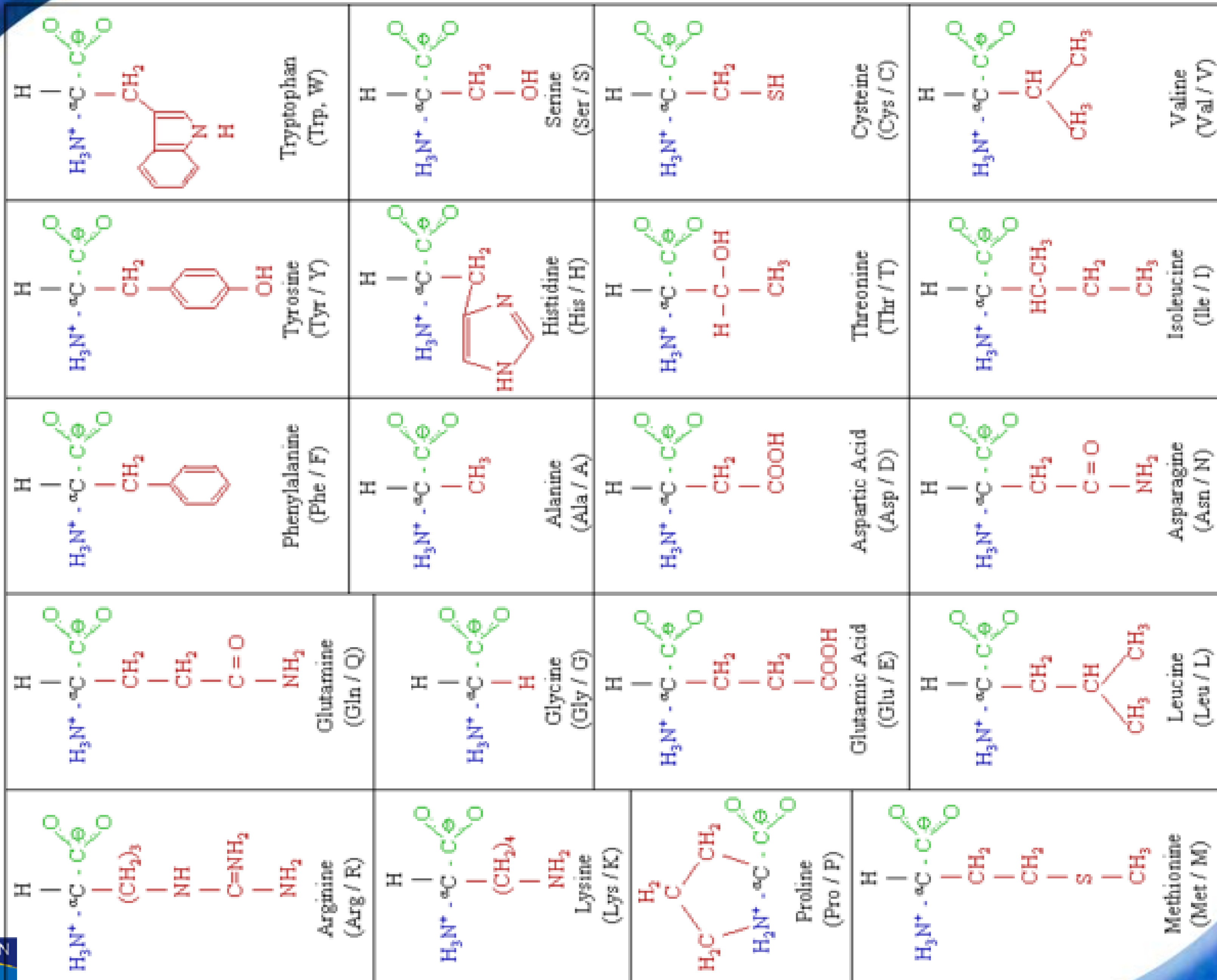
Proteins

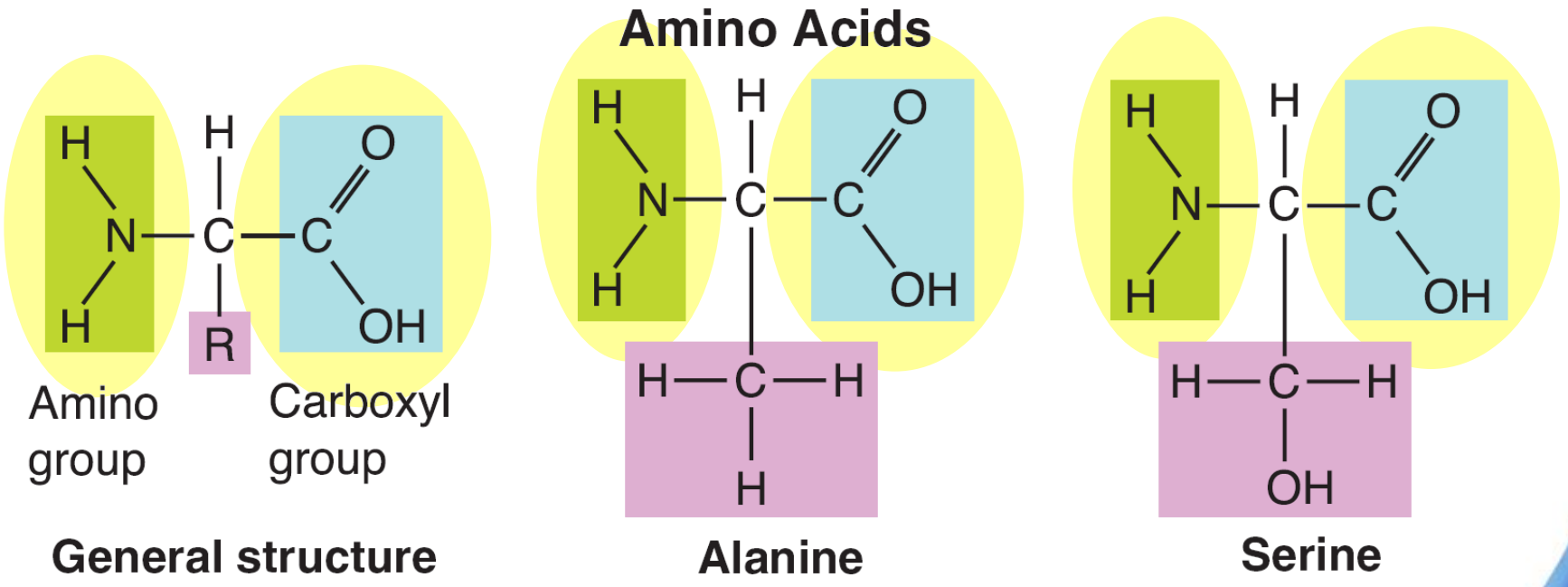
Proteins are macromolecules that contain nitrogen, carbon, hydrogen, and oxygen.

Proteins are polymers of molecules called **amino acids**.

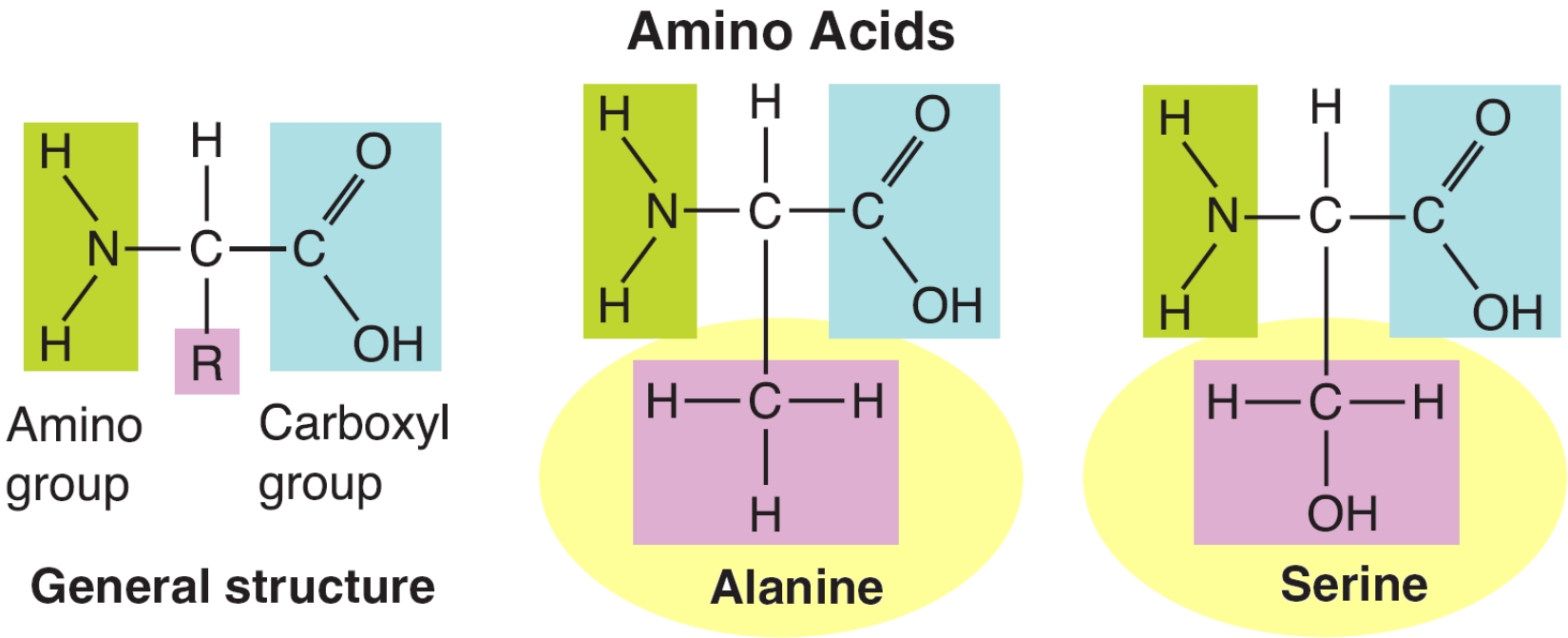
There are 20 amino acids, of them 8 are essential, which means we must consume them in our diet in order for our bodies to use them (can't make them)



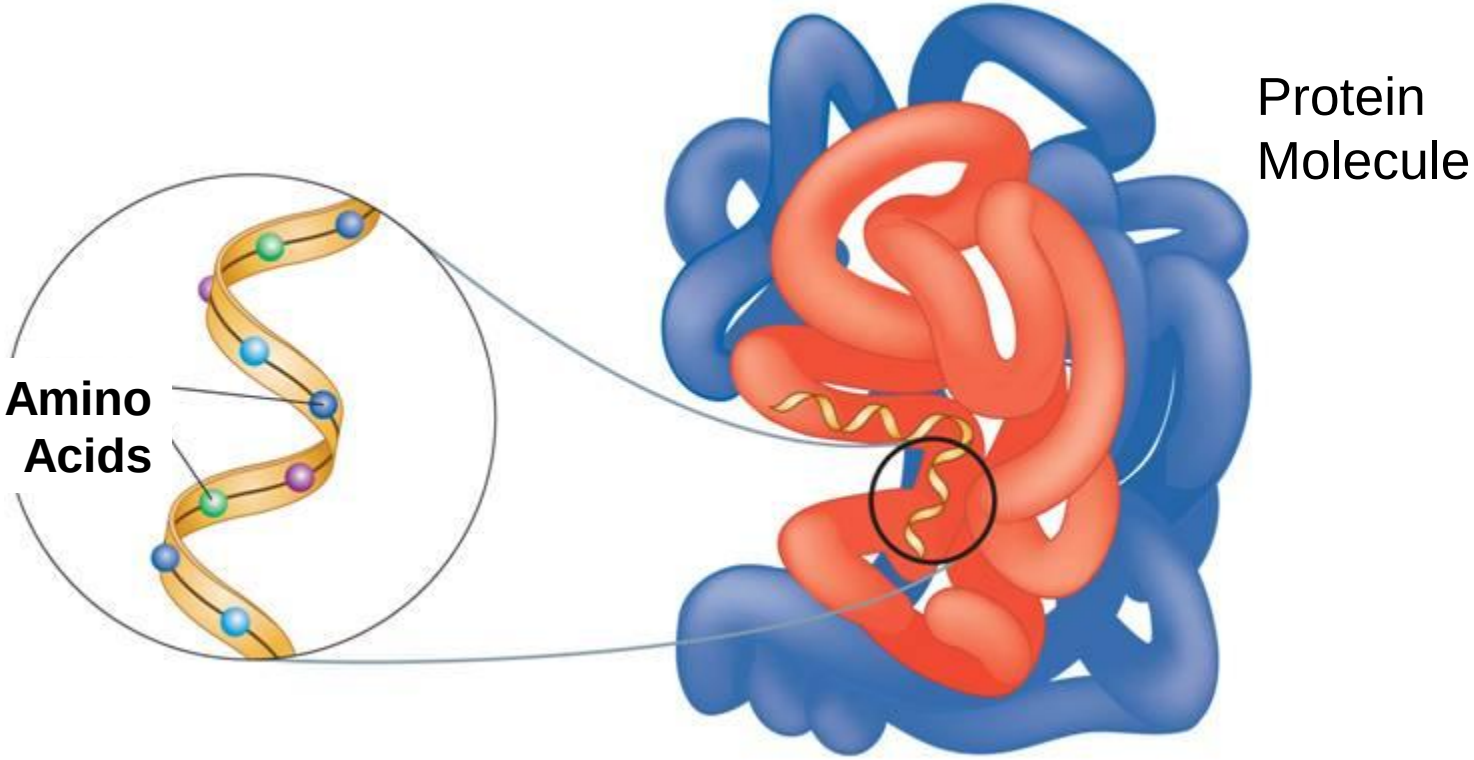
Amino acids are compounds with an amino group ($-NH_2$) on one end and a carboxyl group (-COOH) on the other end.



The portion of each amino acid that is different is a side chain called an R-group.



The instructions for arranging amino acids into many different proteins are stored in DNA.



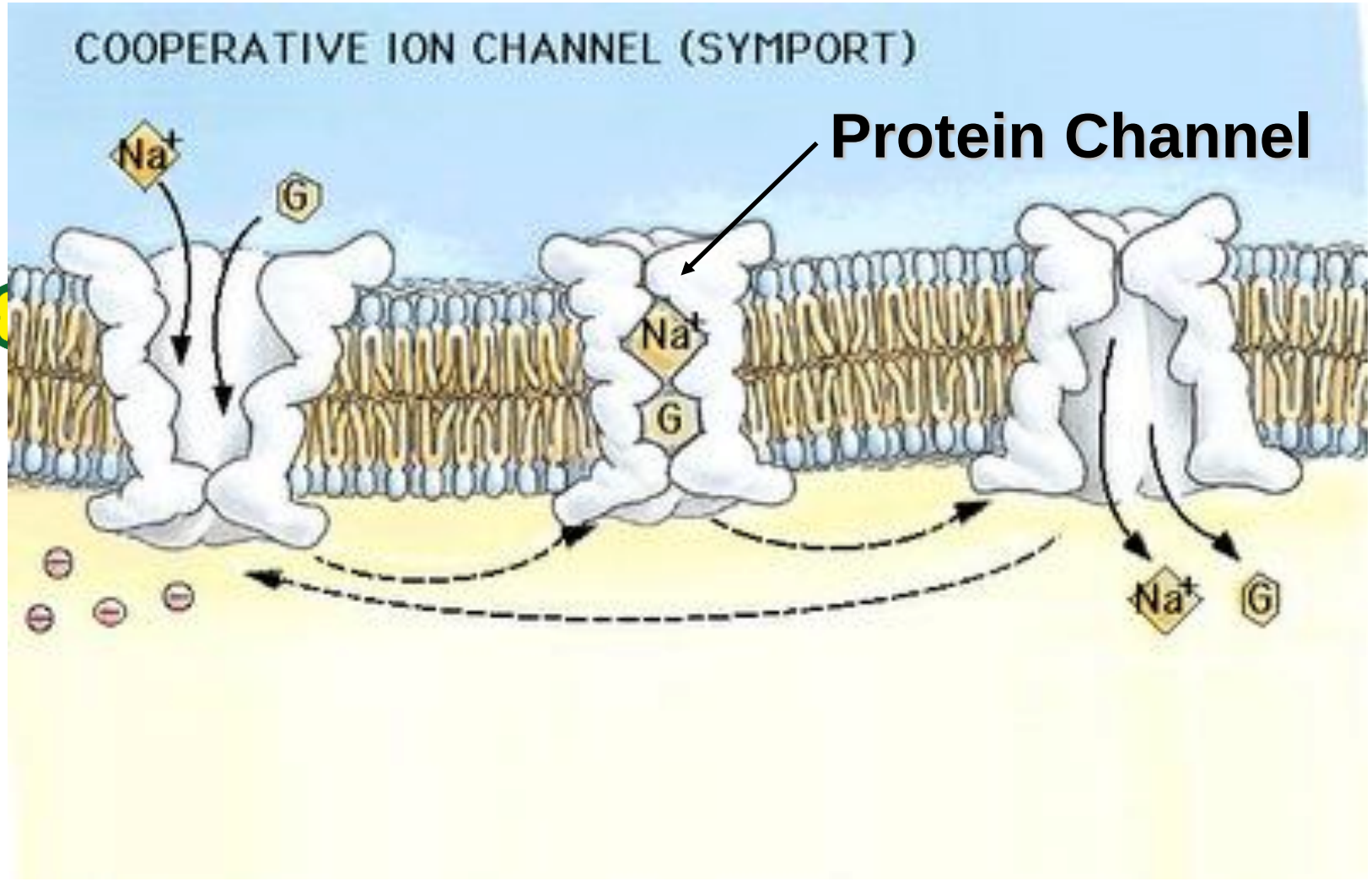
What is the function of proteins?

Some proteins control the rate of reactions and regulate cell processes.

ex) enzymes

Some proteins are used to form bones and muscles.

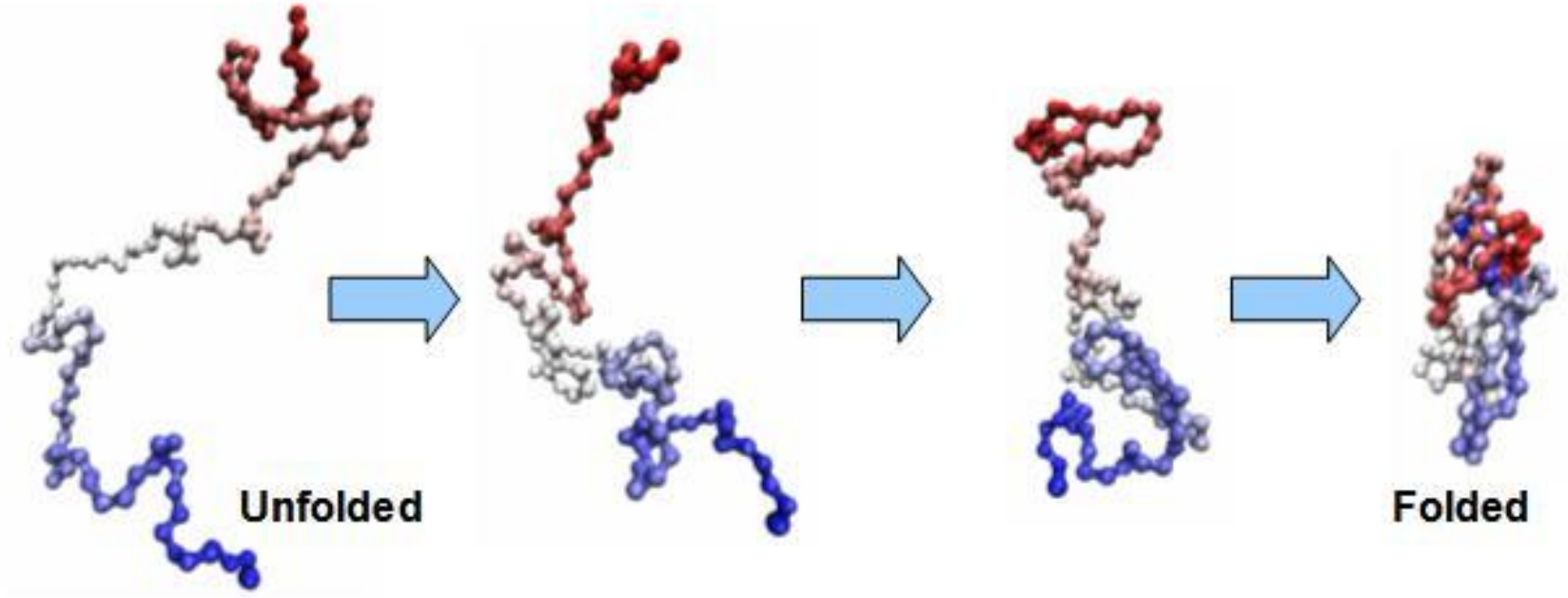
Other proteins transport substances into or out of cells or help to fight disease.



Proteins can have up to four levels of organization:

1. Amino acids have a specific protein chain.
2. The amino acids within a chain can be twisted or folded.
3. The chain itself is folded.
4. If a protein has more than one chain, each chain has a specific arrangement in space.

Protein Folding and Structure



Primary **Secondary** **Tertiary** **Quaternary**

3 Proteins are among the most diverse macromolecules because

a. they contain both amino groups and carboxyl groups.

b. they can twist and fold into many different and complex structures.

c. they contain nitrogen as well as carbon, hydrogen, and oxygen.

d. their R groups can be either acidic or basic.

5 A major difference between polysaccharides and proteins is that

a. plants make polysaccharides, while animals make proteins.

b. proteins are made of monomers, while polysaccharides are not.

c. polysaccharides are made of monosaccharides, while proteins are made of amino acids.

d. proteins carry genetic information, while polysaccharides do not.

Nucleic Acids

a. **Nucleic acids** are macromolecules containing hydrogen, oxygen, nitrogen, carbon, and phosphorus.

b. Nucleic acids are polymers assembled from individual monomers known as nucleotides.

c. Used for storage of genetic information.

c Section QUIZ

Nucleotides **consist of three parts:**

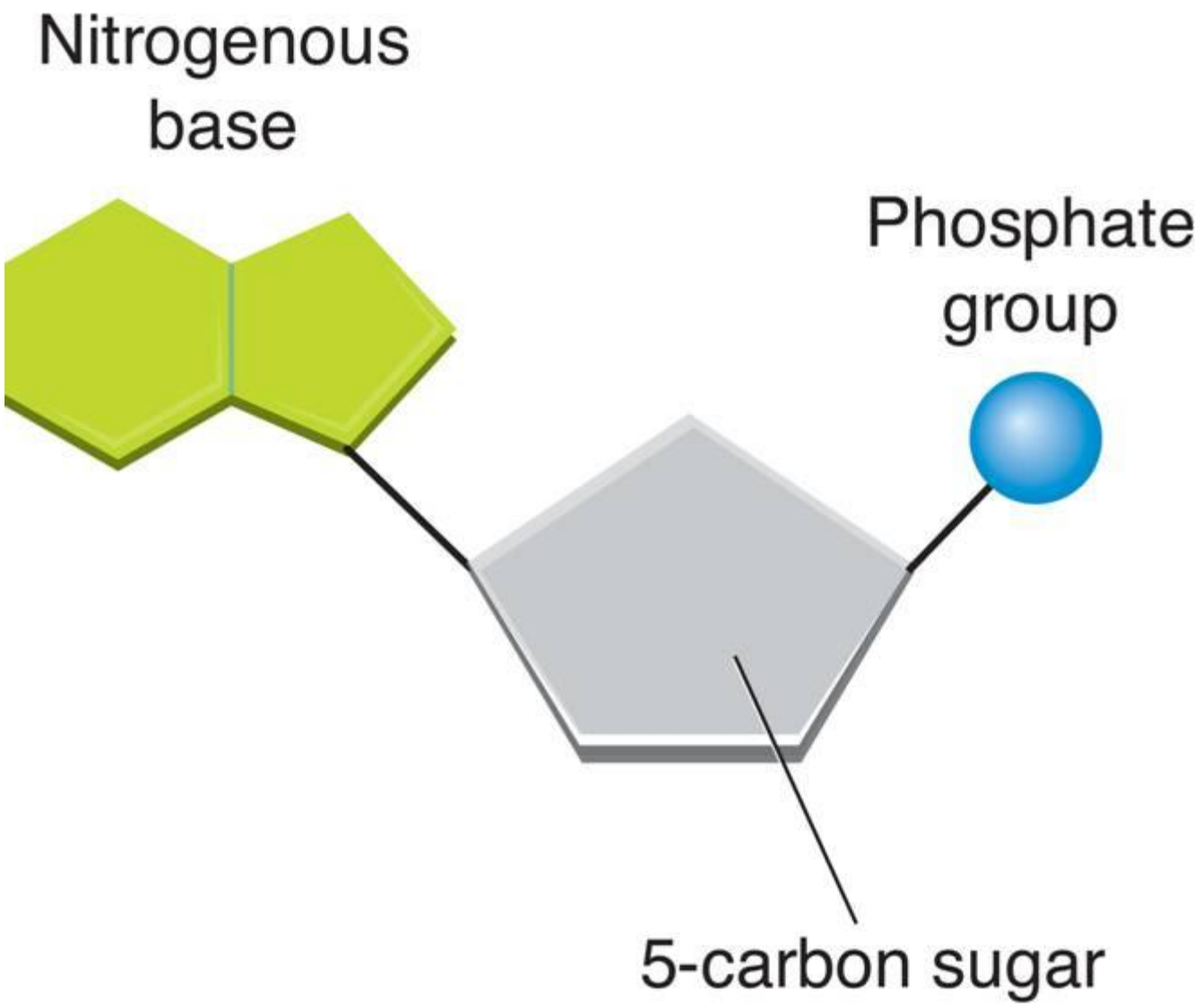
a. a 5-carbon sugar

b. a phosphate group

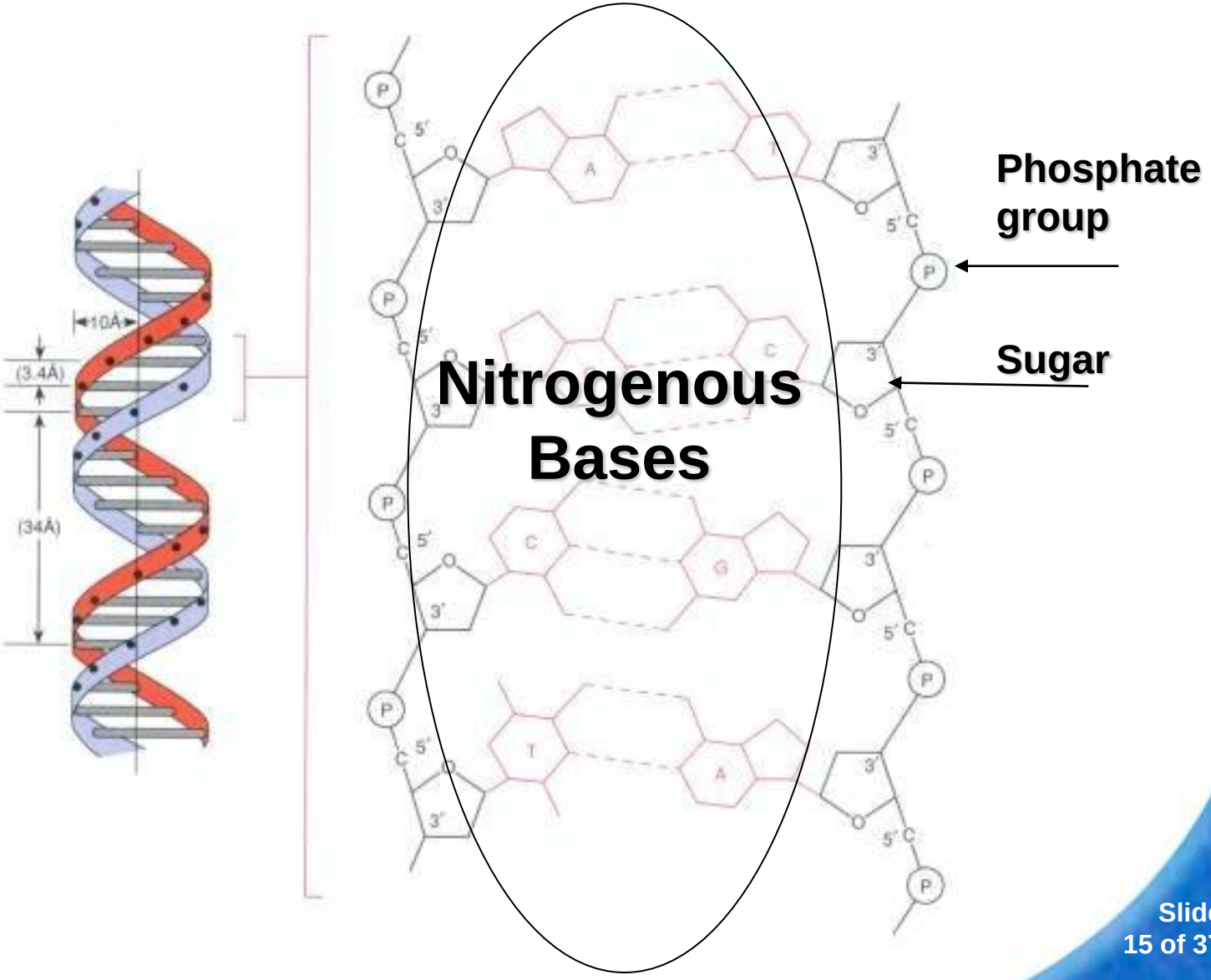
c. a nitrogenous base

Individual nucleotides can be joined by covalent bonds to form a polynucleotide, or nucleic acid.

c Section QUIZ



DNA is a double stranded molecule

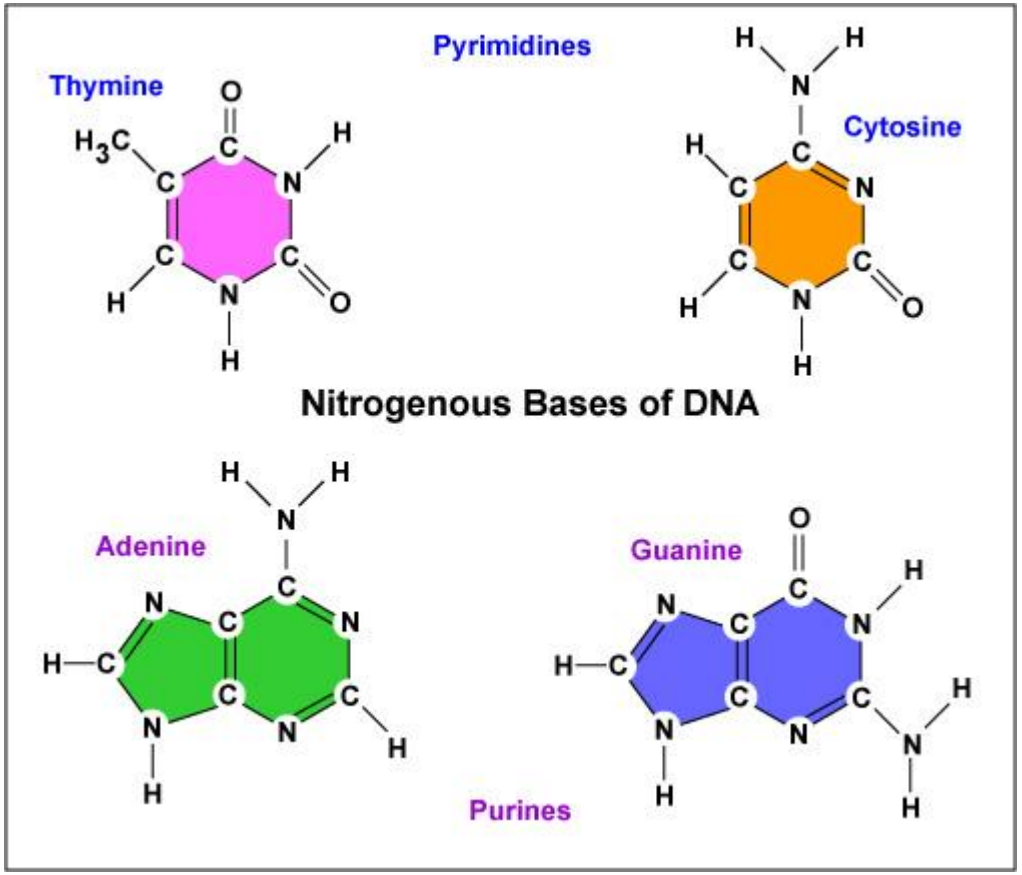


Section QUIZ

DNA Nitrogenous Bases

There are 4 different nitrogen bases found in DNA

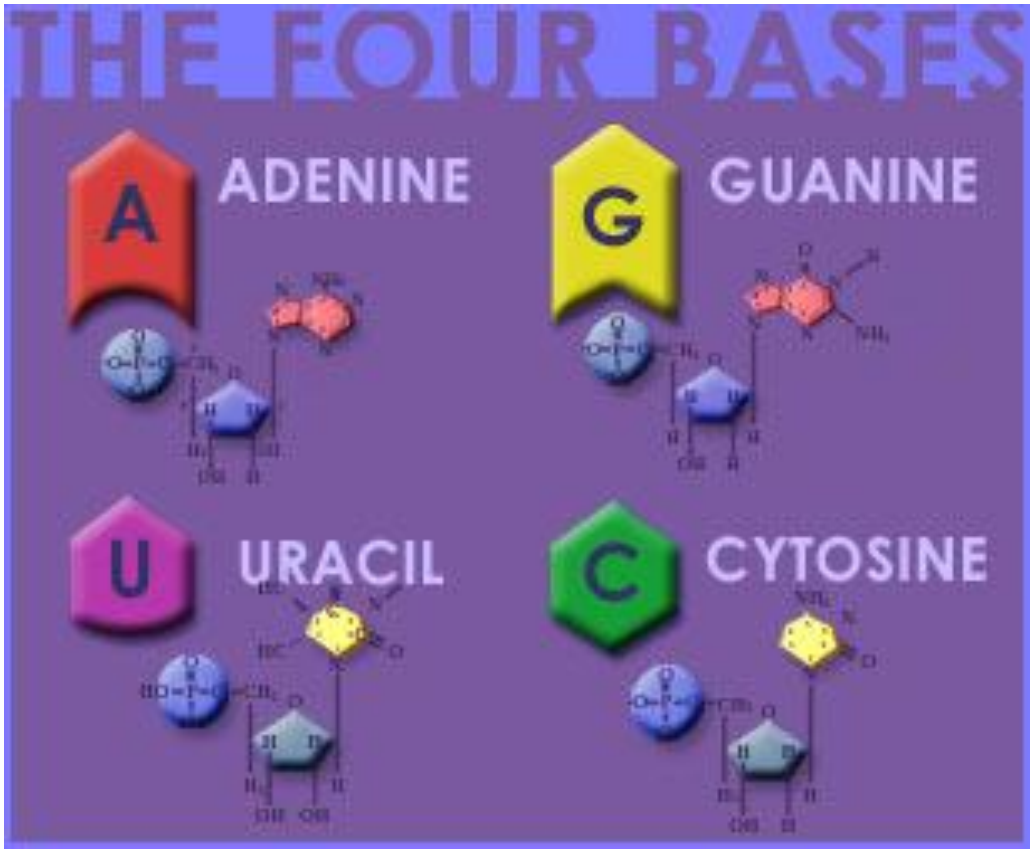
- **Guanine**
- **Adenine**
- **Thymine**
- **Cytosine**



DNA Nitrogenous Bases

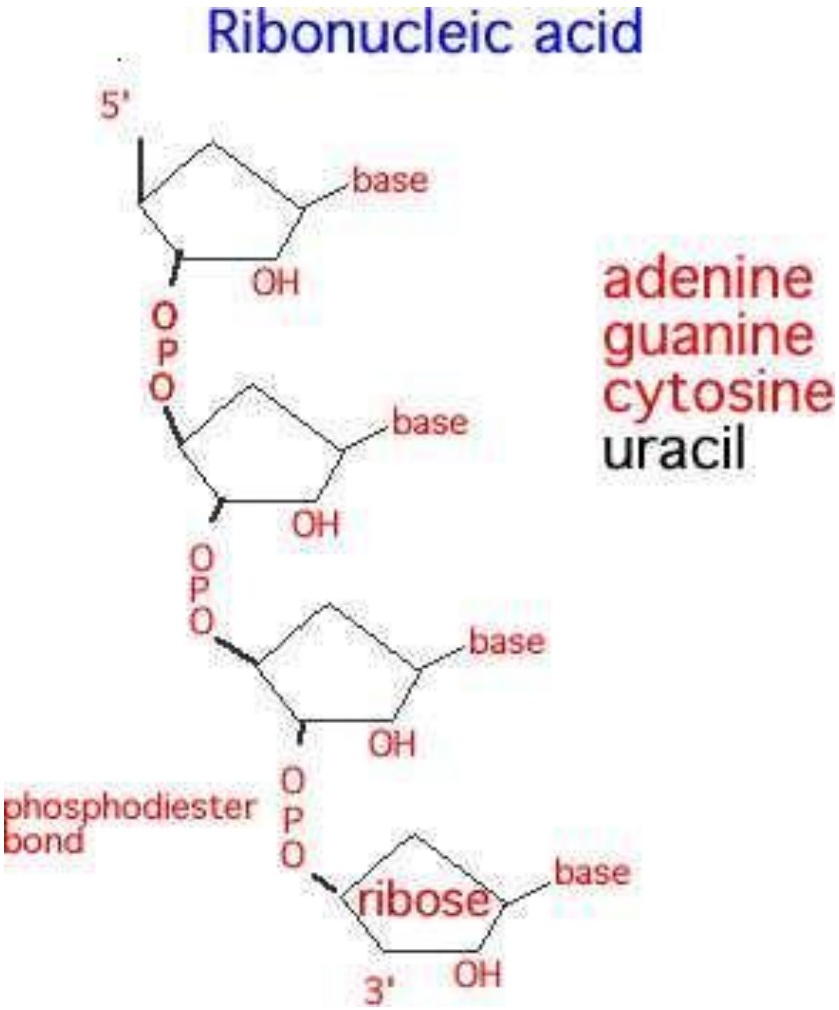
There are 4 different nitrogen bases found in RNA

- **Guanine**
- **Adenine**
- **Uracil**
- **Cytosine**



RNA Molecule

RNA is a single stranded molecule



c Section QUIZ

- What is the function of nucleic acids?

c Section QUIZ

ucleic acids store and transmit hereditary, or genetic, information.

There are two kinds of nucleic acids, ribonucleic acid \A) **and** deoxyribonucleic acid (DNA).

RNA contains the sugar ribose.

DNA contains the sugar deoxyribose.

By alternating the pattern of bases, different proteins are made by the body for different purposes.