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Lecture 1

Introduction to the Human Body

Anatomy and Physiology

- Anatomy is the study of structure
- Physiology is the study of function

Language of Anatomy

- Anatomy is a visual science, based on proper terminology

Anatomic position

- Standing upright
- Feet parallel and on the floor
- Head level and looking forward
- Arms at side of body
- Palms facing forward and thumbs pointing away from body

Sections and planes

- Used to visualise internal and 3D anatomy
 - Section:
 - An actual cut or slice
 - Plane:
 - Imaginary flat surfaces passing through the body or an organ

Three anatomic Planes

- Coronal (frontal) plane
 - Divides the body into anterior (front) and posterior (back) parts
- Transverse (horizontal) plane
 - Divides the body into superior (upper) and inferior (lower) parts
- Midsagittal (median) plane
 - Divides the body into equal left and right halves
 - Other sagittal planes divide the body into unequal left and right parts

Anatomical directions

- Anterior vs posterior
 - Anterior: In front of; toward the front surface
 - Posterior: in back of; toward the back surface
- Superior vs inferior
 - Superior: closer to the head
 - Inferior: closer to the feet
- Medial vs lateral
 - Medial: toward the midline of the body
 - Lateral: away from the midline of the body
- Proximal vs distal
 - Proximal: closest to point of attachment to trunk
 - Distal: furthest from point of attachment to trunk

Lecture 2

Human Body Plan

Regional Anatomy

- Axial
 - Head, neck, trunk (vertical axis of the body)
- Appendicular
 - Upper and lower limbs (appendages)

Two sizes of Anatomy

- Microscopic

- Structures too small to be seen with the unaided eye
 - Cytology – study of individual cells
 - Histology – study of tissues
- Gross
 - Structures that can be seen with the unaided eye
 - Various sub-disciplines of gross anatomy
 - Comparative anatomy
 - Examines similarities and differences in anatomy of species
 - Developmental anatomy
 - Study of structure changes within an individual from conception through maturity
 - Embryology
 - Study of developmental changes occurring prior to birth
 - Regional anatomy
 - Study of structures with a single region
 - Surface anatomy
 - Study of internal structures as their locations relate to regions of skin or other surface markings
 - Systemic anatomy
 - Study of structures involved with a specific activity – e.g. digestion or reproduction

Specialised branches of anatomy

- Pathologic anatomy
 - Examines changes resulting from disease
- Radiographic anatomy
 - Relationships among internal structures that may be visualised by specific scanning procedures, such as ultrasound, magnetic resonance imaging (MRI) or x-rays
- Surgical anatomy
 - Investigates the anatomical landmarks used before and after surgery

Structural organisation of the human body

1. Atoms
2. Molecules
3. Cells
4. Tissues
5. Organs
6. Systems
7. organism

11 organ systems (RUN MRS LIDEC)

- Reproductive
- Urinary
- Nervous
- Muscular
- Respiratory
- Skeletal
- Lymphatic
- Integumentary
- Digestive
- Endocrine
- cardiovascular

Body Cavities

- Posterior cavities
 - Cranial: formed by skull bones
 - Vertebral: formed by vertebral column bones

- Ventral cavities
 - Thoracic: the superior cavity
 - Abdominopelvic: the inferior cavity
 - Physically separated by the diaphragm

Cavity membranes

- Ventral cavities are lined by a thin serous membrane
 - Divided into two continuous parts (layers):
 - Parietal layer: lines the internal surface of the body wall
 - Visceral layer: covers the external surface of organs in the cavity
 - Both layers produce a small amount of fluid to lubricate the organs, protect against friction

Lecture 3

The cell

Cellular functions

1. Covering – protect outer surface of body
2. Lining – regulate nutrient movement into body tissues
3. Storage – store lipid reserves, carbohydrates etc.
4. Movement – pump blood, body movement etc.
5. Connection – form ligaments that attach bone to bone
6. Defence – produce antibodies to target antigens or invading cells
7. Communication – send information between regions of the brain
8. Reproduction – produce new life, produce new cells

Three basic parts to a human cell

- Plasma (cell) membrane
 - Limits the outside of the cell and interacts with the environment through secretion and absorption
 - Make form specialised junctions with other cells
- Cytoplasm
 - Surrounds the nucleus and carries out the main functions using specific organelles
- Nucleus
 - Contains genetic information (DNA)
 - Controls the shape and activity through protein synthesis (synthesis = produce new proteins)
 - Exports genetic information as RNA via the nucleolus

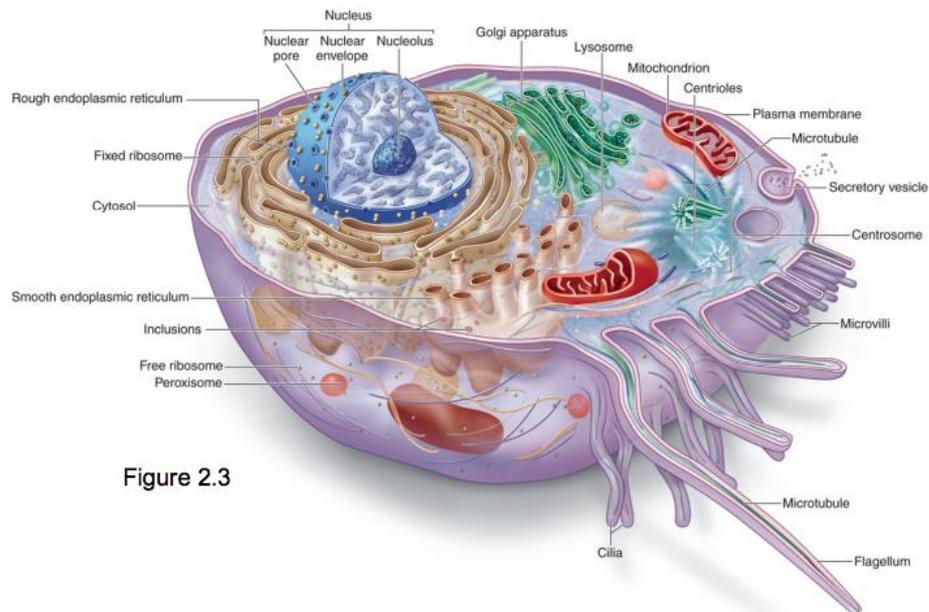


Figure 2.3

Plasma (cell) membrane

- Thin outer border on cell
- Serves as a selective physical and chemical barrier deciding what comes into and leaves the cell
- It is the “gatekeeper” that regulates the passages of gases, nutrients, and wastes between the internal and external environments of the cell
- The plasma membrane and membranes within the cell have two molecular components:
 - Lipids:
 - Lipids are materials that are insoluble in water; examples are fats, oils and steroids
 - Proteins:
 - Large molecules (also known as macromolecules) comprised of chains of amino acids