CELLS

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Human Genetics

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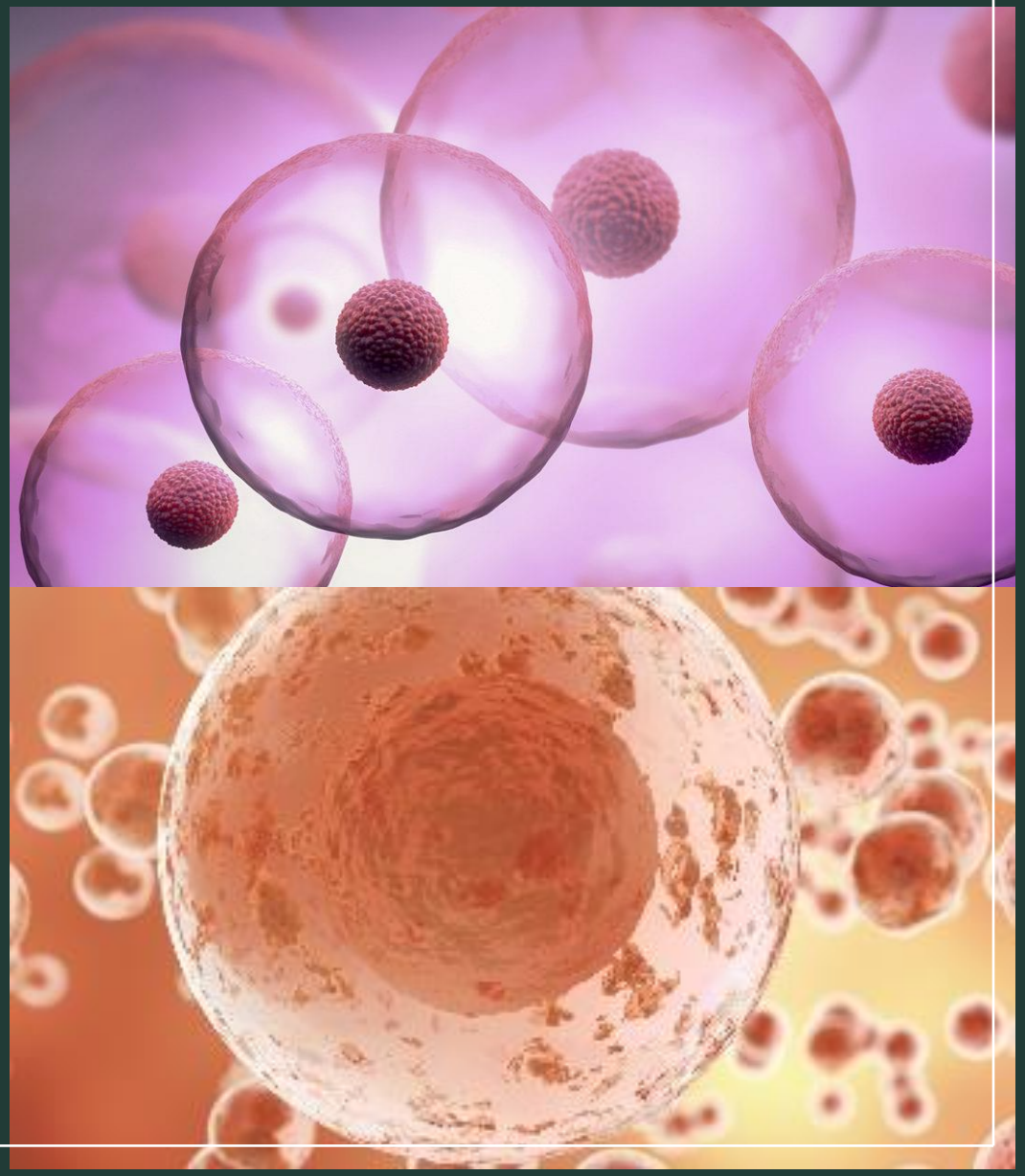
THE CELL

- The activities and abnormalities of cells symbolize traits, quirks, and illness
- When disease occurs, it provides for us a story of what is happening within the cell, and therefore, can suggest ways to treat the condition
- Understanding cell function reveals how a healthy body works, and how it develops from 1 cell to trillions



TYPES OF CELLS

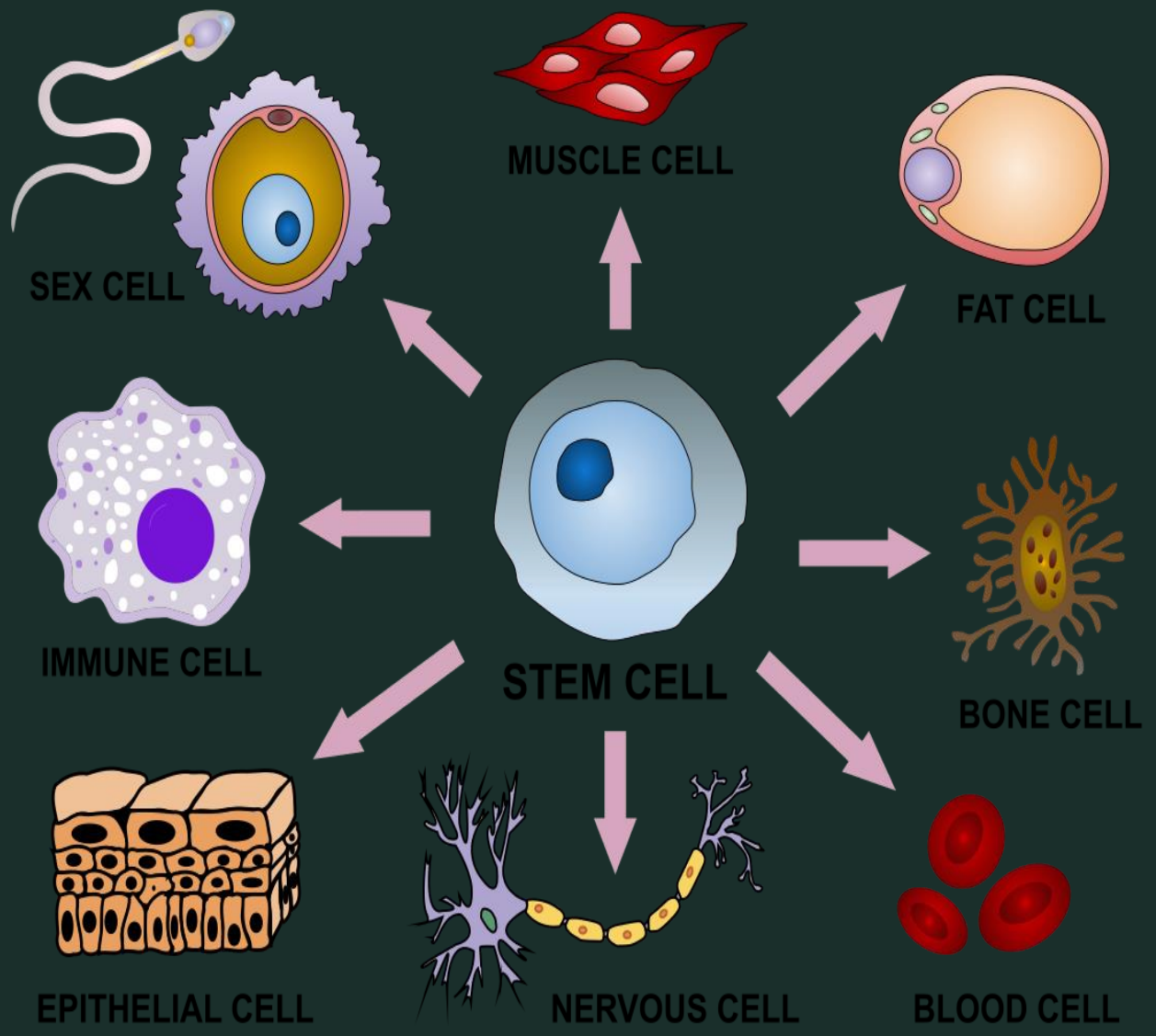
- Specialized Cells:

  Blood, Bone, Muscle

- Unspecialized Cells: Stem Cells

  Stem cells can replicate themselves as well as generate specialized cells

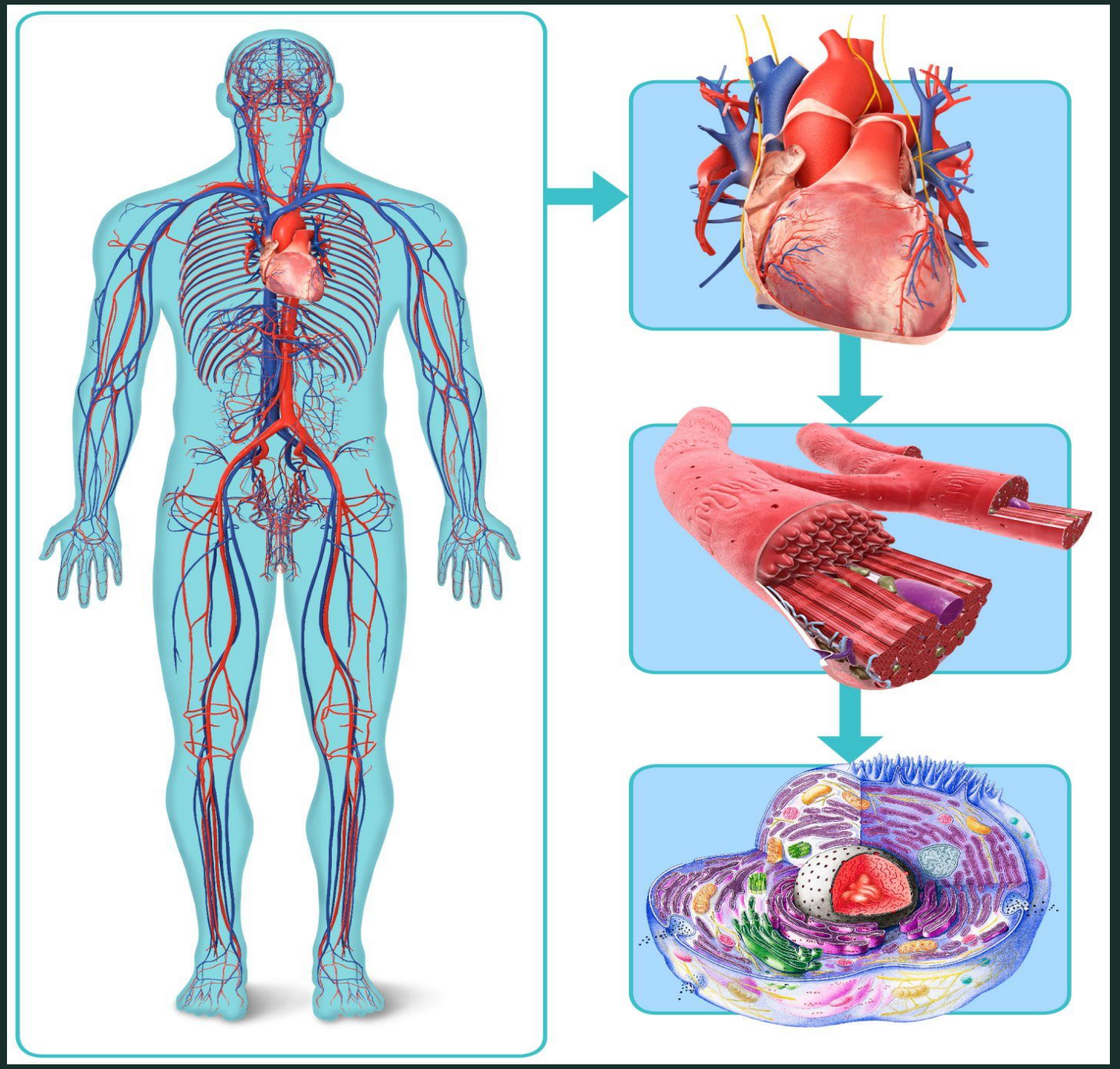
  This allows the body to develop, grow, and repair damage



THE BUILDING BLOCKS OF THE BODY

- Molecule
- Cell
- Tissue
- Organ
- Organ System
- Organism

  Cells interact, communicate, grow, and heal: this reflects the balance between new cells and cell death



THE COMPONENTS OF CELLS

- <u>Cell Functions:</u>

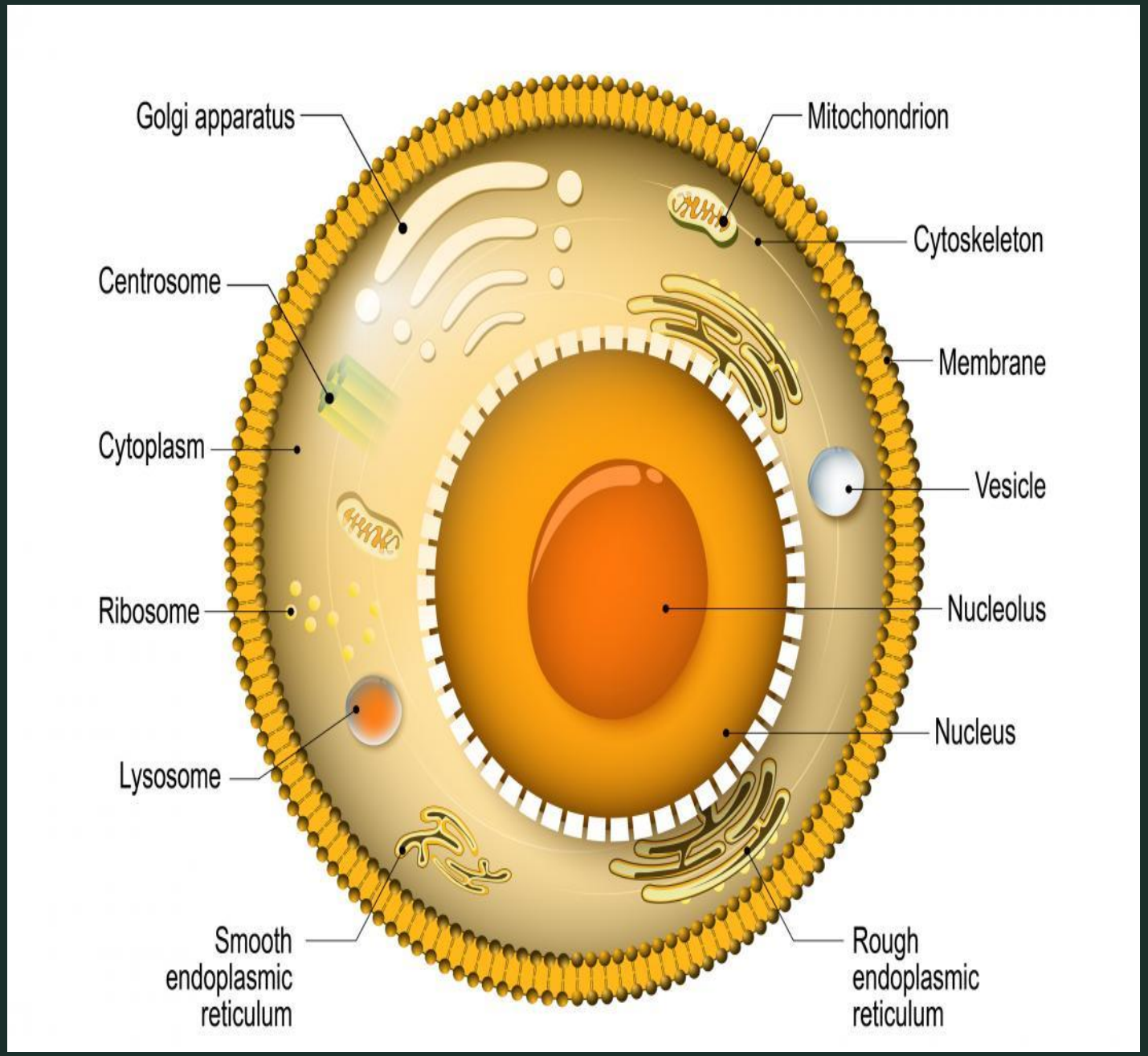
  Reproduction

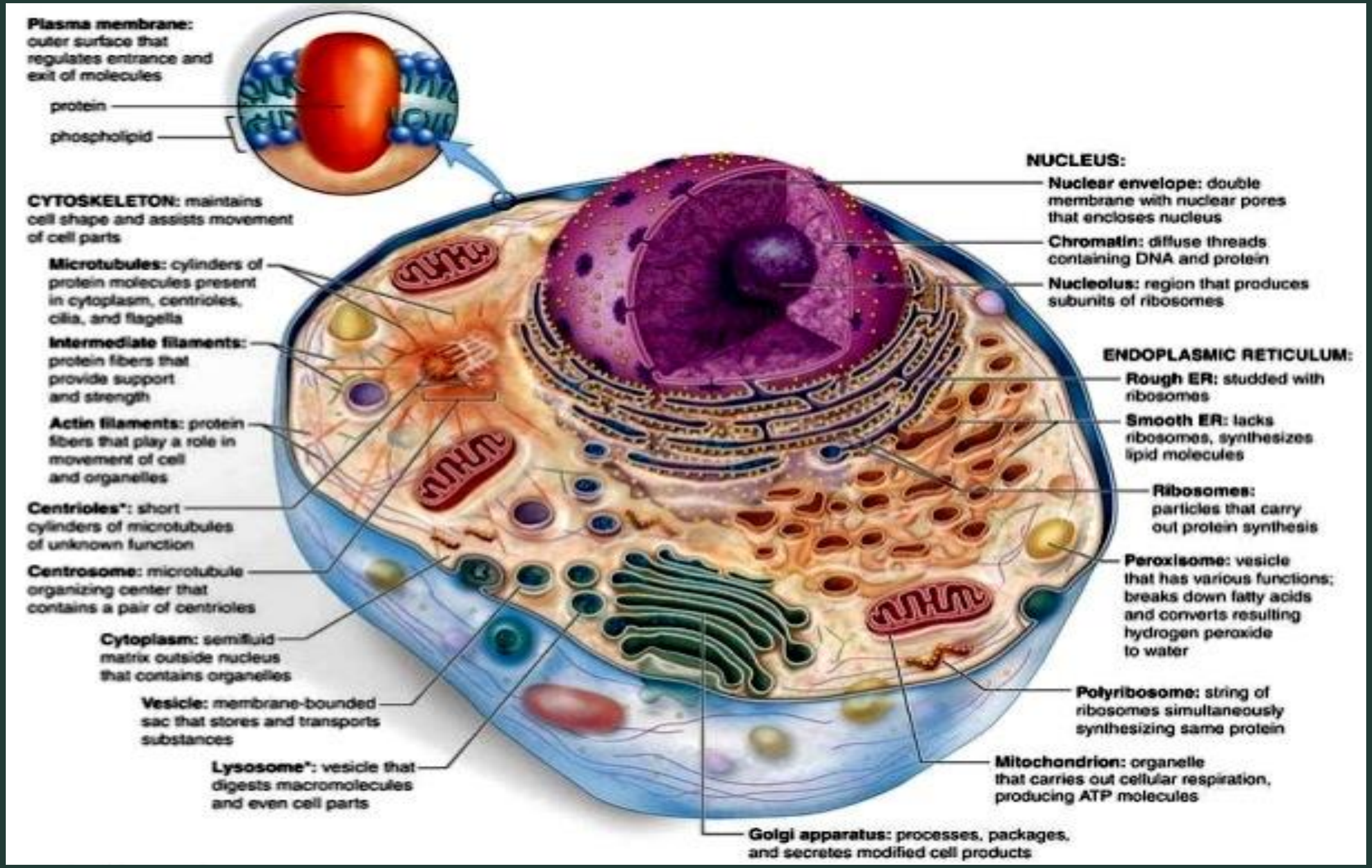
  Growth

  Response to Stimuli

  Energy Use
- 260+ specialized cells in the human body

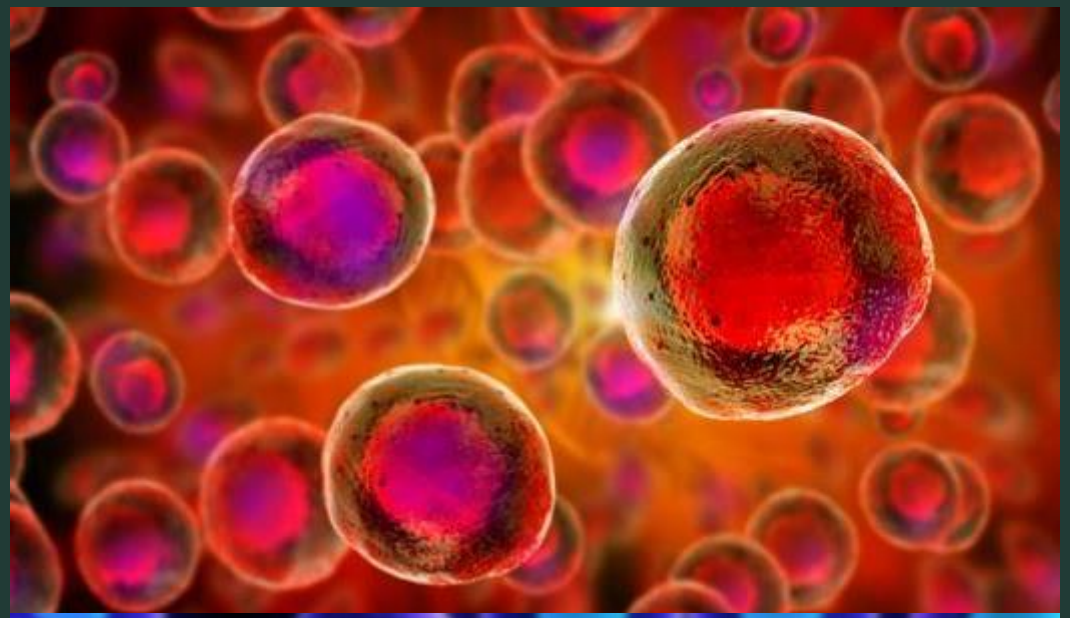
  Different cells expressing different codes

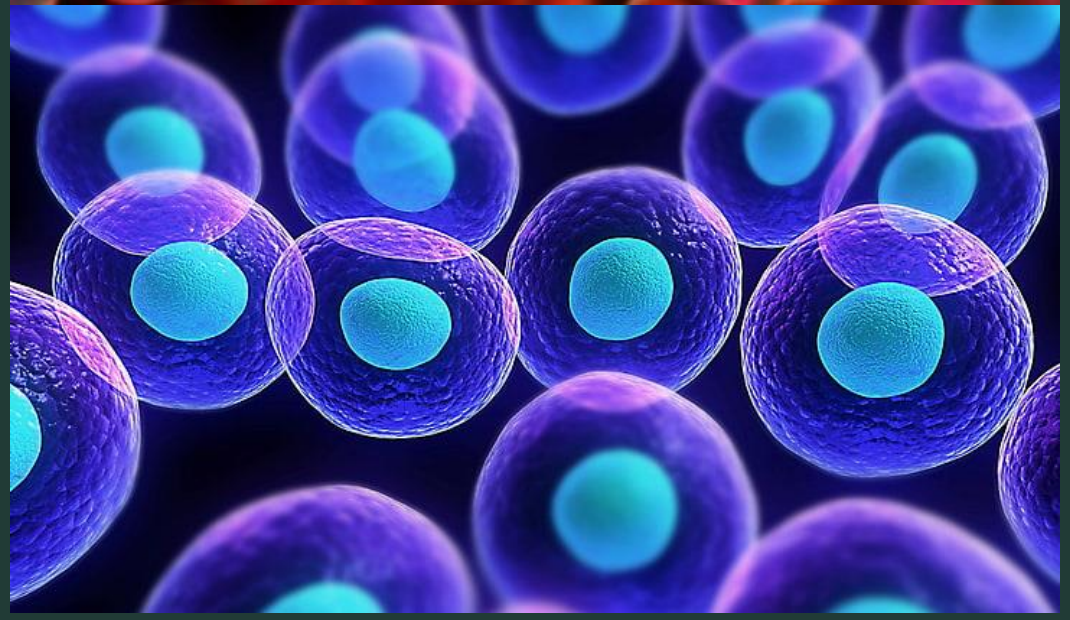



Plasma membrane: outer surface that regulates entrance and exit of molecules
protein
phospholipid
CYTOSKELETON: maintains cell shape and assists movement of cell parts
Microtubules: cylinders of protein molecules present in cytoplasm, centrioles, cilia, and flagella
Intermediate filaments: protein fibers that provide support and strength
Actin filaments: protein fibers that play a role in movement of cell and organelles
Centrioles*: short cylinders of microtubules of unknown function
Centrosome: microtubule organizing center that contains a pair of centrioles
Cytoplasm: semifluid matrix outside nucleus that contains organelles
Vesicle: membrane-bounded sac that stores and transports substances
Lysosome*: vesicle that digests macromolecules and even cell parts
NUCLEUS:
Nuclear envelope: double membrane with nuclear pores that encloses nucleus
Chromatin: diffuse threads containing DNA and protein
Nucleolus: region that produces subunits of ribosomes
ENDOPLASMIC RETICULUM:
Rough ER: studded with ribosomes
Smooth ER: lacks ribosomes, synthesizes lipid molecules
Ribosomes: particles that carry out protein synthesis
Peroxisome: vesicle that has various functions; breaks down fatty acids and converts resulting hydrogen peroxide to water
Polyribosome: string of ribosomes simultaneously synthesizing same protein
Mitochondrion: organelle that carries out cellular respiration, producing ATP molecules
Golgi apparatus: processes, packages, and secretes modified cell products

HUMAN CELLS FALL INTO 4 CATEGORIES

- Epithelium
- Muscle
- Nerve
- Connective Tissue





THE MAJOR DOMAINS OF LIFE

- Archaea

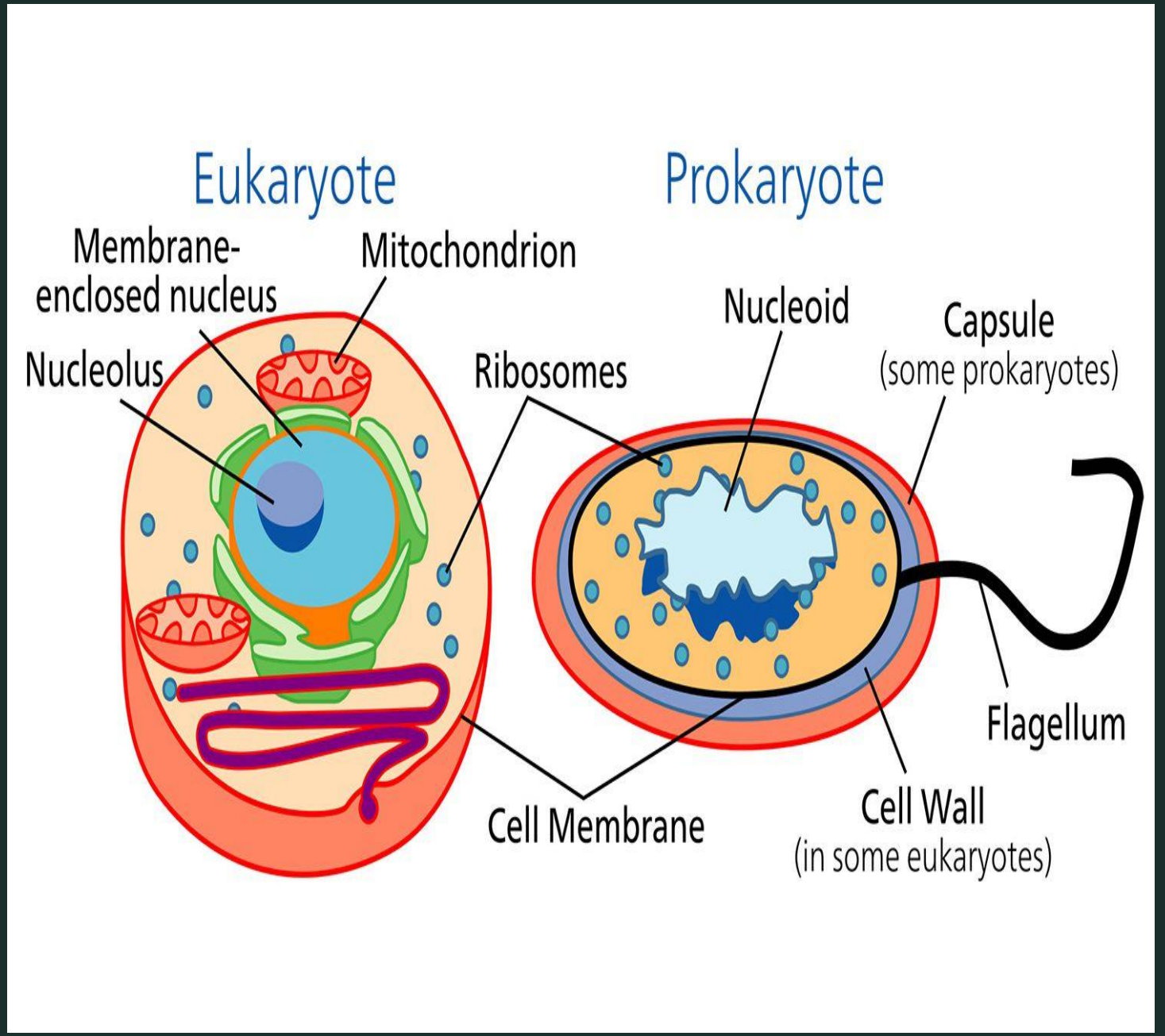
  Prokaryotes (-) Nucleus
- Bacteria

  Prokaryotes (-) Nucleus
- Eukarya

  Eucaryotes (+) Nucleus

  Organelles

  RNA, Ribosomes and Protein Synthesis



CHEMICAL CONSTITUENTS OF CELLS

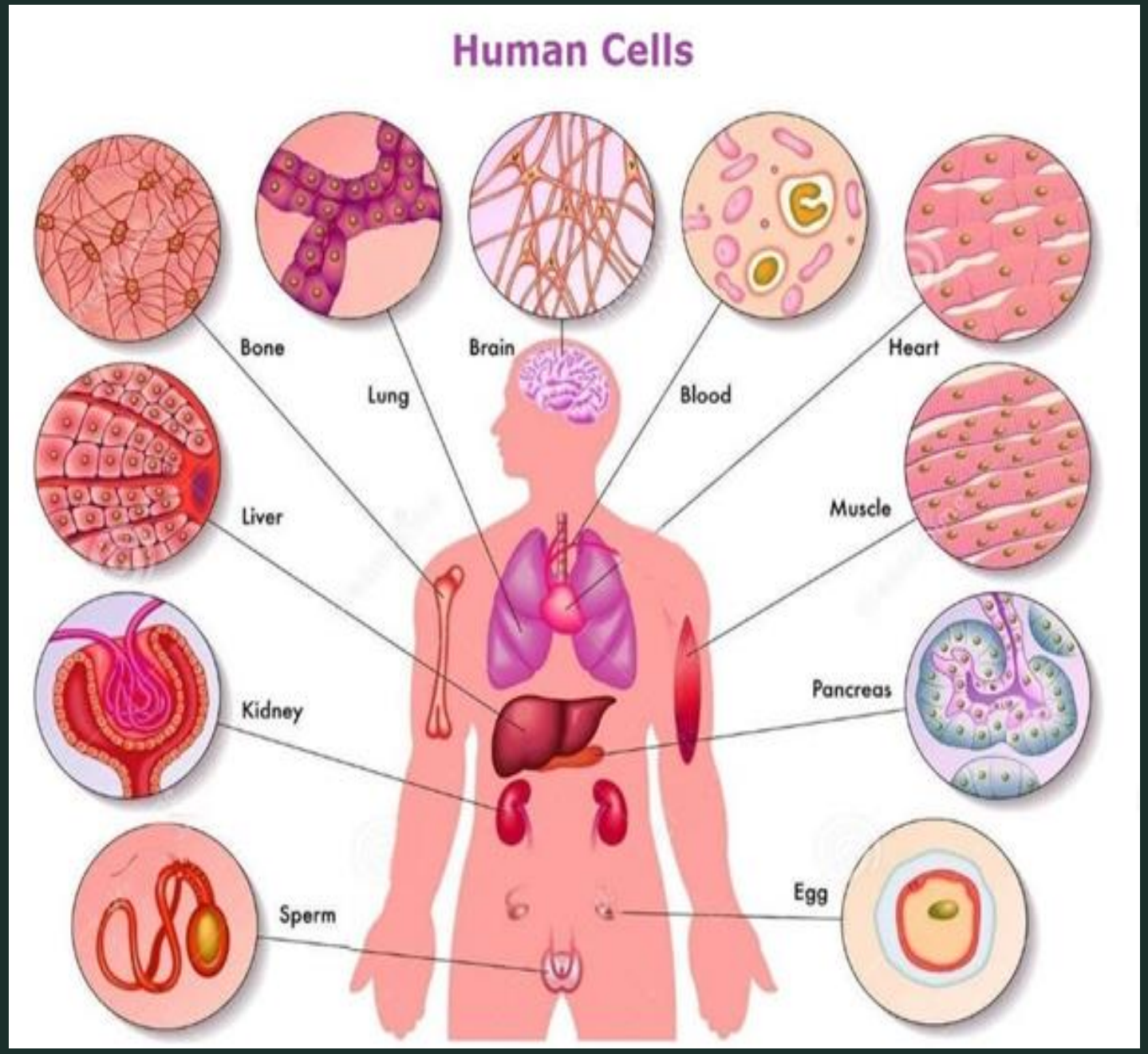
- Macromolecules of Life ☺

  Carbohydrates

  Lipids

  Proteins

  Nucleic Acids



WHAT IS OUR CELL PROVIDED?

- Carbs
  Structure and Energy
- Lipids
  Energy Storage
- Proteins
  A Lot of Everything !

IMPORTANT CELL KNOWLEDGE

- Enzymes are important proteins because they facilitate or catalyze biochemical reaction
- Life is based on chemical principles that govern all matter
- Genetics is based on the highly organized subset of the chemical reactions of life


THANK YOU!
Questions and
Comments