**1. Anatomical Structures**

**Definition**:

The various parts that make up the human body, including bones, muscles, organs, tissues, and systems.

**Types of Structures**:

**Macroscopic (Gross) Anatomy**: Structures visible to the naked eye, such as organs, muscles, and bones.

**Microscopic Anatomy**: Structures that require a microscope to be seen, such as cells and tissues.

**Key Systems**:

**Skeletal System**: Bones and joints, providing structure and support.

**Muscular System**: Muscles responsible for movement.

**Nervous System**: Brain, spinal cord, and nerves, coordinating body functions.

**Cardiovascular System**: Heart and blood vessels, circulating blood throughout the body.

**Respiratory System**: Lungs and airways, enabling breathing.

**Digestive System**: Organs involved in the ingestion, digestion, and absorption of food.

**Urinary System**: Kidneys and bladder, filtering blood and producing urine.

**Reproductive System**: Organs involved in reproduction.

**Endocrine System**: Glands that produce hormones.

**Lymphatic/Immune System**: Defense against infections.

**Integumentary System**: Skin, hair, and nails, protecting the body.

**2. Anatomical Position, Planes, and Directions**

**Anatomical Position**:

The standard reference position for the body in anatomy: standing upright, feet together, arms at the sides, with the head and eyes facing forward, and palms facing forward.

**Anatomical Planes**:

**Sagittal Plane**: Divides the body into left and right halves.

**Frontal (Coronal) Plane**: Divides the body into anterior (front) and posterior (back) portions.

**Transverse (Horizontal) Plane**: Divides the body into superior (upper) and inferior (lower) parts.

**Directional Terms**:

**Superior** (Cranial): Toward the head.

**Inferior** (Caudal): Toward the feet.

**Anterior** (Ventral): Toward the front of the body.

**Posterior** (Dorsal): Toward the back of the body.

**Medial**: Toward the midline of the body.

**Lateral**: Away from the midline.

**Proximal**: Closer to the point of attachment to the body.

**Distal**: Farther from the point of attachment to the body.

**3. Body Organs**

**Definition**:

Distinct structures composed of different tissues that perform specific functions in the body.

**Examples**:

**Heart**: Pumps blood through the circulatory system.

**Lungs**: Facilitate the exchange of oxygen and carbon dioxide.

**Liver**: Detoxifies chemicals, metabolizes drugs, and secretes bile.

* + **Kidneys**: Filter blood, remove waste, and regulate electrolyte balance.
  + **Stomach**: Breaks down food and begins the digestion process.
  + **Brain**: Controls bodily functions and processes information.

**4. Functions of the Human Body Organs**

**Heart**:

* + Circulates blood to supply oxygen and nutrients to the tissues and removes carbon dioxide and wastes.

**Lungs**:

Exchange of gases (oxygen and carbon dioxide) with the blood during breathing.

**Liver**:

Detoxification, metabolism of nutrients, storage of vitamins and minerals, and production of bile.

**Kidneys**:

Filtration of blood, removal of waste products in urine, and regulation of blood pressure, electrolyte balance, and red blood cell production.

**Stomach**:

Secretes acid and enzymes to digest food, and churns food to enhance digestion.

**Brain**:

Coordinates sensory input, motor function, cognitive abilities, and regulation of bodily functions such as heartbeat and breathing.

**5. Human Cell Structure Components**

**Cell Membrane**:

The semi-permeable membrane that encloses the cell, controlling the movement of substances in and out.

**Nucleus**:

The control center of the cell containing genetic material (DNA) and regulating cell growth, metabolism, and reproduction.

**Cytoplasm**:

The gel-like substance inside the cell membrane where organelles are suspended.

**Mitochondria**:

The powerhouse of the cell, generating ATP (energy) through cellular respiration.

**Endoplasmic Reticulum (ER)**:

**Rough ER**: Studded with ribosomes, it synthesizes proteins.

**Smooth ER**: Synthesizes lipids and detoxifies toxins.

**Golgi Apparatus**:

Modifies, sorts, and packages proteins and lipids for secretion or use within the cell.

**Lysosomes**:

Contain enzymes for digestion of cellular waste.

**Ribosomes**:

Sites of protein synthesis.

**Cytoskeleton**:

A network of fibers that provides structure to the cell and aids in movement.

**6. Human Cell Cycle**

**Phases of the Cell Cycle**:

**Interphase**:

* + - **G1 Phase (Gap 1)**: Cell grows and synthesizes proteins necessary for cell division.
    - **S Phase (Synthesis)**: DNA replication occurs.
    - **G2 Phase (Gap 2)**: Further growth and preparation for division.

**Mitosis**:

* + - **Prophase**: Chromosomes condense, nuclear envelope dissolves.
    - **Metaphase**: Chromosomes align at the cell's equator.
    - **Anaphase**: Sister chromatids separate and move toward opposite poles.
    - **Telophase**: Chromosomes de-condense, nuclear envelope reforms.
  + **Cytokinesis**:
    - The division of the cytoplasm, resulting in two daughter cells.

**7. Communicable Diseases**

**Definition**:

* + Diseases caused by infectious agents that can be transmitted from one person, animal, or object to another.

**Examples**:

* + **Bacterial**: Tuberculosis, cholera, and pneumonia.

**Viral**: Influenza, HIV/AIDS, COVID-19.

**Fungal**: Candidiasis, athlete's foot.

**Parasitic**: Malaria, giardiasis.

**8. Modes of Transmission of Communicable Diseases**

**Direct Contact**:

Physical interaction with an infected person, such as touching or sexual contact.

**Indirect Contact**:

Touching surfaces or objects contaminated with infectious agents.

**Droplet Transmission**:

Respiratory droplets expelled during coughing, sneezing, or talking.

**Airborne Transmission**:

Infectious agents carried on air currents, capable of being inhaled by others.

**Vector-Borne Transmission**:

Transmission via vectors like mosquitoes (e.g., malaria) or ticks (e.g., Lyme disease).

**Fecal-Oral Transmission**:

Ingestion of contaminated food or water.

**9. Non-Communicable Diseases**

**Definition**:

Chronic diseases that are not infectious and cannot be transmitted from one person to another.

**Examples**:

**Cardiovascular Diseases**: Heart attack, stroke, hypertension.

**Cancers**: Lung cancer, breast cancer, colon cancer.

* + **hronic Respiratory Diseases**: Asthma, chronic obstructive pulmonary disease (COPD).

**Diabetes Mellitus**: Type 1 and Type 2 diabetes.

**Mental Health Disorders**: Depression, anxiety, schizophrenia.

**10. Risk Factors of Non-Communicable Diseases**

**Behavioral**:

Unhealthy diet, physical inactivity, tobacco use, excessive alcohol consumption.

**Biological**:

Age, genetics, hypertension, obesity, dyslipidemia (abnormal cholesterol levels).

**Environmental**:

Air pollution, exposure to harmful chemicals, occupational hazards.

**Socioeconomic**:

Poverty, lack of access to healthcare, low education level.

**11. Control and Prevention Measures of Common Diseases**

**Communicable Diseases**:

**Vaccination**: Immunization against diseases like measles, influenza, hepatitis.

**Hygiene Practices**: Regular hand washing, use of sanitizers, proper sanitation.

**Quarantine and Isolation**: Preventing the spread of infectious agents by separating those who are infected.

**Use of Personal Protective Equipment (PPE)**: Masks, gloves, and gowns to prevent transmission.

**Non-Communicable Diseases**:

**Lifestyle Modifications**: Healthy diet, regular physical activity, cessation of smoking, moderation in alcohol intake.

**Regular Screening and Monitoring**: Blood pressure, cholesterol levels, blood sugar levels.

**Medications**: For managing conditions like hypertension, diabetes, and hyperlipidemia.

**Education and Awareness**: Public health campaigns to educate about the risk factors and prevention of chronic diseases.

**12. Basic Management of Common Diseases**

**Communicable Diseases**:

**Antibiotics**: For bacterial infections (e.g., penicillin for strep throat).

**Antivirals**: For viral infections (e.g., acyclovir for herpes).

**Antifungals**: For fungal infections (e.g., fluconazole for candidiasis).

**Antiparasitic**: For parasitic infections (e.g., antimalarials for malaria).

**Non-Communicable Diseases**:

**Lifestyle Changes**: Dietary adjustments, exercise programs, smoking cessation support.

**Pharmacological Treatments**: Antihypertensives, statins, insulin, antidepressants.

**Surgical Interventions**: Bypass surgery for heart disease, tumor removal for cancer.

**Psychological Support**: Counseling, cognitive-behavioral therapy for mental health conditions.