The Study of Human Anatomy

Chapter 1

Chapter Outline

An overview of Anatomy:
   a) Define anatomy and physiology
   b) learn subdivisions of anatomy
   c) methods of study
   d) organ systems
   e) levels of structural organization

Gross Anatomy: anatomical position; anatomical terminology, body cavities, 9 regions and 4 quadrants of abdomen,

Microscopic Anatomy: Light and Electron microscopy

Clinical Anatomy: an introduction to medical imaging techniques

An Overview of Anatomy

Anatomy is the study of Structure of body and body parts and their relationships to one another. (anatome = dissection). Morphology Morphe = form, logos = study

Physiology is the study of Function of body and body parts.

Structure supports function. For example, the cornea of eye is transparent and curved. It allows light to pass through and focuses it as image.

Anatomy

Major subdivisions of anatomy

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.

Systemic and Regional Anatomy

Methods of study

Inspection is to look keenly on body surface or parts. Nails, eyes, tongue, injury marks

Palpation means feeling a structure with hands. Pulse

Auscultation means listening to natural sound made by the body. Heart or lung sounds with stethoscope.

Dissection is cutting open the body and internal organs

Exploratory Surgery of past is now replaced by medical imaging techniques – Radiography (X-rays), CT scan, Angiography,
Sonography (Ultrasound scanning), and MRI

X-rays are invasive, can cause mutations; Sonography and MRI are noninvasive.

Levels of Organization

Smaller entities interact with one another and form bigger entities that can perform additional functions (emergent properties).

Atoms ➔ Molecules ➔ Cells ➔ Tissues ➔ Organs ➔ Organ-systems ➔ Body

2 H (hydrogen) atoms can join 1 O (oxygen) atom to make H2O (water) molecule.
2 H (hydrogen) atoms can join 2 O (oxygen) atoms to make H2O2 (hydrogen peroxide) molecule.

11 Organ-Systems of Body

Learn the parts and main functions of each system.

Integumentary System

Skeletal System
Organ-Systems 1

**Integumentary System** has skin, hair and nails
- Protection, thermoregulation, and sensation

**Skeletal System** has bones, cartilages, joints and ligaments
- Support, protection, movements and forms new blood cells

**Muscular System** has skeletal muscles and tendons
- Movements, posture, heat generation

**Nervous System** has brain, spinal cord and nerves
- Fast acting Control system, rapid internal communication, coordination, motor control,
  sensation

**Endocrine System** has ductless glands - pituitary, thyroid, thymus, adrenal, testes and ovaries
- Secrete hormones to regulate metabolism, growth and reproduction

**Cardiovascular System** has heart, arteries, veins and capillaries
- Distribution of nutrients, oxygen, hormones, antibodies and heat

Organ-Systems 2

**Lymphatic System** has thymus, spleen, lymph nodes and vessels
Returns leaked fluid from blood vessels, production of immune cells

**Respiratory System** has nose, pharynx, larynx, trachea, bronchi, lungs
Procures oxygen, discharge of CO₂, and speech

**Digestive System** has mouth, pharynx, esophagus, stomach, large intestine and small intestine, anus;
- liver and pancreas
Breakdown and absorption of nutrients

**Urinary System** has kidneys, ureters, urinary bladder, and urethra
Elimination of urea, maintain balance of water, pH and electrolyte

**Reproductive System - Male** has testes, vas deferens, prostate gland, penis; production and delivery
- of sperm, production of hormones

**Reproductive System - Female** has ovaries, uterine tubes, uterus, and vagina
Production of eggs, development of fetus, production of hormones

Systemic versus Regional Anatomy

**Systemic Anatomy:** Students in allied health or undergraduate courses study separately each
organ-system. For example, skeletal system, muscular system.

**Regional Anatomy:** Professionals or students at graduate levels study anatomy of everything in one
region of body. For example, muscles, nerves, skull, brain, eyes, and ears in head or cephalic region.

Recap 1 Chapter 1

1. ------ is study of structure of internal and external parts & their relationships.
2. Physiology is the study of -------- of body and its parts.
3. -------- is the study of body surface, regions, and sections.
4. ----------- is the study of tissues and -------- is the study of cells.
5. Molecules $\rightarrow$ cells $\rightarrow$ ------
6. organs $\rightarrow$ -------- $\rightarrow$ body
7. -------- system has skin, glands, nails and hair.
8. Respiratory system has --------, --------, and -------- organs.
9. -------- system has thyroid, adrenals, pituitary glands in it.
10. Urinary system has --------, --------, and -------- parts.
11. Professional or students at graduate level study --------anatomy.

The Language of Anatomy

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

Body Planes
Sagittal divides body into left and right parts
Frontal divides body into anterior and posterior parts
Transverse divides body into upper and lower parts

Body regions
Head, Neck, Thorax, abdomen, pelvis and limbs

Orientation and directional terms
Anterior = Ventral / Posterior = Dorsal
Superior / Inferior, medial / lateral, proximal / distal
Superficial / deep, ipsilateral / contralateral

Main Body Cavities

Dorsal Cavity – Brain and Spinal Cord lie in dorsal cavity. It has cranial and vertebral cavities.

Ventral Cavity – Diaphragm, a muscular partition, divides ventral cavity into Thoracic Cavity and Abdominopelvic cavity.

Thoracic Cavity has Pleural and Mediastinal Cavities. Pericardial cavity lies within mediastinum.

Ventral Cavity

Thoracic Cavity has 3 smaller cavities in it.
Pleural cavities surround lungs.
Mediastinum is middle space between lungs.
Superior mediastinum has trachea, esophagus and thymus in it.
Inferior mediastinum has pericardial cavity surrounding heart.

Abdominopelvic Cavity has superior abdomen and inferior pelvic cavity. There is no partition between abdomen and pelvic cavities.

Membranes Lining Cavities

Mucous Membranes: line cavities that open to the outside. For example, Mucosa - inner membrane of stomach, lungs (respiratory and digestive cavities).
**Serous Membranes:** line cavities that do not open to outside. For example, pleural cavities around lungs, pericardial cavity around heart.

Serous membrane = inner visceral and outer parietal layers.

Pleura around lungs, Pericardium around heart, and Peritoneum around stomach and intestine

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9 Regions and 4 Quadrants of Abdomen

2 methods to divide abdomen and pelvis regions

**4 Abdominopelvic Quadrants**

Right Upper and Left Upper Quadrants

Right Lower and Left lower Quadrants

**9 Abdominopelvic regions**

Right hypochondriac – epigastric – left hypochondriac regions

Right lumbar – umbilical – left lumbar regions

Right iliac – hypogastric – left iliac regions

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Recap 2 Chap 1

1. ------ is a longitudinal section dividing the body into 2 unequal left and right parts.
2. ----- is present in pelvic cavity and ---- in pleural cavity.
3. Stomach is lined by ----membrane outside and --- membrane inside.
4. Wrist is ---- region in anatomy and ---- is brachial region.
5. Neck is --- region in anatomy and shoulder is --- region.
6. Stomach is present in ----- quadrant and bladder in ------ region.
7. Lips are --- to chin and ---- to cheeks.
8. Hand is ---- to arm and elbow is ----- to wrist.
9. Muscles are --- to bone and ---- to skin.
10. Trachea and esophagus are present in ------ cavity.