



# NATIONAL INSTITUTE OF TECHNOLOGY RAIPUR

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## Summary of An introduction to Human body

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# SUMMARY

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16 OCT 2022

There are two branches of science- Anatomy and Physiology which provides the foundation for understanding the body parts and functions. Anatomy deals with the structure of body whereas physiology deals with how the body works.

There are different levels of structural organization as follows:

1. Chemical level: Basic level consists of atoms and molecules which are essential for maintaining life.
2. Cellular level: Molecules combine to form cells. Cells are the basic structural and functional units of organism.
3. Tissue level: Group of cells and material surrounding them which works together to perform a particular function. There are just four basic types of tissues in your body: epithelial tissue, connective tissue, muscular tissue, and nervous tissue.
4. Organ level: At the organ level, different types of tissues are joined together. They have specific function and recognizable shapes.
5. System level: A system consists of related organs (organs) with a common function. An example of the system level, also called the organ-system level, is the digestive system, which breaks down and absorbs food.
6. Organismal level: All the parts of the human body functioning together constitute the total organism.

## Characteristics of the Living Human Organism:

There are six important life processes of human body as follows:

1. Metabolism: It is the sum of all chemical processes that occur in the body.
2. Responsiveness: It is the body's ability to detect and respond to changes.
3. Movement: It includes motion of the whole body, individual organs, single cells,

and even tiny structures inside cells.

4. Growth: It is an increase in body size that results from an increase in the size of existing cells, an increase in the number of cells, or both.

5. Differentiation: It is the development of a cell from an unspecialized to a specialized state.

6. Reproduction: It refers either to (1) the formation of new cells for tissue growth, repair, or replacement, or (2) the production of a new individual.

## HOMEOSTASIS:

Homeostasis is the maintenance of relatively stable conditions in the body's internal environment. It is a dynamic condition.

An important aspect of homeostasis is maintaining the volume and composition of body fluids, dilute, watery solutions containing dissolved chemicals that are found inside cells as well as surrounding them.

Body fluids: Body fluids are the fluids such as blood, lymph, milk and saliva which are produced in the body and then either circulated within the body or secreted outside it.

They are mainly divided into three types-

1. Intracellular Body Fluids(which is within the cells)
2. Extracellular Body Fluids(which is outside the body cells)
3. Interstitial Body Fluids(which is present between cells and tissues)

Blood and lymph are the two most important body fluids in the human body. Blood comprises plasma, white blood cells, red blood cells, and platelets. Lymph is a colourless fluid that circulates inside the lymphatic vessels.

The important functions of body fluids include:

1. The body fluids facilitate the transportation of oxygen and nutrients throughout the body and remove waste from the body.
2. They help in regulating body temperature.
3. They maintain an efficient metabolism of the body.

## Control of homeostasis:

Proper functioning of body cells depends on precise regulation of the composition of their surround fluid the body regulates it's internal environment through many

feedback system.

Feedback system - A cycle of events in which the status of a body condition is monitored includes basic components:

- a) Receptor : Monitors changes in controlled conditions and sends input to a control center [afferent pathway].
- b) Control Center: It evaluates the input it receives from receptors and generates output commands when they are needed [efferent pathway].
- c) Effector: Body structure that receives output from control center and produces a response or effect that changes the controlled conditions. Every organ of body or tissue can behave as effector.

## Basic Anatomical Terminology

### Body Positions:

Descriptions of any region or part of the human body assume that it is in a standard position of reference called the anatomical position.

Two terms describe a reclining body. If the body is lying facedown, it is in the prone position. If the body is lying faceup, it is in the supine position.

### Regional Names:

The human body is divided into several major regions that can be identified externally. The principal regions are the head, neck, trunk, upper limbs, and lower limbs.

### Directional Terms:

To locate various body structures, anatomists use specific directional terms, words that describe the position of one body part relative to another.

### Planes and Sections:

We also study parts of the body relative to planes, imaginary flat surfaces that pass through the body parts.

### Body Cavities:

Body cavities are spaces that enclose internal organs. Bones, muscles, ligaments,

and other structures separate the various body cavities from one another. Cavities include cranial cavity, thoracic cavity, pericardial cavity, pleural cavities and abdominopelvic cavity.

### Abdominopelvic Regions and Quadrants:

To describe the location of the many abdominal and pelvic organs more easily, anatomists and clinicians use two methods of dividing the abdominopelvic cavity into smaller areas. In the first method, two horizontal and two vertical lines, aligned like a tic-tac-toe grid, partition this cavity into nine abdominopelvic regions. The second method is simpler and divides the abdominopelvic cavity into quadrants.

### AGING AND HOMEOSTASIS:

Aging is a normal process characterized by a progressive decline in the body's ability to restore homeostasis. Aging produces observable changes in structure and function and increases vulnerability to stress and disease. The changes associated with aging are apparent in all body systems.

### MEDICAL IMAGING:

Medical imaging refers to techniques and procedures used to create images of the human body. Various types of medical imaging allow visualization of structures inside our bodies and are increasingly helpful for precise diagnosis of a wide range of anatomical and physiological disorders. The grandparent of all medical imaging techniques is conventional radiography (x-rays).