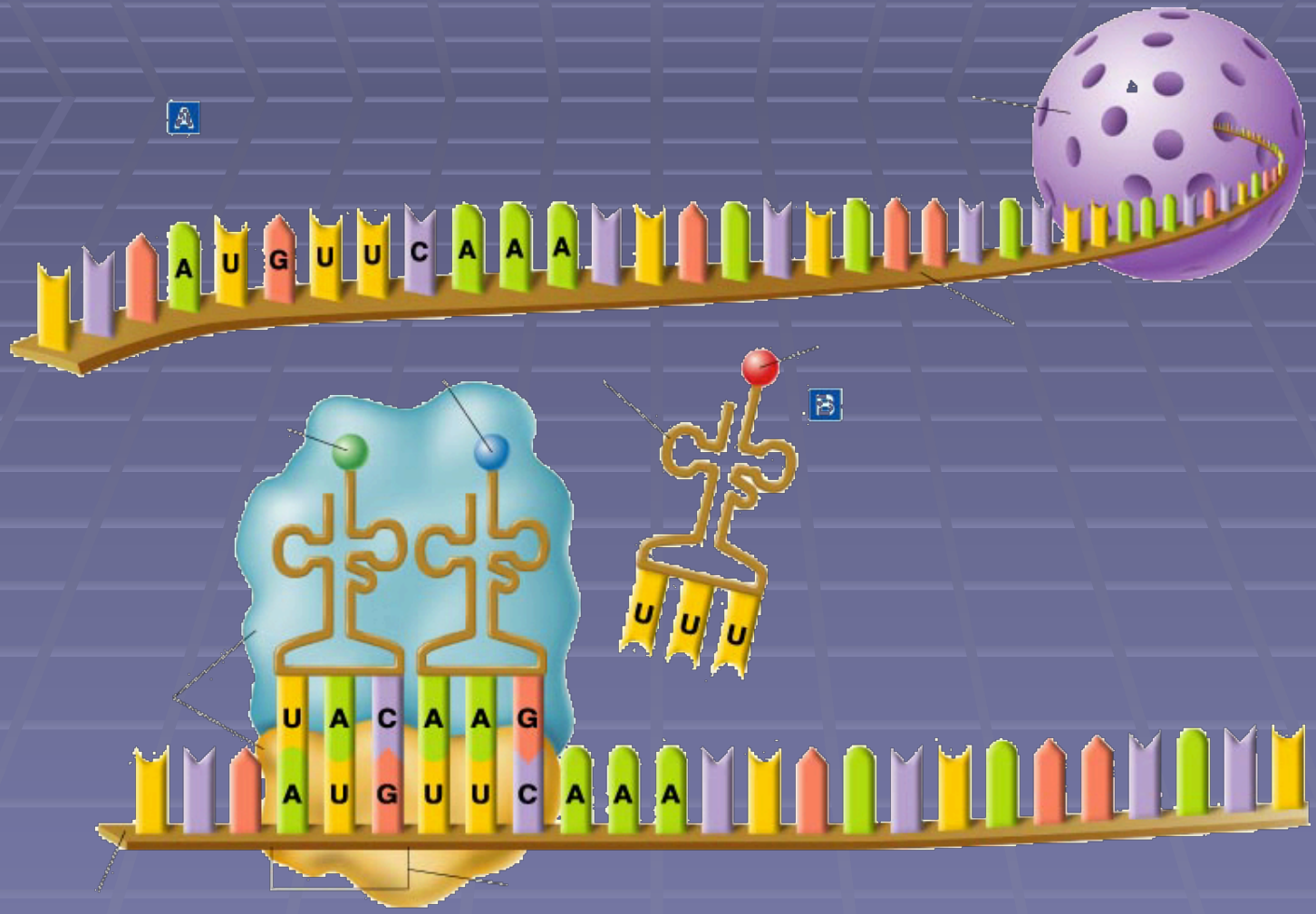
- The Genetic Code
  - Proteins = polypeptides = long chains of amino acids
    - Properties of proteins determined by sequence of amino acids

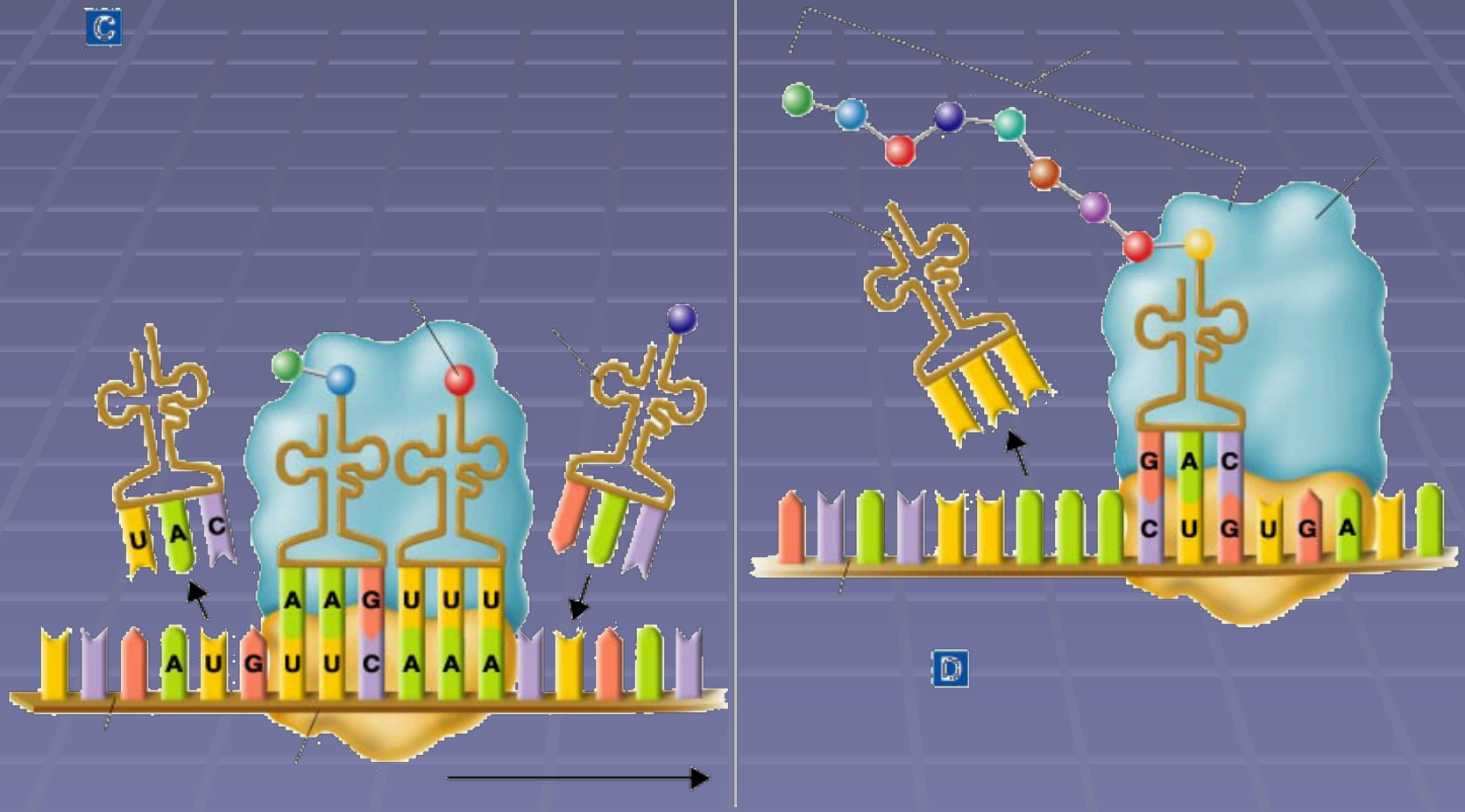


  - Codon = 3 base sequence that specifies a single amino acid
    - Ex: UGUGGAACGCAU specifies what sequence of amino acids?
  - 4 x 4 x 4 = 64 possible combinations, so some a. acids have more than codon


G U A C
U C A G
Phenyl-alanine
Leucine
Serine
Tyrosine
Stop
Cysteine
Stop
Tryptophan
Leucine
Proline
Histidine
Glutamine
Arginine
Isoleucine
Methionine
Threonine
Asparagine
Lysine
Serine
Arginine
Valine
Alanine
Aspartic acid
Glutamic acid
Glycine

- Translation
  - Happens at ribosome
  - mRNA are “instructions” – ribosome “reads” instr. to build proteins
  - Translation starts when mRNA attaches to ribosome & moves through it
    - tRNA “anti-codon” for each a. acid brings it to ribosome
    - Polypeptide chain grows until a “stop” codon is reached, ribosome then releases polypeptide chain (now a protein)


A
A U G U U C A A A
B
U U U
U A C A A G
A U G U U C A A A


C
U A C
A A G U U U
A U G U U C A A A
D
G A C
C U G U G A

- Roles of DNA & RNA
  - Master plans vs. disposable instructions
- Genes & proteins
  - Why are proteins key?
  - Because proteins control reactions that are key to almost everything living cells do