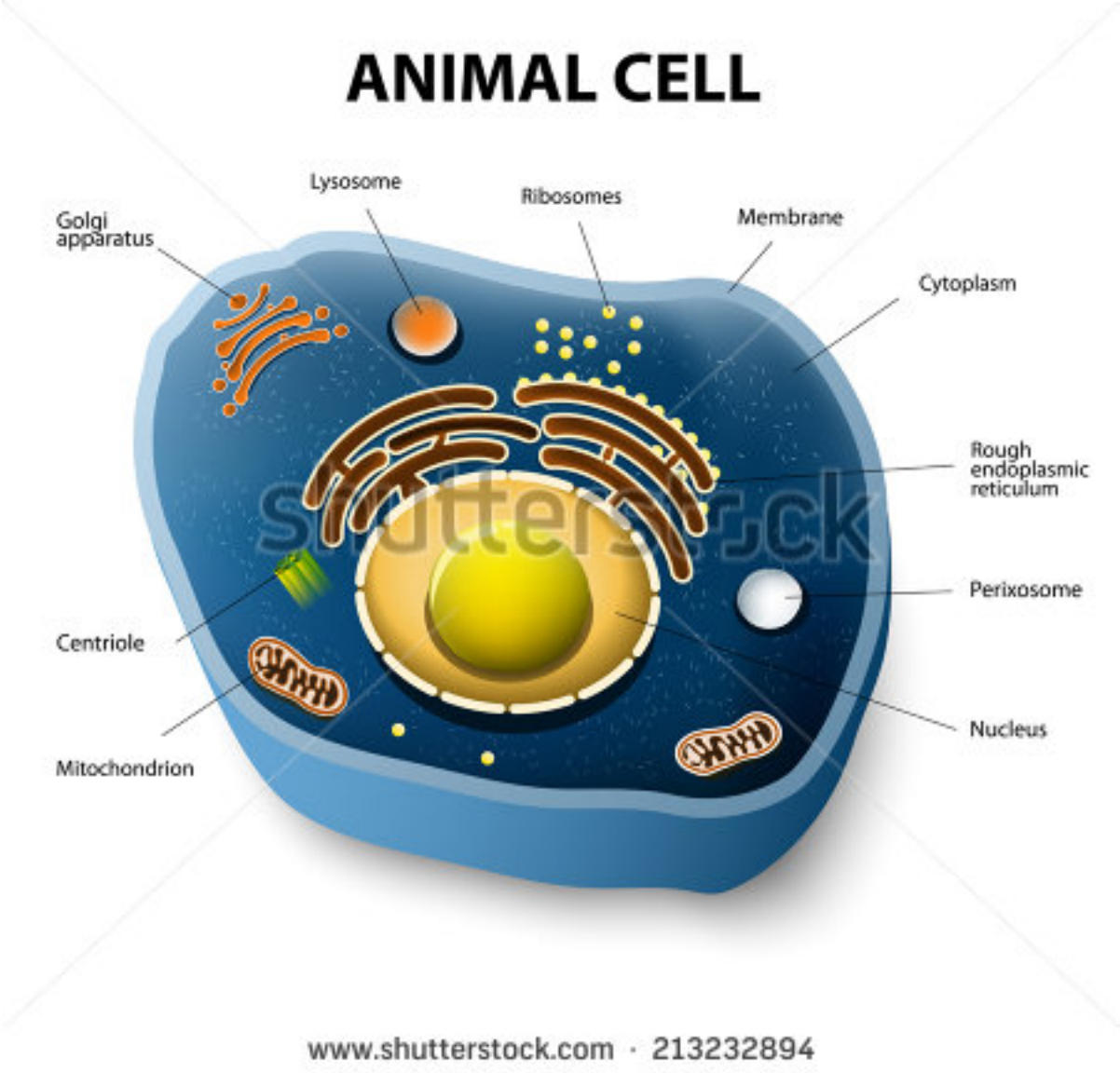
ANSC/FSTC 607
Physiology & Biochemistry of Muscle as a Food
General Cell Structure

I. Types of cells

A. Prokaryotes

1. Pro = before; karyon = nucleus
2. Lack membrane-bound organelles
3. Earliest cell type



human or animal cell. cross...

B. Archaea

1. Originally thought to be prokaryotes
2. Lack membrane-bound organelles

3. Usually live in extreme environments (e.g., thermophiles, halophiles)

C. Eukaroytes

1. Eu = tru; karyon = nucleus
2. Contain membrane-bound organelles
3. Evolved from prokaryotes by endosymbiotic association of two or more prokaryotes

D. Include protists, fungi, animal, and plant cells

II. Properties of eukaryotic cells

A. Plasma membrane

1. Separates the cell contents from the environment
2. In muscle, sarcolemma
3. Sarc = flesh (Greek)

B. Cytoplasm

1. Semi-fluid cell interior
2. Location of metabolic enzymes
3. Location of membrane-bound organelles and ribosomes for protein synthesis
4. In muscle, sarcoplasm

C. Nucleus

1. Double membrane with pores
2. Outer membrane continuous with endoplasmic reticulum (ER)
3. Nucleoplasm – the fluid substance in which the solutes of the nucleus are dissolved
4. Chromosomes – protein and DNA complexes
5. Located just under the sarcolemma in muscle fibers

D. Endoplasmic reticulum

1. Extensive membranous network continuous with the outer nuclear membrane
2. Rough ER – has ribosomes and is involved in secreted protein synthesis
3. Smooth ER – lacks ribosomes and is involved in membrane lipid synthesis

E. Golgi apparatus

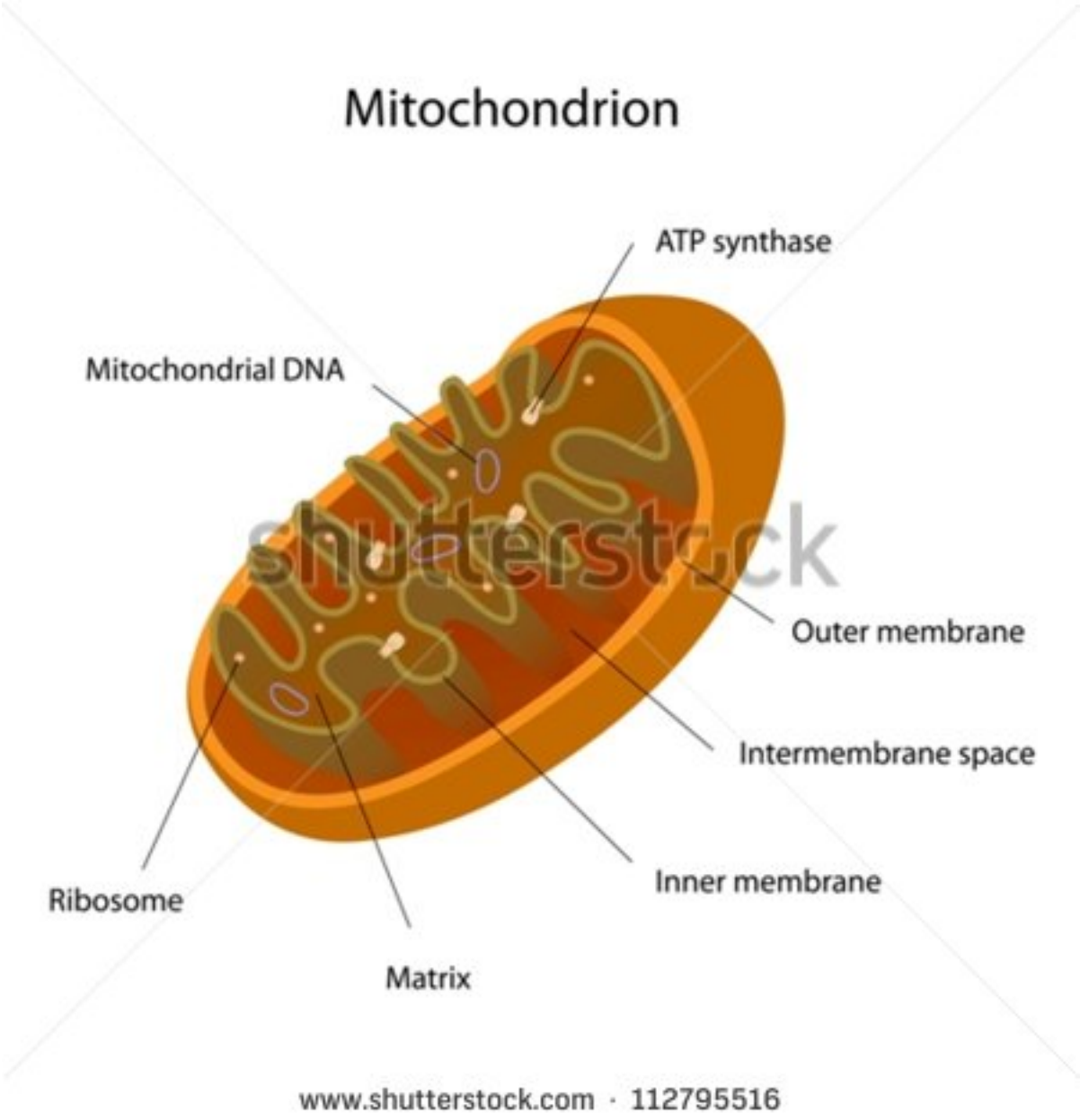
1. Flattened vesicles in stacks that receive protein from the ER
2. Form secretory vesicles to transport proteins to different parts of the cell or for secretion

F. Lysosomes

1. Found only in animal cells
2. Contain enzymes for use in the hydrolytic breakdown of macromolecules (e.g., proteins)

G. **Mitochondria**

1. Found in virtually all eukaryotic cells (exception, red blood cells of many animal species)
2. Site of aerobic respiration
3. Enclosed in a double membrane system
    a. Inner membrane forms the cristae, site of energy generation
    b. Outer membrane is a porous membrane that cells mitochondria from the cytoplasm
4. Matrix is the soluble portion of the mitochondria
    a. Site of carbon metabolism
    b. Site of mitochondrial protein synthesis



mitochondrion