

Introduction to Anatomy and Physiology of

Introduction to Anatomy and Physiology of Farm Animals

(Designed as quick-reference study notes)

1. Overview

- **Anatomy** = the physical structure of the animal (organs, tissues, systems).
- **Physiology** = how those structures function and interact to keep the animal alive and productive.
- Understanding both is essential for:
 - Accurate diagnosis of disease
 - Optimising nutrition, reproduction, and welfare
 - Implementing safe handling and humane husbandry practices

2. Basic Body Plan (Applicable to Cattle, Sheep, Goats, Swine, Poultry, etc.)

Region	Key Structures	Primary Functions
Head	Skull, brain, sensory organs (eyes, ears, nose), oral cavity, teeth, tongue	Sensory perception, food intake, communication
Neck	Cervical vertebrae, trachea, esophagus, major blood vessels, lymph nodes	Passage of air, food, blood flow to head
Thorax	Ribs, sternum, diaphragm, heart, lungs, thymus	Respiration, circulation, immune development
Abdomen	Stomach compartments (rumen, reticulum, omasum, abomasum in ruminants; simple stomach in swine/poultry), liver, spleen, pancreas, intestines, kidneys, urinary bladder	Digestion, metabolism, detoxification, excretion
Pelvis & Hindlimbs	Pelvic girdle, hindquarter muscles, reproductive organs, urinary tract	Locomotion, reproduction, elimination

Introduction to Anatomy and Physiology of Farm Animals

Region	Key Structures	Primary Functions
Skin & Appendages	Epidermis, dermis, hair/feather/coat, hooves/claws, mammary glands	Protection, thermoregulation, sensory input, milk production

3. Major Organ Systems & Their Functions

3.1. Musculoskeletal System

- **Bones** provide support, protect vital organs, store minerals (Ca, P).
- **Muscles** (skeletal) generate movement; smooth muscle in gut walls drives peristalsis.
- **Joints & Ligaments** allow flexibility and stability.

3.2. Digestive System

Species	Stomach Type	Key Features
Ruminants (cattle, sheep, goats)	4-compartment (rumen, reticulum, omasum, abomasum)	Fermentation of fibrous plant material; microbial synthesis of volatile fatty acids (VFAs)
Swine	Simple monogastric	Enzyme-driven digestion of mixed diet; high capacity for starch digestion
Poultry	Simple monogastric with crop & gizzard	Crop stores feed; gizzard mechanically grinds particles; rapid transit time

- **Liver:** central metabolic hub (glycogen storage, protein synthesis, detox).
- **Pancreas:** secretes digestive enzymes (amylase, proteases, lipases) and bicarbonate.

3.3. Respiratory System

- **Nasal passages ? Trachea ? Lungs** (bronchi ? alveoli).
- **Gas exchange:** O₂ diffuses into blood; CO₂ diffuses out.
- **Key adaptations:**
 - Cattle have a large lung surface area for efficient O₂ uptake during grazing activity.
 - Birds possess air sacs for unidirectional flow, supporting high metabolic demand.

Introduction to Anatomy and Physiology of

3.4. Cardiovascular System

Farm Animals