Al- Mustaqbal College University
Department Of Medical Instrumentation
Techniques Engineering
Anatomy and Physiology

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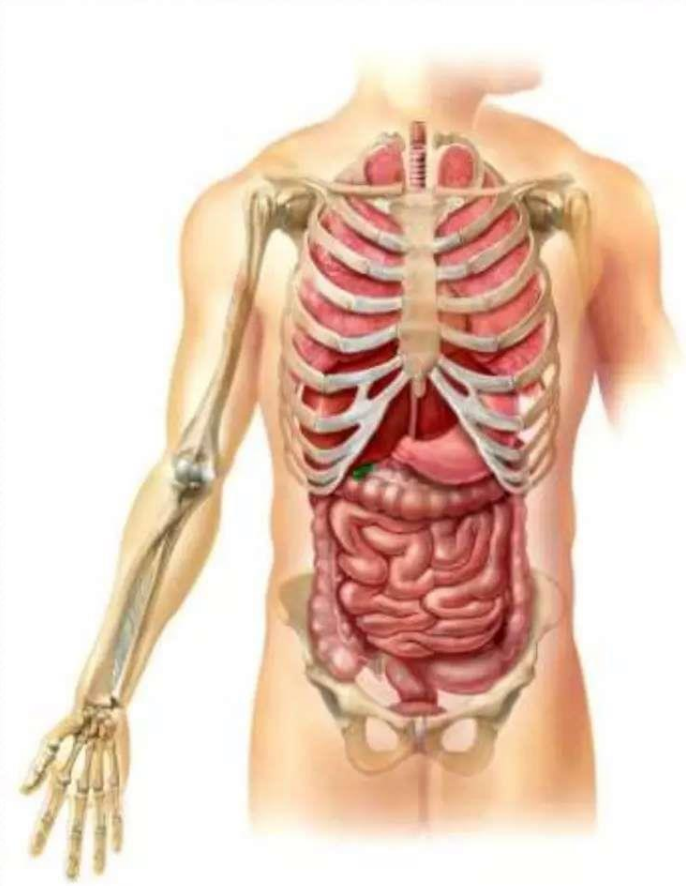
Introduction to anatomy and physiology

Anatomy and Physiology

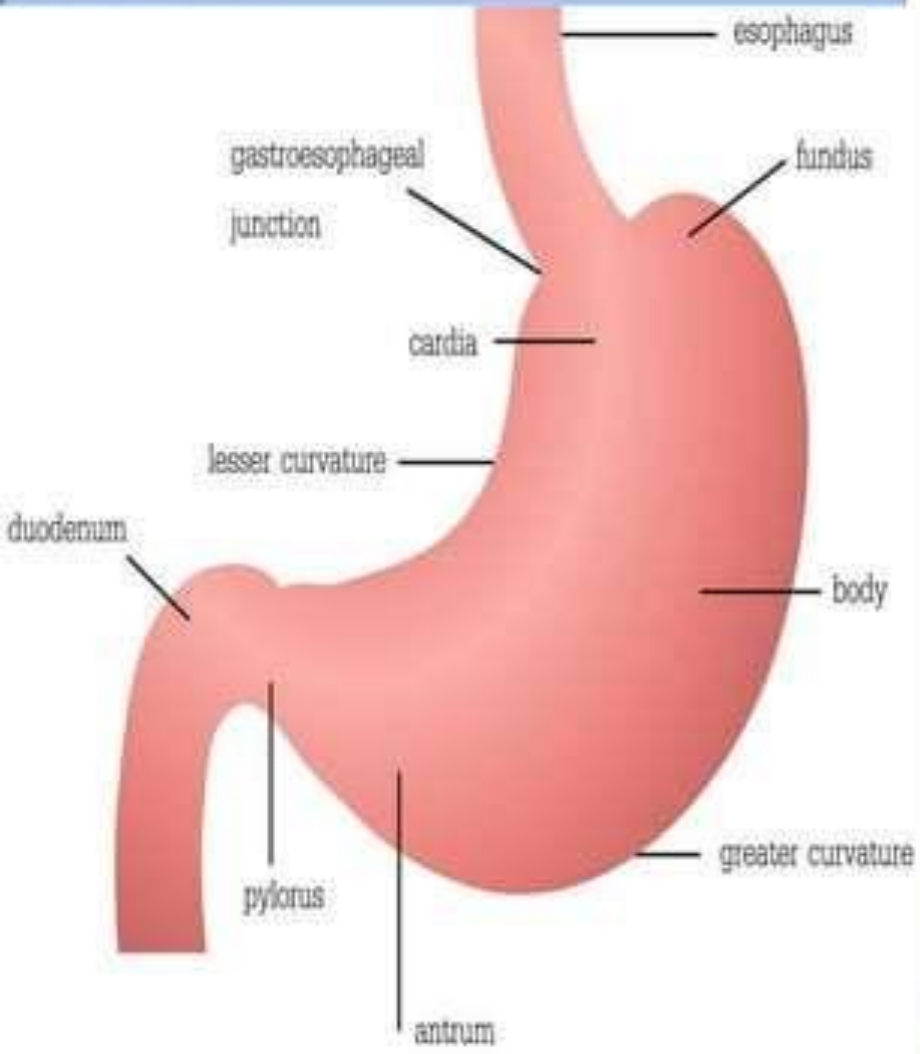
- Anatomy is the study of body structure.
  - science of structure

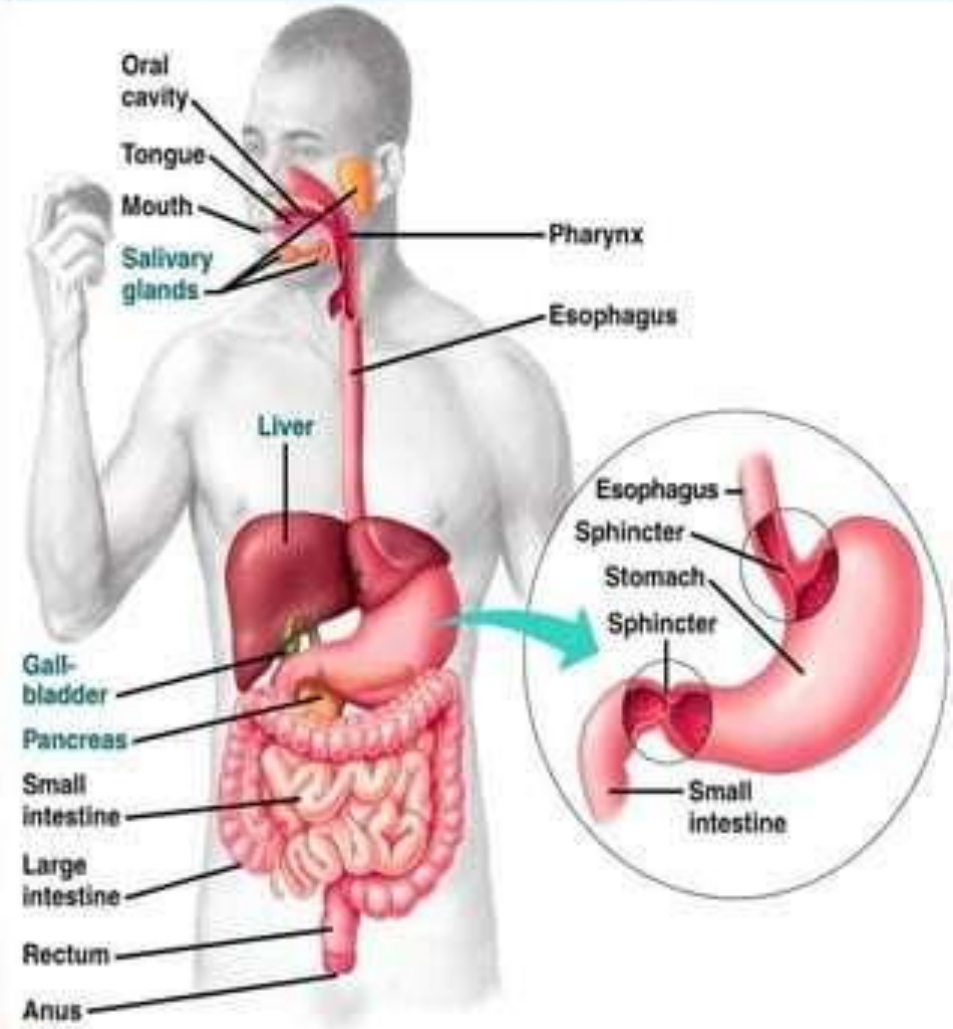
- Physiology is the science of body functions.
  - science of body functions

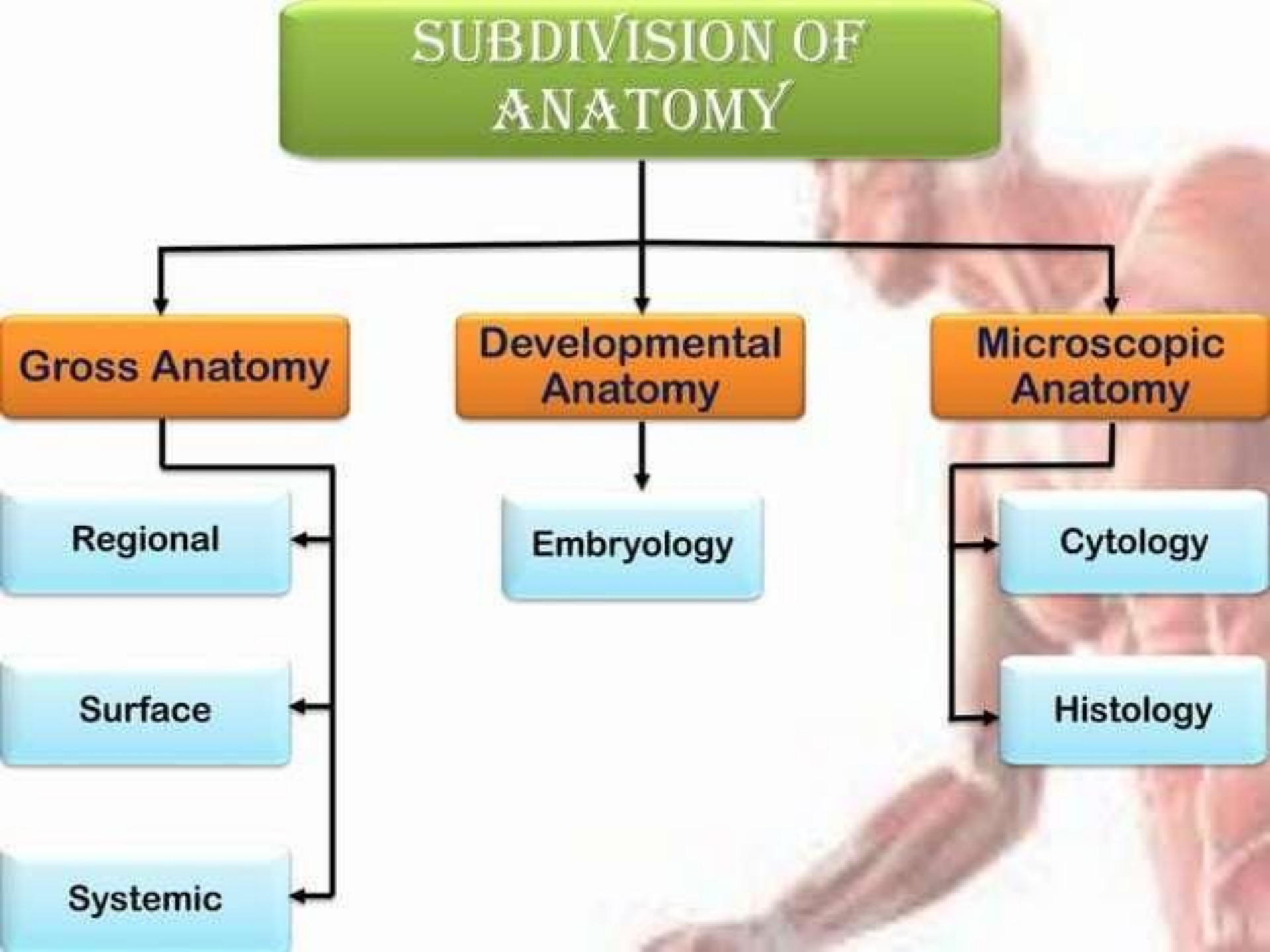


Anatomy: The study of the structure(Stomach) and identity of the parts of the stomach

Physiology: The study of how these parts of stomach is carrying out it's function and relate to one another






SUBDIVISION OF ANATOMY
Gross Anatomy
Developmental Anatomy
Microscopic Anatomy
Regional
Surface
Systemic
Embryology
Cytology
Histology

Subdivisions of Anatomy

- **Surface Anatomy** is the study of form and markings of the body surface, often explored through visualization or palpation (without any "cutting").
- **Gross Anatomy** is the study of anatomical structures visible to unaided eye. After making the appropriate surface marking in the prior picture, the gross dissection proceeds through "cutting."

Subdivisions of Anatomy

- **Gross Anatomy can be studied by two general approaches:**
  - **Systemic** approach (Systemic Anatomy):
  - **Regional** approach (Regional Anatomy)

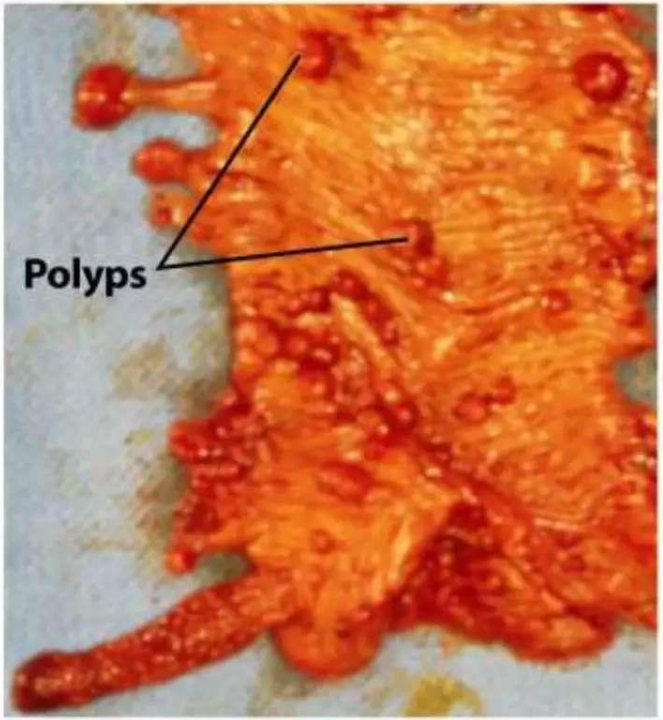
Subdivisions of Anatomy

- **Developmental anatomy**

  is the study of the fertilized egg developing into its adult form.(For e.g., Embryology)

Subdivisions of Anatomy

- **Histology** is the study of **tissues**.
- **Cytology**, like histology, uses a microscope, but restricts the study to individual **cellular structures** .
- **Pathology** is the study of anatomical changes due to **disease** .



Courtesy of Randall W. Burt

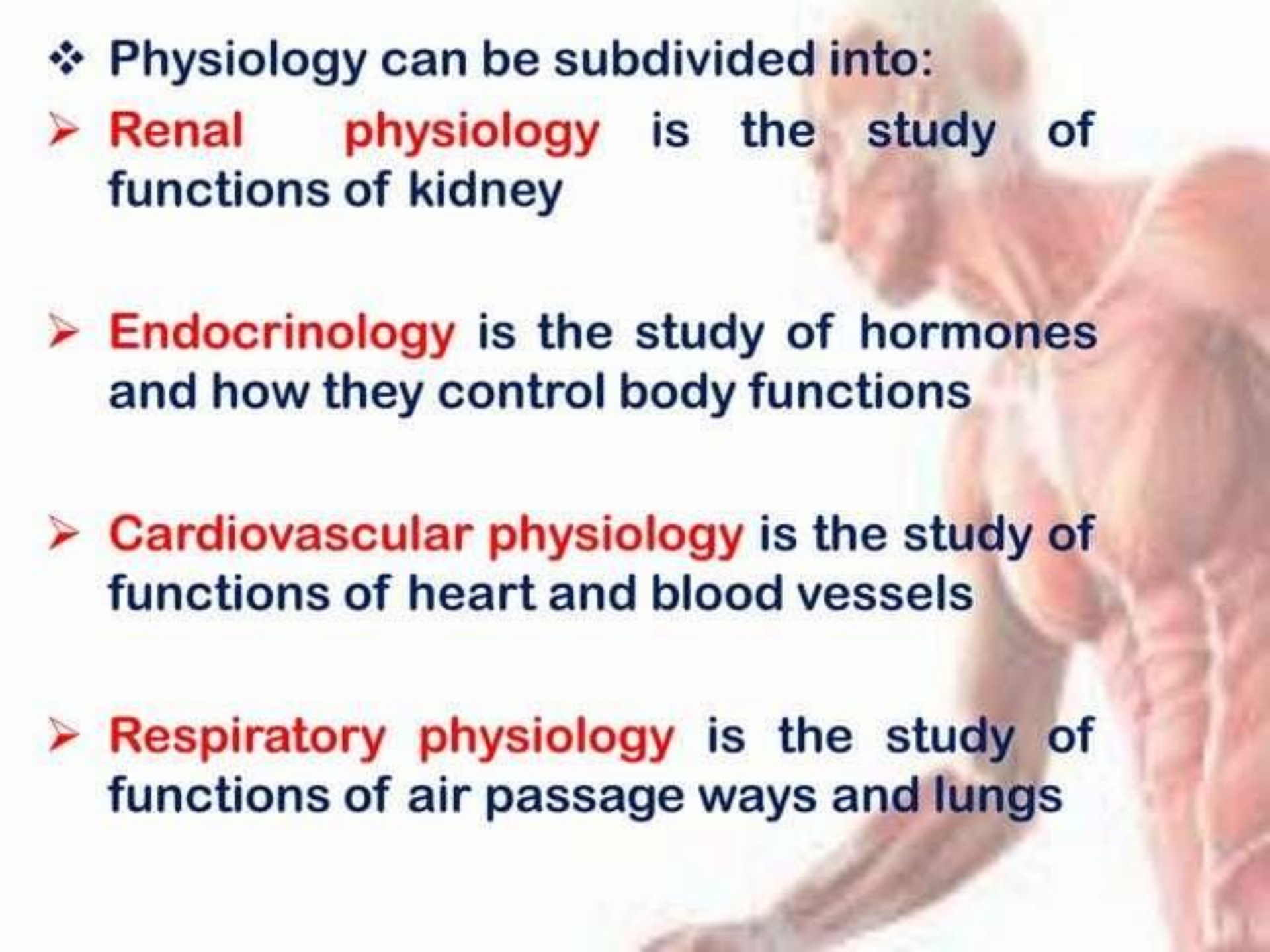
❖ Physiology can be subdivided into:

- **Renal physiology** is the study of functions of kidney

- **Endocrinology** is the study of hormones and how they control body functions

- **Cardiovascular physiology** is the study of functions of heart and blood vessels

- **Respiratory physiology** is the study of functions of air passage ways and lungs



- **Neurophysiology** is the study of functional properties of nerve cells

- **Cell physiology** is the study of functions of cell

- **Pathophysiology** is the study of functional changes associated with disease and aging

- **Exercise physiology** is the study of changes in the cells and organ function during muscular activity

Levels of Organization

Smallest

Chemical
- Atomic
- Molecular

Cellular

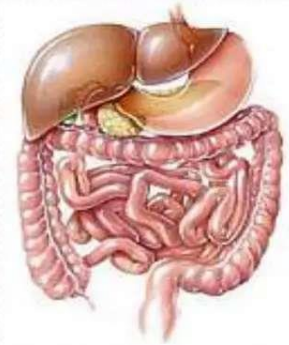
Tissue

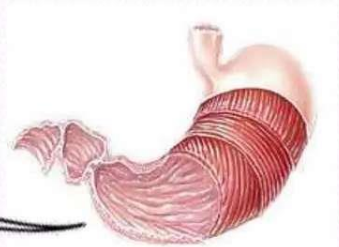
Organ

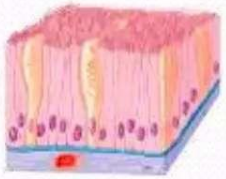
System

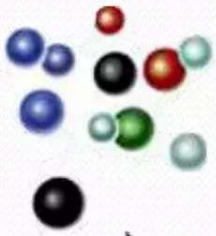
Organism

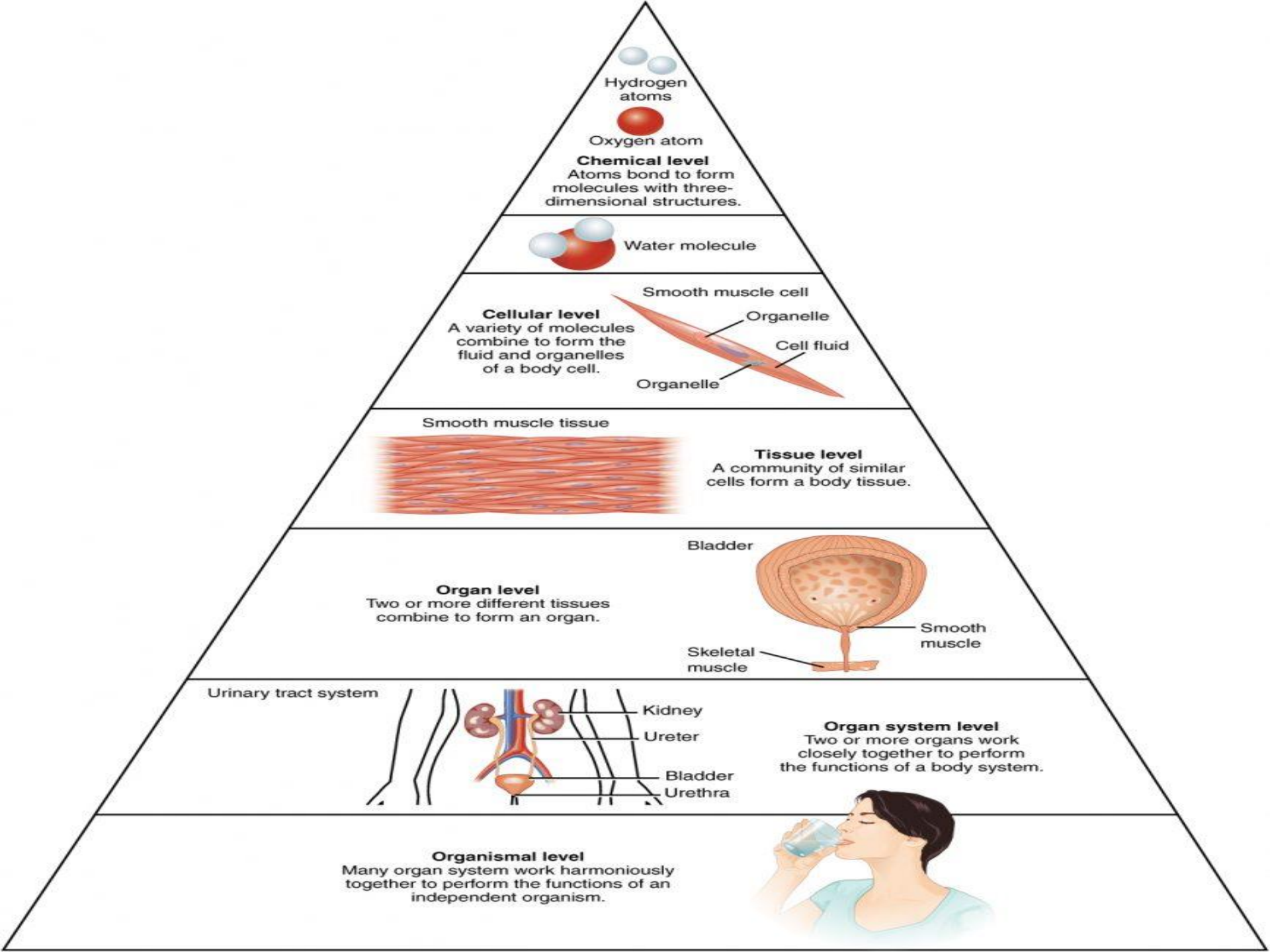
Largest










Hydrogen atoms
Oxygen atom
Chemical level
Atoms bond to form molecules with three-dimensional structures.
Water molecule
Smooth muscle cell
Cellular level
A variety of molecules combine to form the fluid and organelles of a body cell.
Organelle
Cell fluid
Organelle
Smooth muscle tissue
Tissue level
A community of similar cells form a body tissue.
Bladder
Organ level
Two or more different tissues combine to form an organ.
Smooth muscle
Skeletal muscle
Urinary tract system
Kidney
Ureter
Bladder
Urethra
Organ system level
Two or more organs work closely together to perform the functions of a body system.
Organismal level
Many organ system work harmoniously together to perform the functions of an independent organism.

The Chemical Levels of Organization

To study the chemical level of organization, scientists consider the simplest building blocks of matter: subatomic particles, atoms and molecules.

All matter is composed of one or more unique pure substances called elements.

Examples of these elements are hydrogen, oxygen, carbon, nitrogen, calcium, and iron. The smallest unit of any of these pure substances (elements) is an atom.

Atoms -: The basic unit or component of organization in both living and non-living object is an atom. They are made up of subatomic particles such as the proton, electron and neutron.

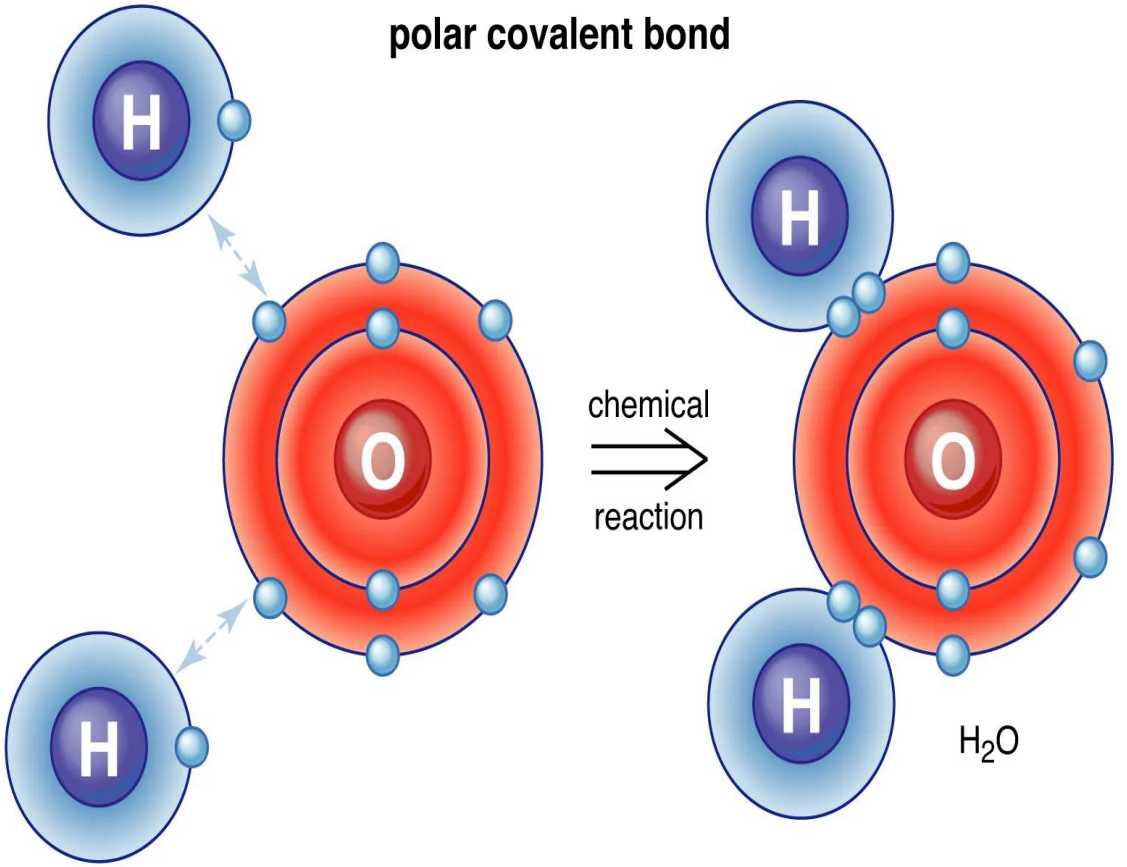
Molecules are a chemical structure consisting of at least two atoms held together by a chemical bond. They are the chemical building blocks of all body structures. such as the water molecules, proteins, and sugars found in living things.

Diatomic molecules contain two atoms that are chemically bonded.

If the two atoms are identical, as in, for example, the oxygen molecule (O_2), they compose a homonuclear diatomic molecule,

while if the atoms are different, as in the carbon monoxide molecule (CO), they make up a heteronuclear diatomic molecule.

Molecules containing more than two atoms are termed polyatomic molecules such as water (H_2O).



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