Welcome to ANAT 10A!

- What is “Anatomy”?
- Different levels of Anatomy
- The Language of Anatomy
Introduction

• “Anatomy” means to dissect: (ANAT 10A)
  • The study of internal & external body structures
  • The study of the relationship between body parts
    • i.e. identify structure and location of an organ

• Physiology (ANAT 10B)
  • The study of how the body functions & the mechanisms in the body
Introduction

- **Anatomical terminology**
  - Based on ancient Greek or Latin
  - Provides standard nomenclature worldwide

- **Branches of anatomy**
  - Microscopic anatomy (histology)
  - Gross/macroscopic anatomy
  - Other perspectives
Microscopic Anatomy

- Microscopic anatomy
  - The study of structures that cannot be seen without magnification
    - Cytology—study of cells
    - Histology—study of tissues
Gross/Macroscopic Anatomy

- Gross/Macroscopic anatomy
  - The study of structures that can be seen without magnification
Gross/Macroscopic Anatomy

- **Surface anatomy:** refers to the superficial anatomical markings (ex. bones)
- **Regional anatomy:** refers to all structures in a specific area of the body, whether they are superficial or deep (ex. upper limb)
- **Systemic anatomy:** The study of the organ systems of the body (ex. skeletal system)
Other Perspectives on Anatomy

- **Developmental anatomy:**
  - Examines structural changes over time (after birth)

- **Embryology:**
  - The study of early developmental stages (before birth)

- **Comparative anatomy:**
  - Compare structures between species
  - Compare development between species
  - Compare developmental stages
  - Compare individuals for variation
Figure 1.2 Comparative Anatomy

All vertebrates share a basic pattern of anatomical organization that differs from that of other animals.

The similarities between vertebrates are most apparent when comparing embryos at comparable stages of development.

The similarities are less obvious when comparing adult vertebrates.

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Other Perspectives on Anatomy

- Clinical anatomy:
  - Focuses on pathological changes during illness
Other Perspectives on Anatomy

- **Radiographic anatomy:**
  - X-ray: beam diffracts depending on density (2-D) image

- Ultrasound: Uses sound waves to create 3-D moving images of internal structures; relies on differing densities of tissues
Other Perspectives on Anatomy

- Cross-sectional anatomy:
  - CAT: Computed (axial) tomography = rotating X-ray beam gives a sectional image
  - MRI: (Magnetic resonance imaging or Nuclear Magnetic resonance) Uses magnetic fields; relies on internal water to create a sectional image
Human Organs we will cover:

Brain    Pancreas    Spleen
Lungs    Ovaries    Testes
Heart    Adrenals    Thyroid
Kidneys    Parathyroid    Thymus
Urinary bladder    Liver    Gall bladder
Uterus    Small intestine
Stomach    Large intestine
& more…
# An Introduction to Organ Systems (Part 1 of 2)

<table>
<thead>
<tr>
<th>ORGAN SYSTEM</th>
<th>MAJOR FUNCTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integumentary system</td>
<td>Protection from environmental hazards; temperature control</td>
</tr>
<tr>
<td>Skeletal system</td>
<td>Support, protection of soft tissues; mineral storage; blood formation</td>
</tr>
<tr>
<td>Muscular system</td>
<td>Locomotion, support, heat production</td>
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<tr>
<td>Nervous system</td>
<td>Directing immediate responses to stimuli, usually by coordinating the activities of other organ systems</td>
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<tr>
<td>Endocrine system</td>
<td>Directing long-term changes in the activities of other organ systems</td>
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<tr>
<td>Cardiovascular system</td>
<td>Internal transport of cells and dissolved materials, including nutrients, wastes, and gases</td>
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<tr>
<td>ORGAN SYSTEM</td>
<td>MAJOR FUNCTIONS</td>
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<td>-----------------------</td>
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<tr>
<td>Lymphoid system</td>
<td>Defense against infection and disease</td>
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<tr>
<td>Respiratory system</td>
<td>Delivery of air to sites where gas exchange can occur between the air and circulating blood</td>
</tr>
<tr>
<td>Digestive system</td>
<td>Processing of food and absorption of organic nutrients, minerals, vitamins, and water</td>
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<tr>
<td>Urinary system</td>
<td>Elimination of excess water, salts, and waste products; control of pH</td>
</tr>
<tr>
<td>Reproductive system</td>
<td>Production of sex cells and hormones</td>
</tr>
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Figure 1.7 The Importance of Precise Vocabulary
The Language of Anatomy

- **Superficial Anatomy**
  - Using the proper terms to identify the structures of the body helps physicians communicate with each other and the patient.
  - The terms are typically derived from Latin or Greek.
    - Latin or Greek is used because they are descriptive languages.
Anatomical Landmarks - anterior view

- **Anatomical position**
  - Person stands erect with feet together and eyes forward
  - The hands are at the side
  - The palms are facing forward
  - All discussion of the human body is in reference to the anatomical position

- **Supine**: lying down (face up) in the anatomical position

- **Prone**: lying down (face down) in the anatomical position
Anatomical Landmarks - posterior view

- Need to identify all the body landmarks & regions

- 2 Regions:
  - Axial = head, neck & trunk
  - Appendicular = limbs
Regional Terms

**Upper limb**
- Acromial
- Brachial (arm)
- Olecranal
- Antebrachial (forearm)

**Manus (hand)**
- Metacarpal
- Digital

**Lower limb**
- Femoral (thigh)
- Popliteal
- Sural (calf)
- Fibular or peroneal

**Pedal (foot)**
- Calcaneal
- Plantar

**Cephalic**
- Otic
- Occipital (back of head)

**Cervical**

**Back (dorsal)**
- Scapular
- Vertebral
- Lumbar
- Sacral
- Gluteal

**Perineal (between anus and external genitalia)**
The Language of Anatomy

- **Anatomical directions** – refers to the body in anatomical position
  - Standardized terms of directions are paired terms
- The most common directional terms used are:
  - Superior vs. Inferior
  - Anterior vs. Posterior
  - Medial vs. Lateral
  - Superficial vs. Deep
Figure 1.10 Directional References

SUPERIOR

Cranial

Posterior or dorsal

Anterior or ventral

Caudal

INFERIOR

Lateral view

a

Right

Proximal

Lateral

Medial

Proximal

Distal

INFERIOR

Anterior view

b

Left

Distal

Proximal
The Language of Anatomy

• **Sectional Anatomy**
  • There are many different ways to dissect a piece of tissue for further study. These are referred to as dissectional cuts or dissectional planes.
    • **Sagittal cut** (midsagittal and parasagittal)
    • **Transverse cut**
    • **Frontal cut**
    • **Oblique cut**
The Language of Anatomy

- **Sectional Anatomy**
  - **Sagittal cut**: separating left and right
    - **Midsagittal**: separating left and right equally
    - **Parasagittal**: separating left and right unequally
  - **Transverse cut**: separating superior and inferior
  - **Frontal cut**: separating anterior and posterior
  - **Oblique cut**: separating the tissue at an angle
Figure 1.11  Planes of Section

- Frontal plane
- Transverse plane
- Sagittal plane
The Language of Anatomy

• **Abdominopelvic quadrants and regions**
  • Anatomists and clinicians use specialized regional terms to indicate a specific area of concern within the abdomen or the pelvic regions of the body.
    • The abdomen and pelvic regions can be subdivided into four regions (*abdominopelvic quadrants*)
    • The abdomen and pelvic regions can be subdivided into nine regions (*abdominopelvic regions*)
Abdominopelvic quadrants
More precise anatomical descriptions are provided by reference to the appropriate abdominopelvic region.
Quadrants or regions are useful because there is a known relationship between superficial anatomical landmarks and underlying organs.
The Language of Anatomy

- Sectional Anatomy: Body cavities
  - If you remove an organ from the body, you will leave a cavity
  - The body cavities are studied in this manner:
    - Posterior/dorsal cavity
    - Anterior/ventral cavity
Sectional Anatomy: Body cavities

- Posterior cavity
  - **Cranial cavity**: consists of the brain
  - **Spinal cavity**: consists of the spinal cord
- Anterior cavity
  - **Thoracic cavity**
  - **Abdominal cavity**
  - **Pelvic cavity**
The Language of Anatomy

• Sectional Anatomy: Anterior cavity
  • Thoracic cavity consists of:
    • **Pleural cavity**: lungs
    • **Pericardial cavity**: heart
    • **Mediastinal cavity**: space between the apex of the lungs
The Language of Anatomy

• **Sectional Anatomy: Anterior cavity**
  • Abdominopelvic cavity consists of:
    • **Peritoneal cavity:** stomach, intestines, spleen, liver, etc.
    • **Pelvic cavity:** urinary bladder
Ventral Body Cavity Membranes

- Each cavity consists of a double-layered membrane (serosa)
  - Parietal serosa lines internal body walls
  - Visceral serosa covers the internal organs
  - Serous fluid separates the serosae
The Language of Anatomy

- The serosa nearest the wall of the body (farthest from the organs) is the **parietal serosa**
  - parietal pleura, parietal pericardium, parietal peritoneum

- The serosa farthest from the wall of the body (nearest the organs) is the **visceral serosa**
  - visceral pleura, visceral pericardium, visceral peritoneum
Figure 1.13ab  Body Cavities

**POSTERIOR**

Lateral view of the subdivisions of the ventral body cavities. The muscular diaphragm separates the superior thoracic (chest) cavity and the inferior abdominopelvic cavity.

**ANTERIOR**

The heart projects into the pericardial cavity like a fist pushed into a balloon.