

Integumentary, Skeletal and Muscular Systems

I. Introduction

- Integumentary system – skin
- Skeletal system – bones
- Muscular system – muscles attached to bones

II. Integumentary System

A. Functions

- Physical barrier
- Prevents dehydration
- Temperature regulation
- Vitamin D production

B. Human skin layers

- Epidermis
- Dermis
- Hypodermis

C. Comparative skin biology

III. Skeletal Systems

A. Function

- Support for body movement

B. Comparative skeleton structure (types of skeletons)

- Hydrostatic skeleton
- Exoskeleton
- Endoskeleton

C. Vertebrate skeleton (example of endoskeleton)

1. Bones and cartilage

Functions

- | | | |
|-----------------|----------------------|----------|
| Protection | Support | Movement |
| Mineral storage | Blood cell formation | |

Divisions

- | | |
|-------|--------------|
| Axial | Appendicular |
|-------|--------------|

Bone structure

- Compact bone vs. spongy bone

Osteon

Bone formation (in long bones)

Osteoporosis

2. Joints

- Fibrous joints
- Cartilaginous joints
- Synovial joints

IV. Muscular System

A. Function

Contract to provide movement

B. Muscle action

Antagonist vs. synergist

Flexor vs. extensor

Origin vs. insertion

C. Muscle structure

Muscle organization

Muscle

Fascicle

Muscle fiber

Myofibril

Sarcomere

Myofilaments

Myosin

Actin

Myofibril structure

Sarcomere – individual contractile unit

A band

I band

Sliding filament process

Exposure of myosin binding sites on actin

Attachment of myosin to actin

Power stroke

Detachment

Cocking of myosin head

Sarcoplasmic reticulum

Calcium release

Muscle control