

An Introduction to Anatomy and Physiology - Chapter 1

A Power Point presentation based on lecture 1 of 'Essentials of Anatomy and Physiology' by Martini – Bartholomew; Pearson Publishing

Characteristics of Living things

- **Metabolism** is sum of all chemical reactions taking place in a living body
- **Organization** of progressively complex levels
- **Growth:** living things grow by changing food into living matter
- **Reproduction:** all living things produce young ones
- **Responsiveness:** respond to changes in surroundings (stimuli; singular is stimulus)
- **Movements:** all living things spontaneously move their parts

Anatomy and Physiology

- Anatomy is the study of Structure of body and body parts and their relationships to one another.
- Physiology is the study of Function of body and body parts.

Anatomy

- 2 major branches
- **Gross Anatomy** is the study of body surface, regions, and sections. It studies organs and their relationship to one another.
- **Microscopic Anatomy** studies the cells and tissues. Cytology is the study of cells and Histology is the study of tissues.

Physiology

- Physiology is the study of systems, organs, tissues and cells
- Physiology is also the study of diseases

Levels of Organization

- Smaller entities interact with one another and form bigger entities that can perform additional functions.
- Molecules → Cells → Tissues → Organs → Organ-systems → Body

11 Organ-Systems

Human Body can be divided into

Homeostasis

- Homeostasis is a dynamic mechanism to maintain internal conditions within optimal limits.
- Some examples of Internal conditions are body temperature and concentrations of glucose, sodium ions and potassium ions in blood plasma.

3 Components of Homeostasis

- Receptors – change in variable
- Integrating Center – compare to set-point
- Effectors – undo the change in variable

Negative and Positive Feed-Back

- Negative Feedback control most of the homeostasis mechanisms.
- ↑Temperature → Homeostasis → ↓Temperature
- ↑plasma Glucose → Homeostasis → ↓plasma glucose
- Positive feedback operate in special conditions like child birth and blood clotting
- ↑slow weak labor → homeostasis ↑fast stronger labor

Homeostatic Regulation

- Disease is Failure of homeostatic regulation that leads to malfunctioning of organs.

Recap 1 Chapter 1

1. Responsiveness, -----, reproduction, movement and -----are characteristics of living things.
2. Anatomy is study of internal and external -----& their relationships.
3. Physiology is the study of ----- of body and its -----.
4. ----- & ----- are 2 main types of anatomy.
5. ----- is the study of tissues and ----- is the study of cells.
6. Molecules → ----- → -----→ organs → ----- → -----.
7. ----- system has skin, glands, nails and hair.
8. Respiratory system has -----, -----, and ----- organs.
9. ----- system has thyroid, adrenals, pituitary glands in it.
10. ----- is maintenance of internal conditions within limits and its failure causes -----.

11. Mostly homeostasis operates by ----- mechanisms.
12. 3 essential parts of homeostasis are -----, ----- & -----.
13. 2 examples of positive feedback mechanism are ----- and -----.

The Language of Anatomy

- Anatomical Position
- Standing, arms at sides with palms facing forward, feet close or slightly apart
- Lying face up – Supine
- Lying face down - Prone

The language of Anatomy

- Body regions
- Head, Neck, Thorax, abdomen, pelvis and limbs
- 2 methods to divide abdomen and pelvis regions
- 4 Abdominopelvic Quadrants
- 9 Abdominopelvic regions

Main Body Cavities

- **Dorsal Cavity** – Brain and Spinal Cord lie in dorsal cavity.
- **Ventral Cavity** – Diaphragm, a muscular partition, divides ventral cavity into Thoracic Cavity and Abdominopelvic cavity.

Ventral Cavity

- **Thoracic Cavity** has Pleural cavities surrounding lungs and a Pericardial cavity surrounding heart.
- **Abdominopelvic Cavity** has superior abdomen and inferior pelvic cavity. There is no partition between abdomen and pelvic cavities.

The Language of Anatomy

- Anatomical descriptions refer to an individual in the *anatomical position*: standing, with the hands at the sides,
- palms facing forward, and feet together.

The Language of Anatomy

- Radiological Procedures : X-rays, CT-scans, MRI scans and Ultra-sound scans.

Recap-2 Chapter 1

1. Wrist is -----to elbow and -----to palm.
2. Eyes are -----to ears and -----to nose.
3. Chest is -----to neck and ----- to abdomen.
4. Muscles in thigh are ----- to femur and ----- to skin.
5. Heart is ----- to breast bone and ----- to back bone.
6. ----lies in upper left quadrant and -----in right upper quadrant.
7. Mouth is -----region and neck is ----- region.
8. Arm is -----region and wrist is -----region.
9. In anatomical position hands facing ----- and held on -----; person is -----.
10. Calf is ----- region and ankle is -----region.
11. Loin is -----region and buttock is ----- region.
12. Urinary bladder is present in ----- abdominopelvic region.
13. -----membranes line cavities opening to outside; -----membranes line sealed cavities that do not open to outside.
14. Pericardium is a ----- and inner lining of stomach is -----membrane.
15. ----- and ----- are non-invasive diagnostic imaging techniques.