

TEAS Entrance Exam – (ANATOMY & PHYSIOLOGY) Science, MATH, ENGLISH, & READING STUDY GUIDE

Anatomy: is what you see with your eyes in the human body.

Microscopic Anatomy: examines cells and molecules.

- **Cytology:** study of cells.
- **Histology:** study of tissues.

Physiology: is the study of functions of anatomical structures.

*Smallest living is a **CELL**.

*Smallest organisms is a **ATOM**.

Levels of Hierarchy

Atom- the most basic complete unit of an element.

Molecule- a group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction.

Organelles- are cells parts that function within a cell.

Cells- the basic structural unit of an organism from which living things created. Is one individual cell.

Tissues- a group of cells with similar structure that functions together as a unit, but at a lower level than organs.

Organ- a self contained part of an organism that performs specific functions. Is formed by two or more similar tissues.

Organ System- functional groups of organs that work together within the body: circulatory, integumentary, skeletal, reproductive, digestive, urinary, respiratory, endocrine, lymphatic, muscular and nervous.

- Humans have 11 Organ Systems.

Cells Structure

- **Nucleus-** holds the cells DNA in form of chromatin
- **Ribosomes-** small structures that build proteins “amino acids”.
- **Golgi Apparatus-** modifies and packages proteins secreted from cell.

- **Vacuoles**- storage, digestion and waste removal.
- **Cytoskeletal**- series of rod shaped proteins that provide shape/support cell.
- **Microtubules**- part of the cytoskeletal.
- **Cytosol**- liquid material in cell.
- **Cell membrane**- separate internal and external cellular environment allows material to enter and exit cell.
- **Endoplasmic Reticulum**- smooth or rough transport system of the cell.
- **Mitochondria**- generates ATP powerhouse of the cell. ATP production is called cellular respiration

Animal Cells

Centrosome- pairs of centrioles involved in mitosis.

Centriole- cylinders involved in cellular division.

Lysosomes- the purpose of the lysosome is to digest things. They might be used to digest food or break down the cell when it dies.

Cilia- cause cell to move.

Flagella- whip tail to move cell.

TISSUES:

→ Group of CELLS.

→ Muscle, Nerve, Epithelial, Connective.

1. **Epithelial**: (joined together tightly) Example. Skin
2. **Connective**: (dense, loose, or fatty) Example. Tissue, Cartilage, Tendons, Ligaments, Fat, Blood, Lymph.
 - It protects and binds body parts.
 - a. **Cartilage**: cushions and provides structural support
 - Fibrous
 - b. **Blood**: transport oxygen to cells and removes waste. Also carries hormones and defends against disease.
 - c. **Bone**: (hard) produces red blood cells
3. **Muscle**: supports and move body
 - Smooth
 - Cardiac
 - Skeletal
4. **Nervous**: Example. Brain, spinal cord, and nerves.
 - Neurons: control responses to changes in environment.

Mitosis - it has 4 phases. Pink MAT / **Prophase, Metaphase, Anaphase, Telophase**

Interphase - Cell prepares for division by replicating genetic/cytoplasmic material.

Prophase - Chromatin thickens into chromosomes and the nuclear membrane begins to disintegrate. Pairs of centrioles move to opposite sides of cell and spindle fibers form.

Metaphase - Spindle moves to center of cell and chromosome pairs align along center of spindle structure.

Anaphase - Chromosome pairs pull apart into daughter chromosomes.

Telophase - Spindle disintegrates, nuclear membrane reforms or is pinched.

Cytokinesis - Physical splitting of cell.

Meiosis - same as mitosis except happens twice, results in four daughter cells instead of two. Mature haploid male and female germ cell uniting in sexual reproduction.

- Gametes in female = Egg
- Gametes in Male = Sperm
- Meiosis is when gametes produce a zygote.

Zygote: controls cell differentiation. It forms during fertilization. The cells from each parent that combine to form a zygote are called gametes. Zygote is the first stage of reproduction.

1. Respiratory System

- main functions are the critical tasks of transporting oxygen from the atmosphere into the body's cell and moving carbon dioxide in the other direction.

Nasal Cavity - air passage that warms, moistens, and filters air, and also contains olfactory receptors. Medially divided by the nasal septum.

External Nares - the visible 'nostrils' that are the entrances into the nasal cavity

The Larynx - air passage that connects the pharynx to the trachea, composed of individual cartilages, mostly hyaline. Commonly called the voice box for its additional function of voice production.

Epiglottis - the only elastic cartilage, blocks entrance to the larynx during swallowing, ensuring food only enters the esophagus.

Lungs - Paired organs that are highly compartmentalized into small air sacs called alveoli. Also contain elastic tissue to facilitate ventilation.

Alveoli – the individual lung compartments where gas exchange with blood occurs.

- **Type 2 cells** - cuboidal cells that secrete surfactant, which reduces the surface tension of water to prevent alveolar collapse.

Bronchi – the main passageways directly attached to the lungs.

Bronchioles - small passages in the lungs that connect bronchi to alveoli

Right Lung - divided into upper, middle, and lower lobes by the horizontal fissure and oblique fissure respectively.

Left Lung - divided into upper and lower lobes by the oblique fissure, also has the cardiac notch – an indentation for the heart's apex.

The Pleurae - a double layer of serous membrane producing serous fluid to reduce friction during lung ventilation/movement.

- **Visceral pleura** - the serous membrane layer that clings to the lung surface.
- **Parietal pleura** - the serous membrane that is separated from the lungs, clings to the internal surface of the thoracic body wall.
- **Pleural cavity** - the space between the parietal and visceral layers filled with serous fluid, which reduces friction and causes pleural membranes to stick together.

Perfusion - The passage of fluid to an organ or a tissue.

Pulmonary Ventilation - the movement of air into and out of the lungs based on the interactions of pressures in and around the body.

- **Inspiration** - the movement of air into the lungs.
- **Expiration** - the movement of air out of the lungs.

Tidal volume - The volume of air ventilated during resting breathing.

Inspiratory reserve volume - additional air that can be forcefully inhaled beyond tidal.