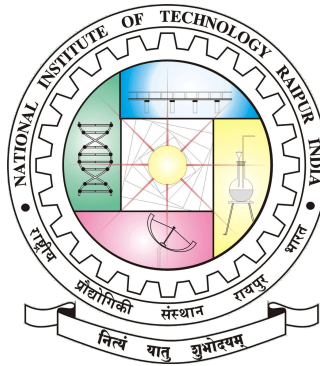


**National Institute Of Technology, Raipur**



## **Assignment-1**

# **Summary of Chapter 1, "An introduction to human body"**

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# 1 The Human Body and Homeostasis

Human Body is all about maintaining the Homeostasis and restoring the maintained condition of the Body.

**Anatomy** : It is the science of body structure and the relationship among them.

**Physiology** : It is the science of body functions-how the body parts works.

## 1.1 Levels of structural organisation and body systems

From the smallest to largest, there are six levels of human organisation.

1. **Chemical Level** : atoms (*C,H,O,N,Ca,etc*) and molecules (*DNA,Glucose,etc*).
2. **Cellular level** : basic structural and functional units of an living organisms like (*nerve cells, epithelial cells, etc*).
3. **Tissue level** : Group of cells and the materials surrounding them that work together to perform a particular function. Four basic types of tissue are : *Epithelial tissue, Connective tissue, Nervous tissue, etc*.
4. **Organ level** : Structures that are composed of two or more different types of tissues having specific functions and usually recognizable shapes like *skin, stomach, heart, liver, lungs, brain, etc*.
5. **System level** : Organs combines to form organ systems. Like *skeleton, cardiovascular, endocrine, lymphatic, respiratory, reproductive, etc*.
6. **Organismal level** : All the parts of the human body functioning together constitute the total organism.

## 1.2 Characteristics of the Living Human Organism

Certain processes distinguish organisms : **1. Metabolism** : Sum of all chemical process that occur in the body. Its two phases are Anabolism and Catabolism. **2. Responsiveness** : It is body's ability to detect and respond to changes. **3. Movement** : It includes motion and coordination of whole body. **4. Growth** : It is an increase in body's cells and its growth. **5. Differentiation** : It is the development of a cell from an unspecialized to a specialized state. **6. Reproduction** : The formation of new cells for tissue growth, repair or replacement or the production of new individual. Formation of new cells occurs through fertilization and cell division.

## 2 Homeostasis and Body Fluids

Homeostasis is the maintenance of relatively stable condition in the body's internal environment in response to changing conditions.

### 2.0.1 Homeostasis and body fluid

An important aspect of homeostasis is maintaining the volume and composition of body fluids. The proper functioning of body cells depends on precise regulation of the composition of various fluids like *Intercellular fluid*, *extra-cellular fluid*, *interstitial fluid*, *blood plasma*, *lymph*, *cerebrospinal fluid*, *synovial fluid*, *aqueous humor* and *vitreous fluid*.

### 2.0.2 Control of homeostasis

Homeostasis in the body is continuously being disrupted by external environment such as *intense heat*, *lack of oxygen*, etc. internal environment such as *glucose level*, social environment such as *work*, *school*, etc. Fortunately, the body has many regulating systems that can usually bring the internal environment back into balance. Most often, the nervous system and the endocrine system, working together or independently, provide the needed corrective measures.

## 2.1 Feedback System

A feedback system or feedback loop is a cycle of events in which the status of a body condition is monitored, evaluated, changed, remonitored, reevaluated, and so on.

A feedback system includes three basic components :-

**1. Receptor :** It monitors the changes in a controlled condition and sends input to a control center. **2. Control center :** It evaluates the input it receives from receptors, and generates output command when they are needed in the form of nerve impulses or hormones or other chemical signals. **3. Effector :** It receives the output from the control center and produces a response or effect that changes the controlled condition.

### 2.1.1 Negative and Positive Feedback system

- ❑ If the response reverses the stimulus, a system is operating by **negative feedback**. eg:- Let the Blood pressure suddenly increases, then the sequence of events will occur which will reduce the BP and homeostasis is restored.
- ❑ If the response enhances or intensifies the stimulus, a system is operating by **positive feedback**. when a great amount of blood is lost , then the sequence of events will occur which will decrease the pumping action of the heart and BP continues to fall but it can be very dangerous.

## 2.2 Homeostasis imbalances

The body's ability to maintain homeostasis gives it tremendous healing power and also responsible for good health. The many health factors are the environment and your own behaviour, genetic makeup, the air you breathe, the food you eat, the thought you think. Many diseases are the result of poor health behaviour like smoking damages the lung's ability to repair itself.

A **disorder** is any abnormality of structure or function. **Disease** is a more specific term for an illness characterized by a recognizable set of signs and symptoms.