

PAPER 4

V.V Sangha's



Veerashaiva College, Ballari-583102

DEPARTMENT OF P.G STUDIES IN ZOOLOGY

Course Title :

NEUROBIOLOGY AND AGING

Course Code :

21ZOO3E2CL

Title Of Seminar :

GROSS ANATOMY OF ADULT BRAIN

Submitted By :

MAHANTESH A.M

Semester :

III SEMESTER

Register Number :

P16VB22S221011

Submission Date : 22/12/2023

Submitted To : Dr. Zareena Banu

Coordinator & Principal : Dr. G.Manohara

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## INTRODUCTION TO PHYSIOLOGY

### INTRODUCTION:

Physiology is the scientific study of how living organisms function and the processes that occur within their cells, tissues, and organs to maintain life. It seeks to understand the mechanisms that enable organisms to respond to changes in their environment and maintain internal balance, a concept known as homeostasis.

#### Key Aspects of Physiology:

**Cellular Level:** Physiology explores the functions of individual cells, considering how they carry out processes like energy production, communication, and maintenance of cellular structures.

**Organ System Interactions:** It examines how different organ systems collaborate to sustain life. For instance, the circulatory system transports nutrients, while the respiratory system ensures an adequate oxygen supply.

**Homeostasis:** A central theme in physiology, homeostasis refers to the body's ability to regulate its internal environment and maintain a stable state. This involves dynamic adjustments to physiological variables, such as temperature, pH, and nutrient levels.

**Adaptation:** Physiology studies how organisms adapt to changes in their surroundings, whether it's responding to stress, temperature fluctuations, or alterations in nutrient availability.

**Integration with Other Sciences:** Physiology is closely linked with anatomy, biochemistry, molecular biology, and other scientific disciplines. It draws on knowledge from various fields to comprehensively understand the mechanisms governing life processes.

**Clinical Applications:** Understanding physiological principles is crucial in medicine. Medical professionals use physiological knowledge to diagnose, treat, and prevent diseases by recognizing deviations from normal functioning.

#### Why Study Physiology:

**Insight into Life Processes:** Studying physiology provides insights into the intricate processes that allow living organisms to function, grow, and adapt.

**Basis for Medical Understanding:** It forms the foundation for medical knowledge, helping healthcare professionals comprehend health and disease at a fundamental level.

**Biological Research:** Physiological research contributes to advancements in biotechnology, pharmacology, and other fields by unraveling the mechanisms underlying biological phenomena.



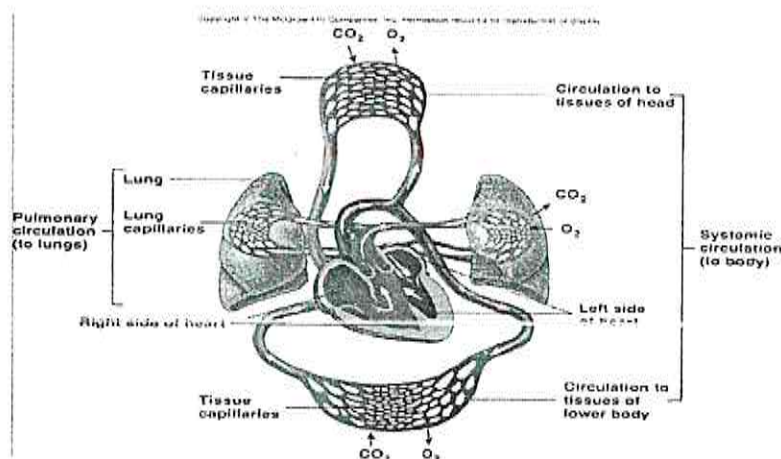
### Circulatory System:

The circulatory system, comprising the heart, blood vessels, and blood, is a complex network dedicated to the transportation of essential substances throughout the body.

**Function:** Its primary role is to transport blood, laden with oxygen and nutrients, to all cells, tissues, and organs. Simultaneously, it collects waste products for elimination.

**Example:** During exercise, as your body demands increased energy, the circulatory system responds dynamically. The heart rate accelerates, and blood vessels dilate to enhance blood flow. This heightened circulation ensures that oxygen, carried by red blood cells, is efficiently delivered to hardworking muscles. Nutrients, vital for energy production, are also transported, supporting the increased metabolic demands of exercising muscles.

Understanding the circulatory system's function illustrates its pivotal role in sustaining the body's activities, especially during periods of heightened demand such as physical exertion.

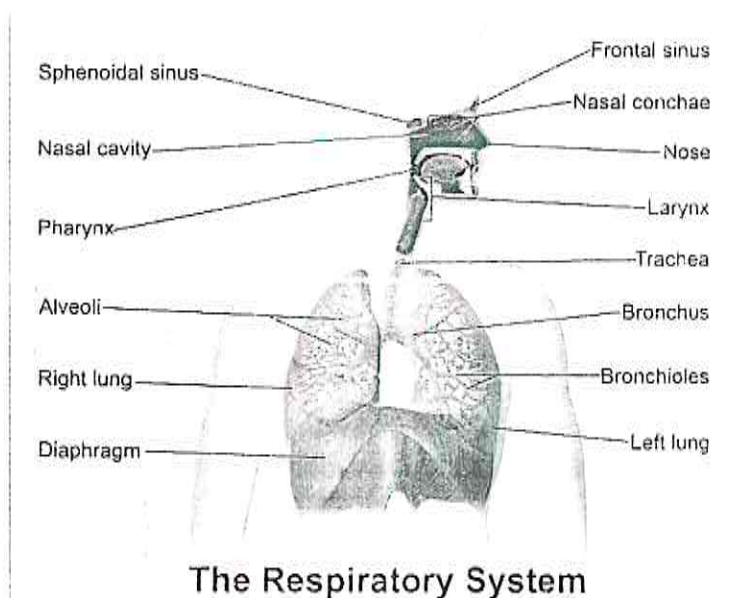


## Respiratory System:

The respiratory system, comprising the lungs and airways, serves as the body's respiratory control center, managing the crucial exchange of gases necessary for cellular function.

**Function:** It not only facilitates breathing, the process of inhaling and exhaling air, but also orchestrates the exchange of oxygen and carbon dioxide in the lungs, ensuring a continuous supply of oxygen for cellular processes.

**Example:** When you inhale, oxygen-rich air fills the lungs and diffuses into the bloodstream. This oxygen is utilized during cellular respiration, a fundamental process for energy production. Conversely, when you exhale, carbon dioxide, a byproduct of this energy production, is expelled from the body. This meticulous gas exchange ensures that the body maintains an optimal balance of gases for metabolic efficiency.



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PAPER 3



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DEPARTMENT OF P.G STUDIES IN ZOOLOGY

Course Title :

HUMAN PHYSIOLOGY

Course Code :

21ZOO3E1AL

Title Of Seminar :

FUNCTIONS OF COMPONENTS OF INTEGUMENTARY SYSTEM

Submitted By :

SAI J TERANI

Semester :

III SEMESTER

Register Number :

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Seminar Conducted On : 21/12/2023

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## **COMPONENTS OF INTEGUMENTARY SYSTEM AND ITS FUNCTIONS**

### **INTRODUCTION**

The integumentary system is a complex and vital organ system encompassing the skin, hair, nails, and associated structures. It serves as the body's largest organ and plays a crucial role in protecting internal organs, regulating body temperature, and facilitating sensory perception. Let's explore the components of the integumentary system and their functions:

### **COMPONENTS OF THE INTEGUMENTARY SYSTEM:**

#### **1. Skin:**

- The skin is the largest organ of the body and serves as a protective barrier against physical injury, pathogens, and dehydration.
- It consists of three layers: the epidermis (outermost layer), the dermis (middle layer), and the subcutaneous tissue (hypodermis).

#### **2. Hair:**

- Hair follicles embedded in the skin produce hair, which serves various functions, including protection from UV radiation, temperature regulation, and sensory perception.

#### **3. Nails:**

- Nails are formed by specialized epithelial cells and keratinized tissue.
- They protect the tips of the fingers and toes and assist in grasping and manipulating objects.

#### **4. Glands:**

- Sebaceous Glands: These glands secrete sebum, an oily substance that helps lubricate the skin and hair, preventing dryness and protecting against microbes.
- Sweat Glands: Eccrine glands produce sweat to regulate body temperature by evaporative cooling. Apocrine glands, found in specific areas, produce a thicker secretion that can be a source of body odor.



#### **5. Blood Vessels:**

- Blood vessels, including arteries and veins, are present in the dermis. They play a crucial role in thermoregulation by adjusting blood flow to dissipate or conserve heat.

#### **6. Nerve Endings:**

- Numerous sensory receptors, such as Meissner's corpuscles for touch and Pacinian corpuscles for pressure, are distributed throughout the skin, enabling the perception of various stimuli.

#### **7. Subcutaneous Fat:**

- This layer of adipose tissue in the hypodermis serves as insulation, providing cushioning and helping regulate body temperature.

#### **8. Melanocytes:**

- Found in the epidermis, melanocytes produce melanin, the pigment responsible for skin color. Melanin provides protection against harmful UV radiation.

#### **9. Lymphatic Vessels:**

- Lymphatic vessels assist in immune surveillance and the removal of excess interstitial fluid, contributing to the overall health of the skin.

#### **10. Connective Tissues:**

- Collagen and elastin fibers in the dermis provide structural support, elasticity, and resilience to the skin.

#### **11. Immune Cells:**

- Various immune cells, including macrophages, are present in the skin, contributing to local immune defense and wound healing.

#### **12. Merkel Cells:**

- Specialized cells in the epidermis associated with sensory nerve endings, contributing to the sense of touch.



## FUNCTIONS OF THE INTEGUMENTARY SYSTEM:

### 1. Protection:

- The skin acts as a physical barrier, protecting underlying tissues and organs from external threats, such as pathogens, chemicals, and physical and blood vessels in the skin play crucial roles in temperature regulation. When the body overheats, sweat is produced, and as it evaporates, it cools the body. Blood vessels near the skin's surface can dilate to release excess heat or constrict to conserve heat in colder conditions.

### 2. Sensation:

- The integumentary system contains sensory receptors, including those for touch, pressure, temperature, and pain. These receptors provide the nervous system with information about the external environment, allowing for appropriate responses.

### 3. Excretion:

- Small amounts of waste products, such as salts and urea, are eliminated through sweat produced by sweat glands. While not a primary excretory organ like the kidneys, the skin does contribute to the removal of certain waste substances.

### 4. Immune Defense:

- The skin serves as an initial line of defense against pathogens. Sebum produced by sebaceous glands contains antimicrobial substances, and the acidic pH of the skin creates an inhospitable environment for many microbes.


### 5. UV Protection:

- Melanocytes in the epidermis produce melanin, a pigment that provides protection against the harmful effects of ultraviolet (UV) radiation from the sun. This helps prevent DNA damage and reduces the risk of skin cancer.

### 6. Absorption:

- Certain substances can be absorbed through the skin, such as medications administered through transdermal patches. However, the skin is generally an effective barrier that limits the absorption of many substances.

  
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