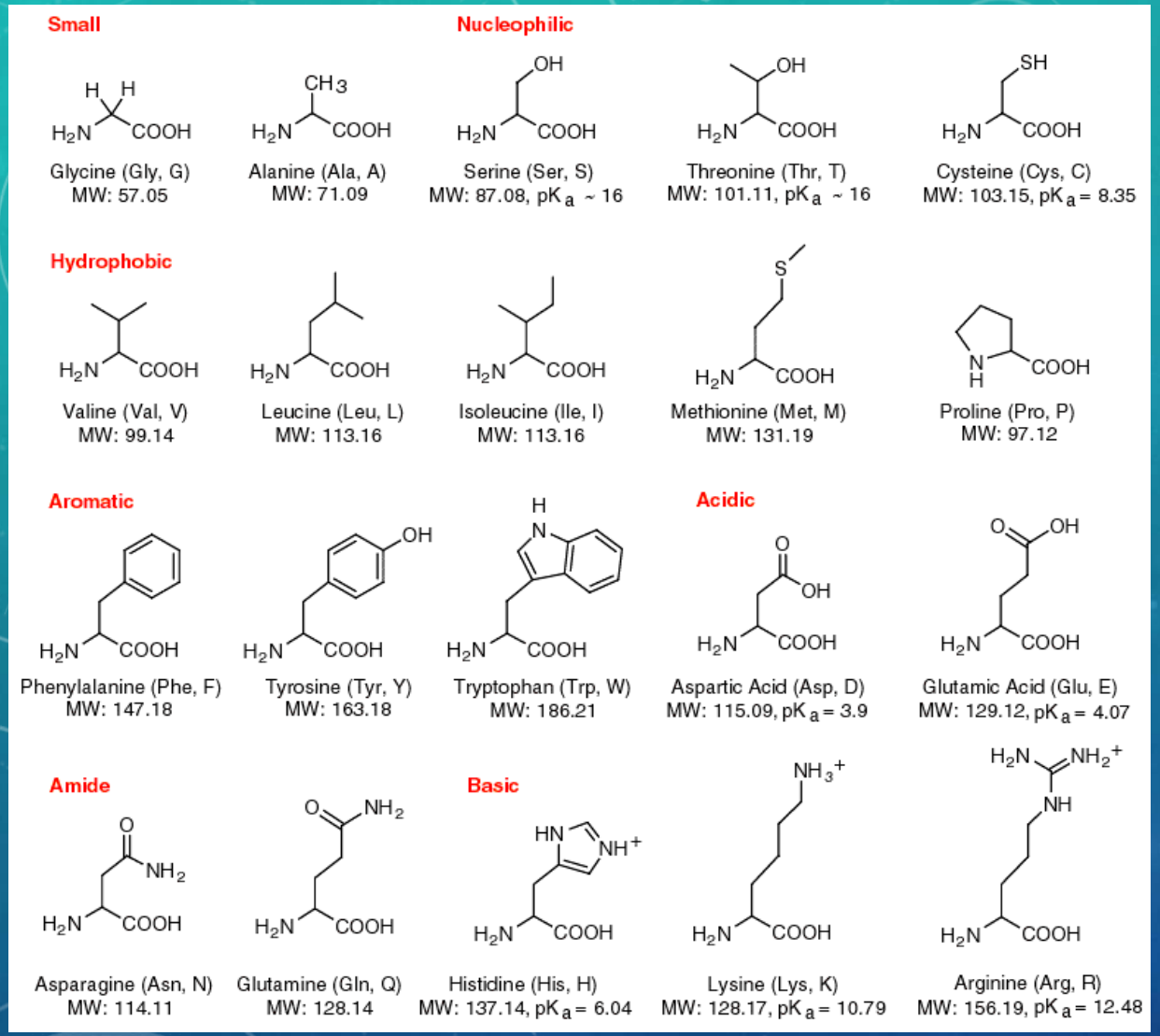
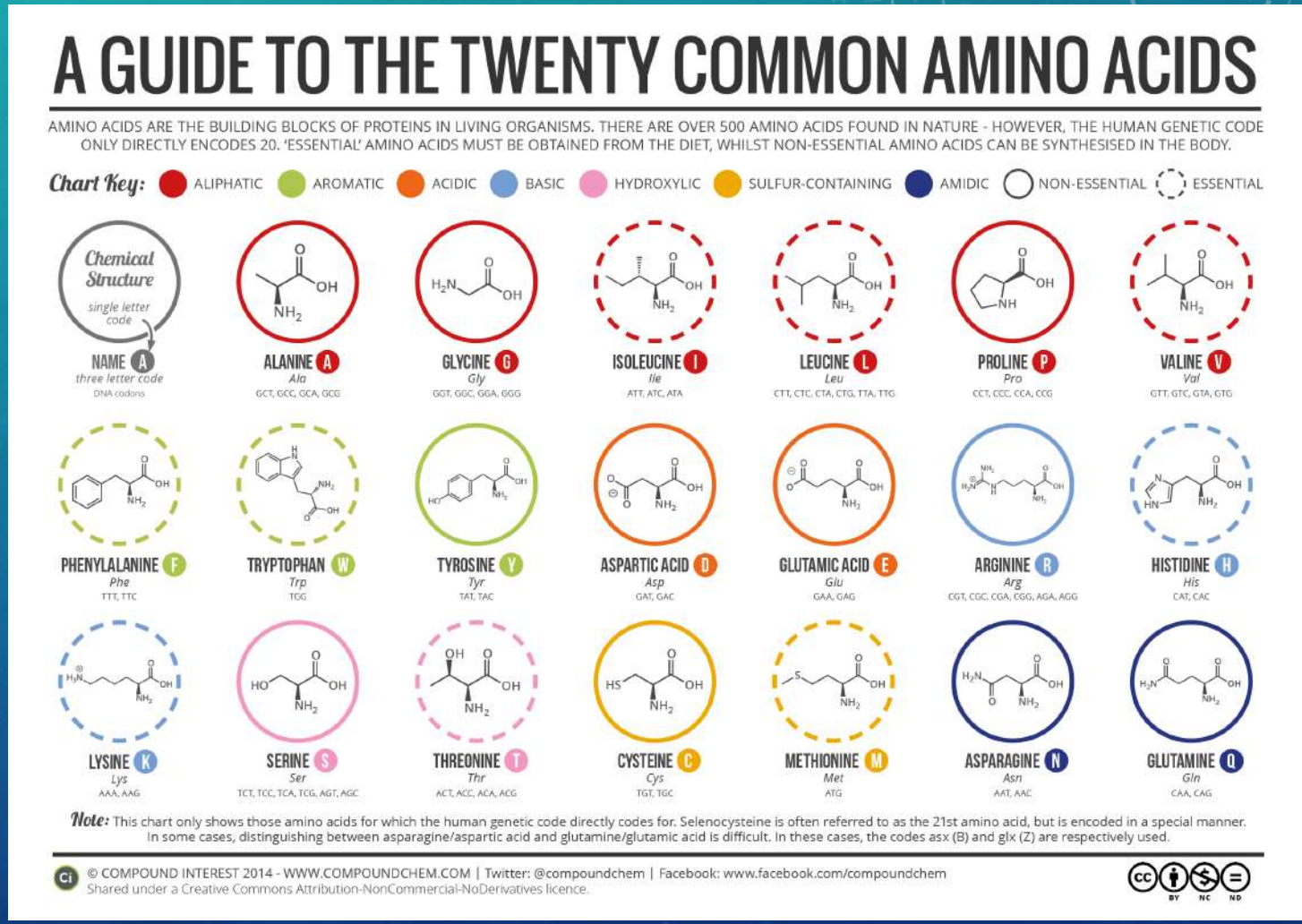
MACROMOLECULES
PROTEINS



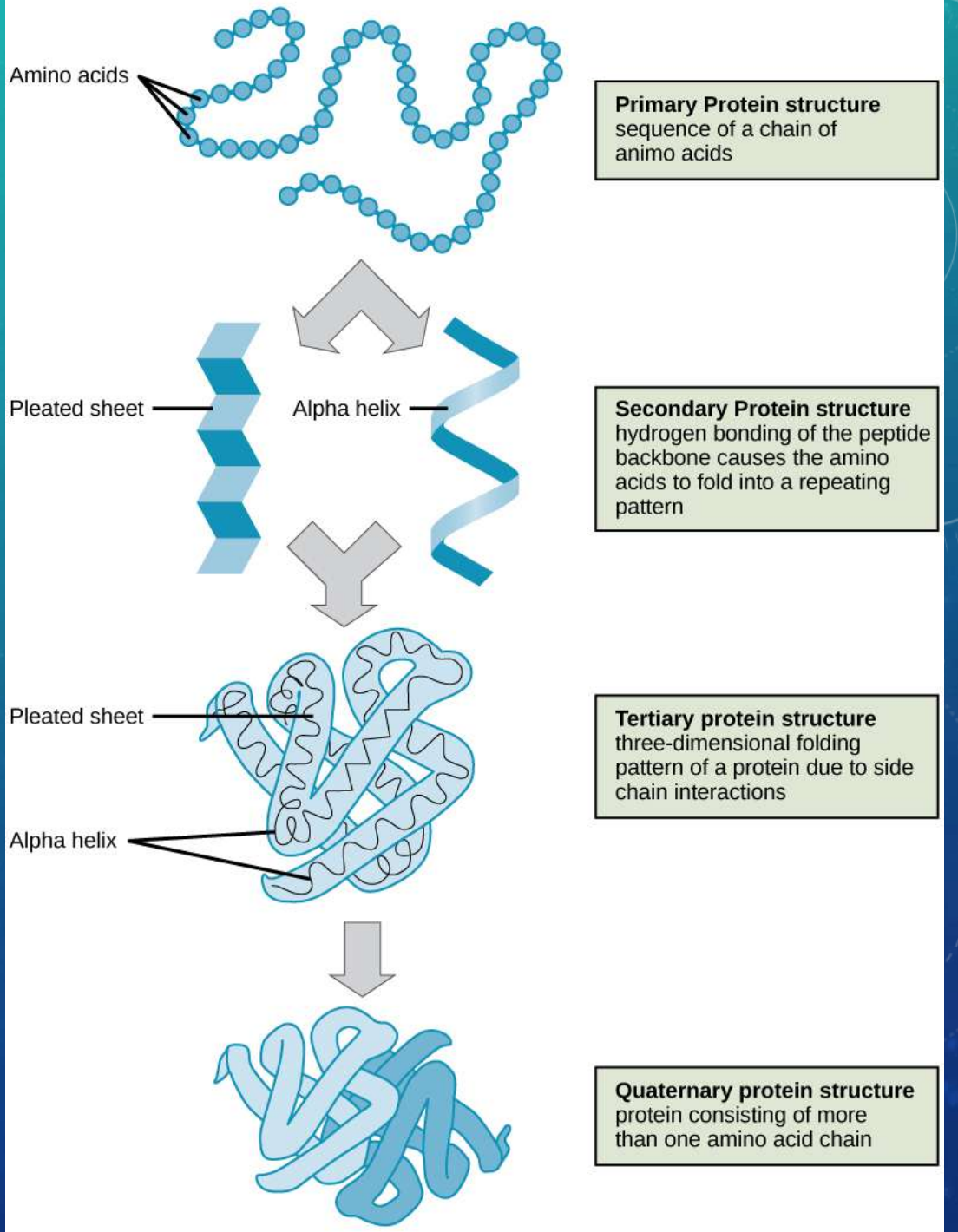
PROTEINS
ARE MADE FROM AMINO ACIDS

- Proteins are polymers
- Amino acids are called monomers
  - 20 Amino Acids



HOW A PROTEIN IS STRUCTURED

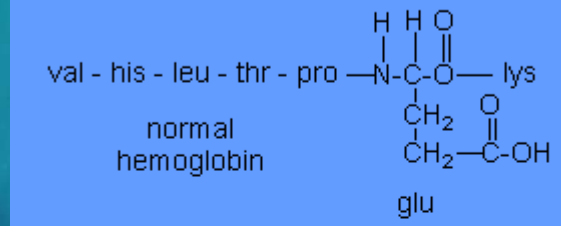
Primary –Amino Acids form a chain and are peptide bonded
Secondary
Tertiary – 3D shape
Quaternary

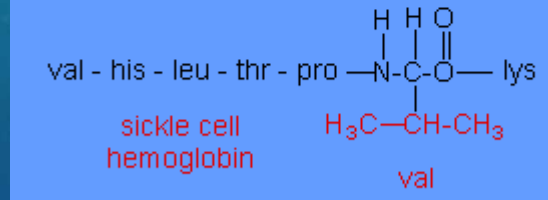


ACTIVITY #1

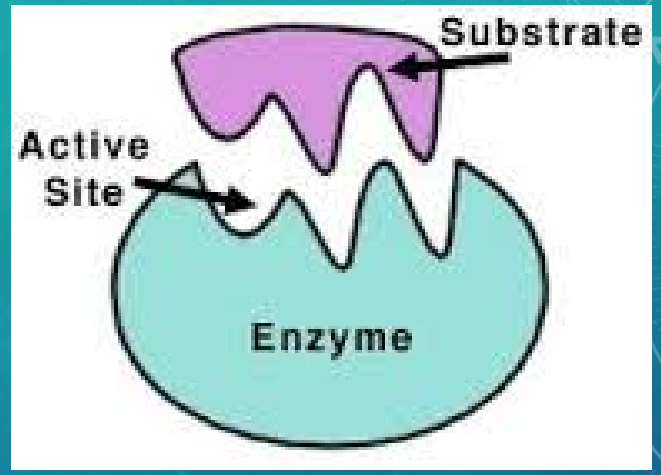
- Build a Protein molecule from a sequence of Amino Acids
  - 20 Amino Acids
  - Can build any protein due to any sequence and # of Amino Acids.
  - Characteristics of Amino Acids
    - Hydrophilic
    - Hydrophobic
    - Acidic
    - Basic
- How does the sequence of Amino Acids change the shape of the protein?

Sickle Cell Anemia

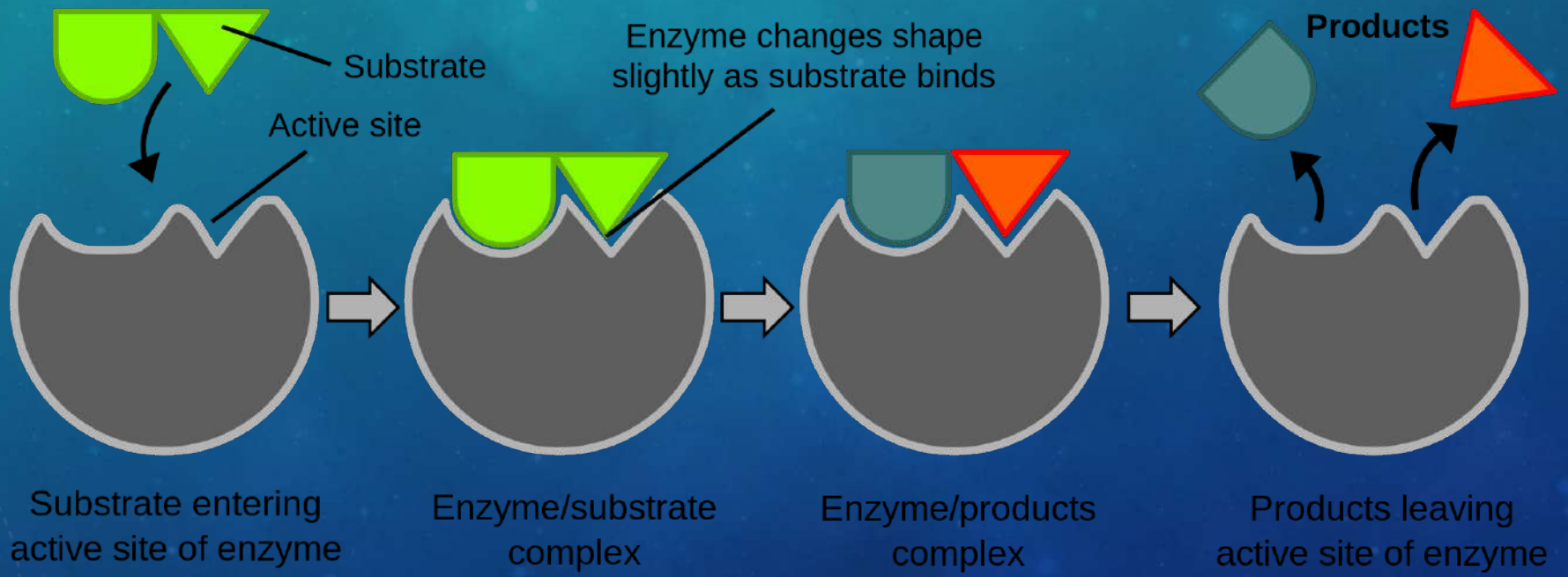




FUNCTIONS OF PROTEINS

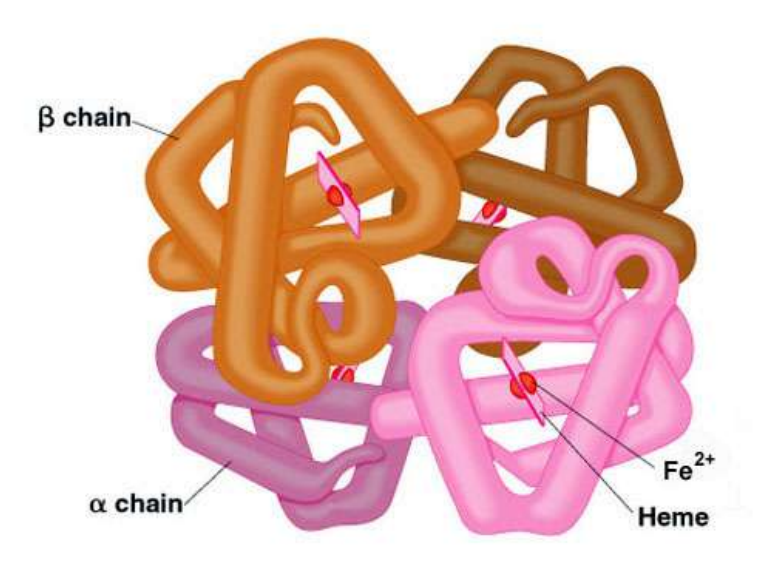


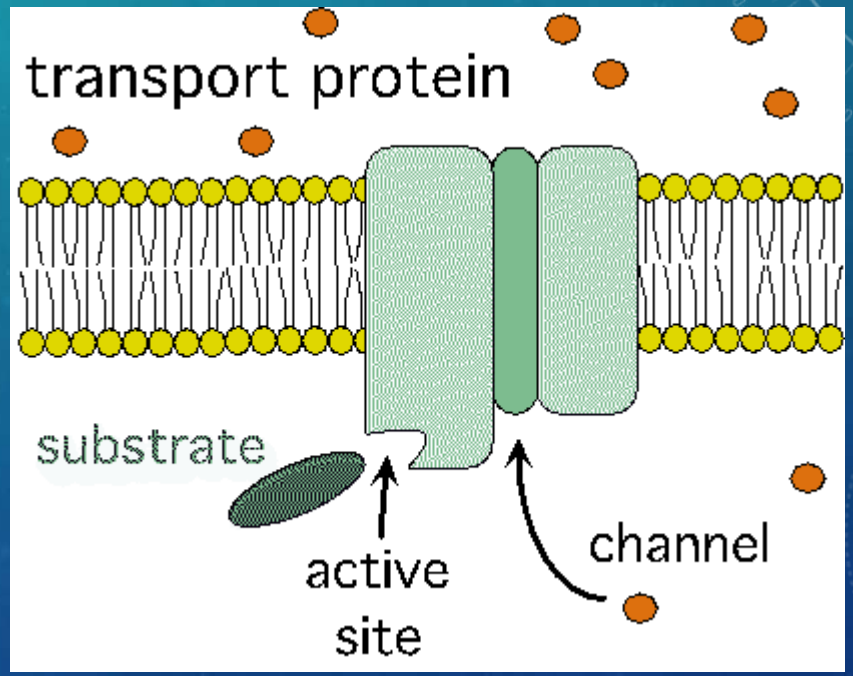
- Enzymes – speed up chemical reactions
  - Are not used up and can be used again & again



FUNCTIONS OF PROTEINS

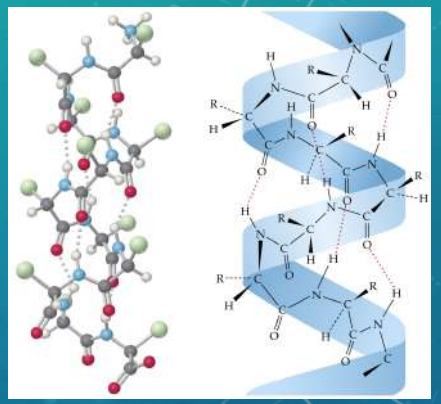
- Transport Proteins
  - Hemoglobin – O_2
  - Sickle Cell Anemia



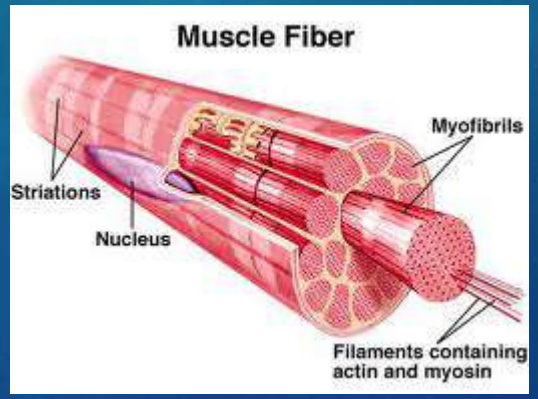


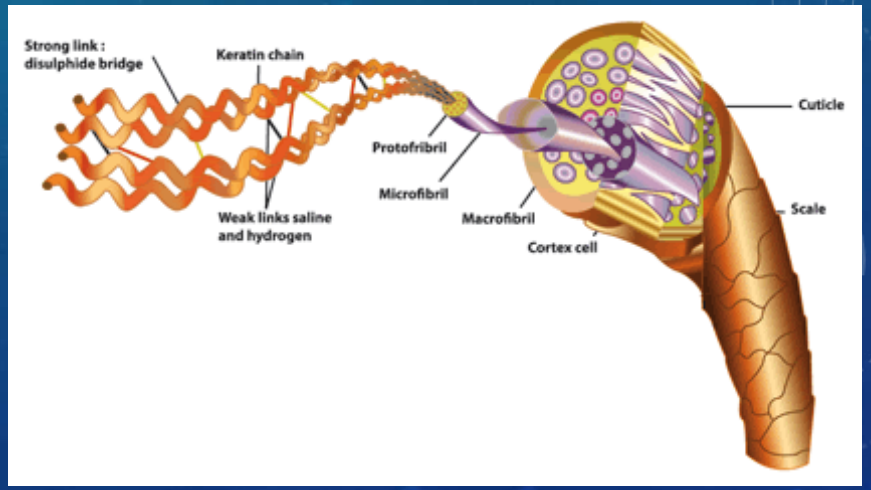
FUNCTIONS OF PROTEINS

Keratin

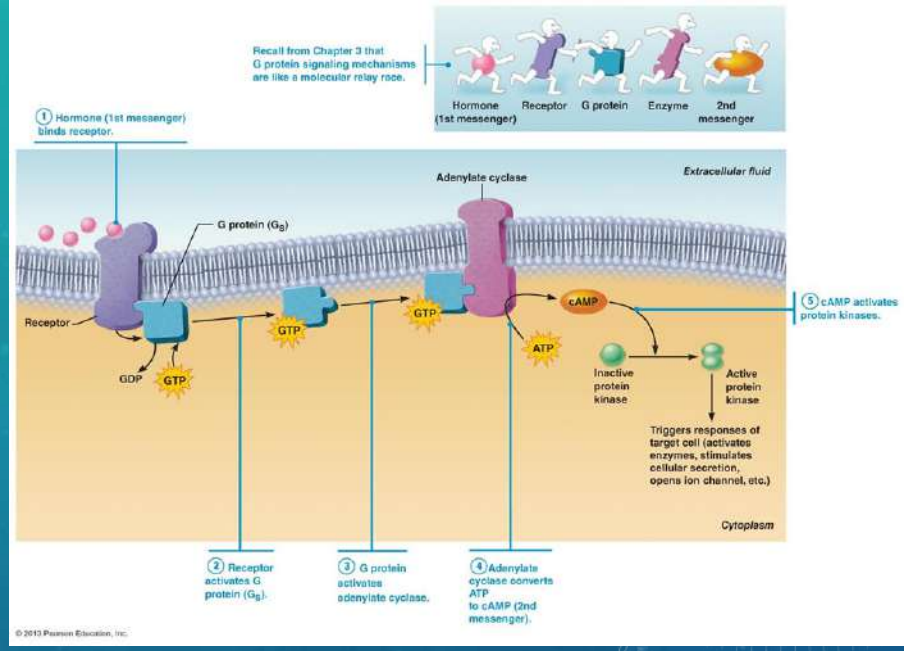


- Structural Proteins
  - Collagen
    - Skin, ligaments, tendons, bone, hair, fur, wool, hooves, fingernails, cocoons, silk, feathers,
  - Muscle
    - Formation of DNA

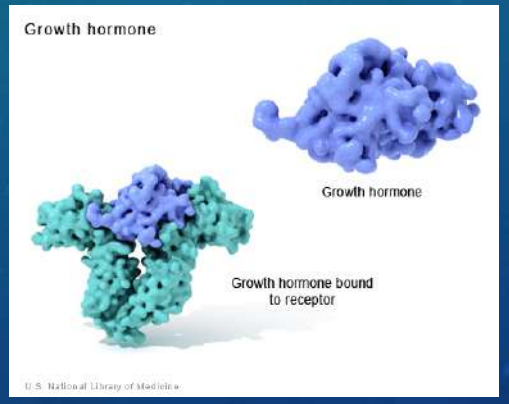


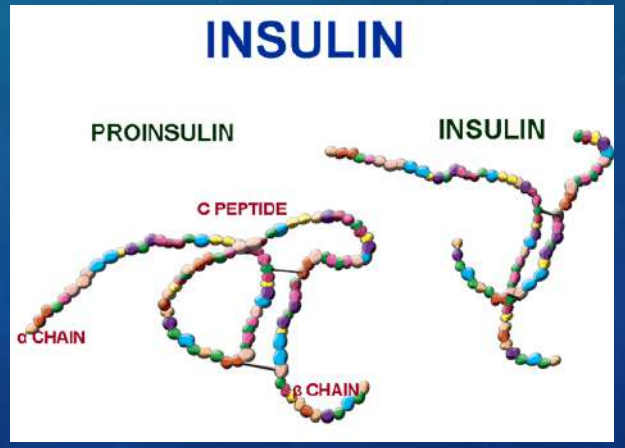


FUNCTIONS OF PROTEINS



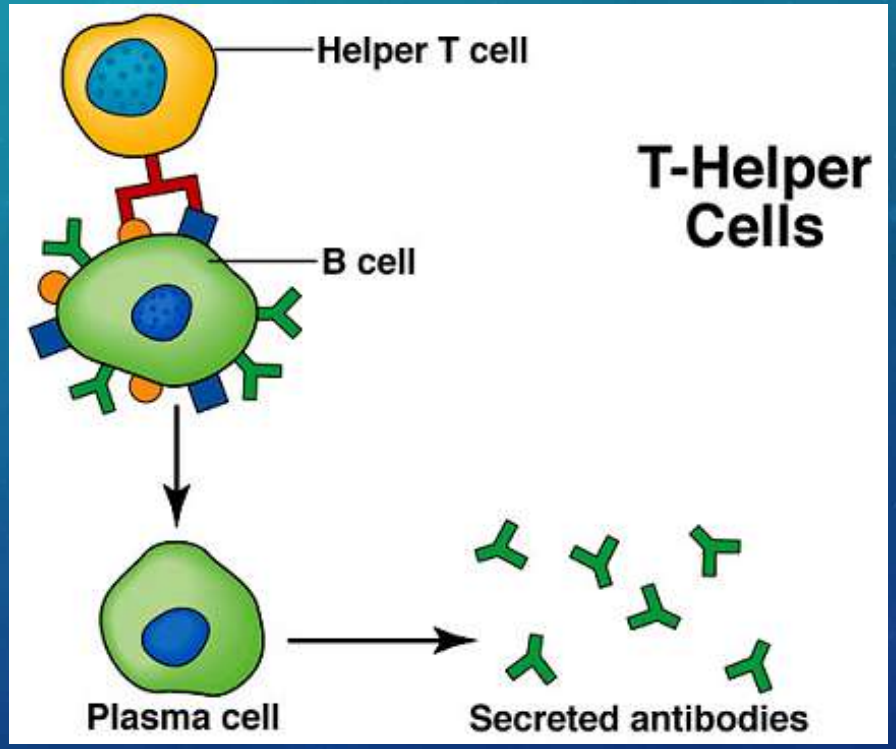
- Hormones
  - Messenger molecules that carry signals
    - Insulin – 51 Amino Acids, regulates uptake of sugar in the bloodstream
    - Thyroid Hormones
    - Growth Hormones





FUNCTIONS OF PROTEINS

- Protective Proteins – Antibodies (Immune System)



9 ESSENTIAL AMINO ACIDS
COPY THIS LIST ON YOUR PROJECT PAPER

- Your body can make 11 of the 20 Amino Acids
- 9 of them however, you must get from your diet to represent a complete protein (Animal Protein)
- Histidine (Infants)
- Isoleucine
- Leucine
- Lysine
- Methionine
- Phenylalanine
- Threonine
- Tryptophan
- Valine

ACTIVITY #2

- PhET Website
- Biology
  - Gene Expression - the Basics

PROJECT CREDIT = .25

- Research 9 foods that contain one of each of the 9 Essential Amino Acids
  - Identify the food
  - Identify the Amino Acid that it contains
  - What is the recommended daily allowance for that food
    - 1 cup, 6 ounces
- What is the result if there is a deficiency in that Amino Acid

- Nine Essential Amino Acids:
- Histidine (Infants)
- Isoleucine
- Leucine
- Lysine
- Methionine
- Phenylalanine
- Threonine
- Tryptophan
- Valine

WORKS CITED

- Chemistry in the Community, P. 604 – 618
- Chemistry – Matter and change P. 775 - 780