

WHAT IS ANATOMY?

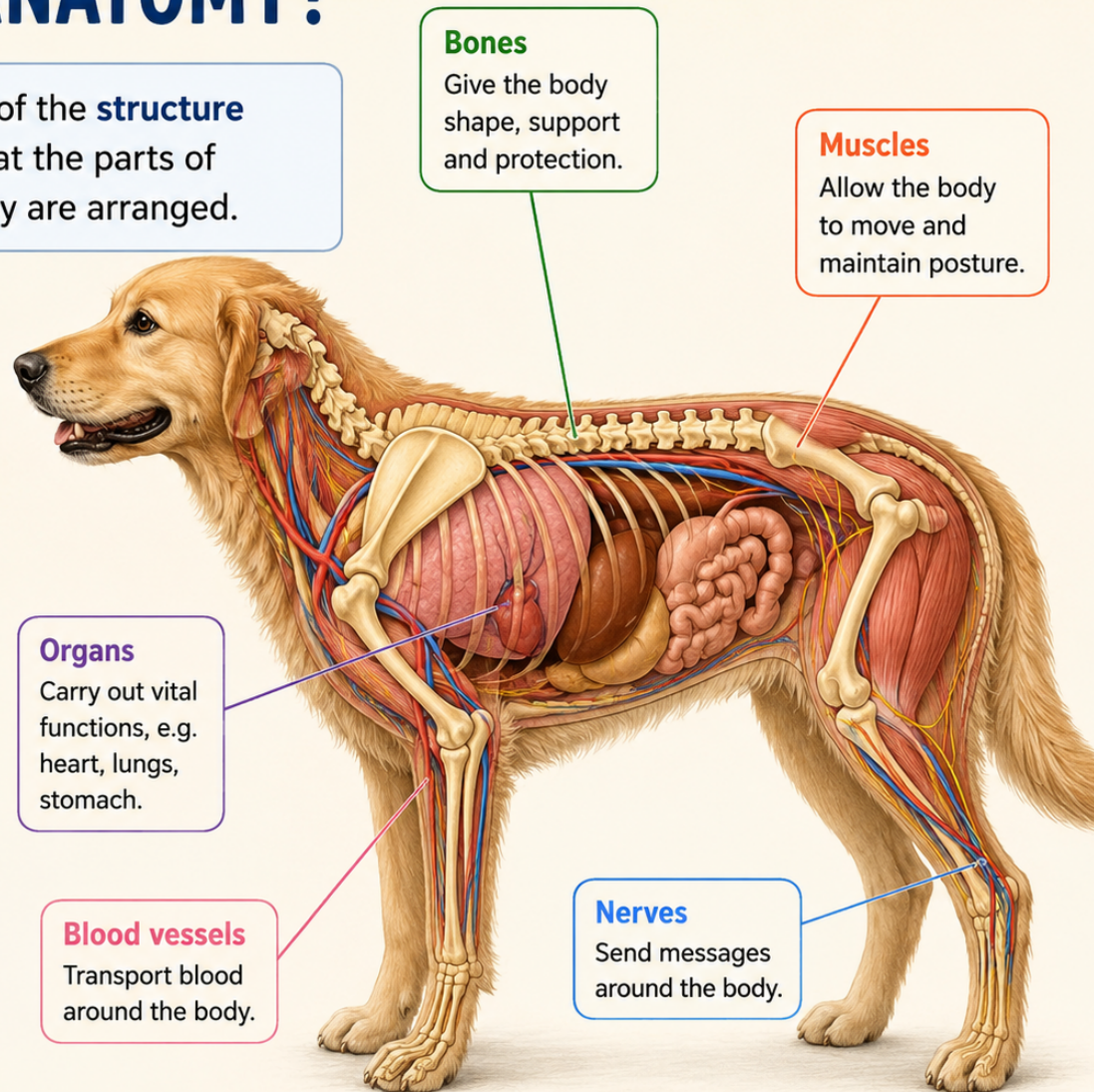
Anatomy is the study of the **structure** of an animal. It looks at the parts of the body and how they are arranged.

Examples of structures (anatomical features):

- Bones
- Muscles
- Organs
- Blood vessels
- Nerves
- Tissues

EXAMPLE

A skeleton is part of anatomy because it shows how the body is built.



WHAT IS PHYSIOLOGY?

Physiology is the study of how the **body works** and how the different systems carry out their functions to keep the animal alive, healthy and in balance.



RESPIRATORY SYSTEM (breathing)

- Takes oxygen in from the air.
- Removes carbon dioxide (a waste product).
- Gas exchange occurs in the alveoli of the lungs.



CIRCULATORY SYSTEM (blood transport)

- The heart pumps blood around the body.
- Delivers oxygen and nutrients to cells.
- Removes waste products.
- Helps control body temperature.



DIGESTIVE SYSTEM (food processing)

- Breaks food down into nutrients.
- Nutrients are absorbed into the bloodstream.
- Waste is removed from the body.



URINARY SYSTEM (waste removal)

- Kidneys filter waste from the blood.
- Controls water and electrolyte balance.
- Produces urine and removes it from the body.



MUSCULAR SYSTEM (movement)

- Muscles work with the skeleton to produce movement.
- Helps maintain posture.
- Generates heat to keep the body warm.



IMMUNE SYSTEM (defence)

- Protects the body from disease-causing organisms.
- White blood cells and antibodies fight infection.
- Works with other systems to keep the body healthy.



HOMEOSTASIS EXAMPLES

- Regulating body temperature
- Controlling blood glucose levels
- Maintaining water balance
- Keeping blood pH stable

HOW THE BODY WORKS

The body's systems work together in a continuous process.

Each system has a specific job.

They rely on each other to maintain life.

This is called **HOMEOSTASIS** – keeping the internal environment stable.



NERVOUS SYSTEM (control and communication)

- Detects changes inside and outside the body.
- Sends messages through nerves.
- Coordinates body functions and behaviour.



ENDOCRINE SYSTEM (hormones)

- Glands release hormones into the bloodstream.
- Hormones control and regulate many body functions (e.g. growth, reproduction, stress).

All these systems work together every second of every day to keep the animal alive and functioning.



THE SKELETAL SYSTEM

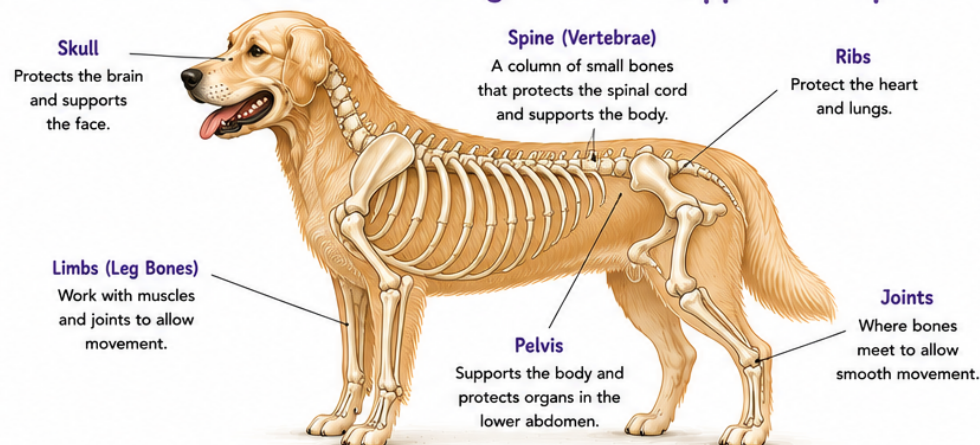


How animals have a strong frame to support and protect

WHAT IS IT?

The skeletal system is the **framework** of bones in the body.

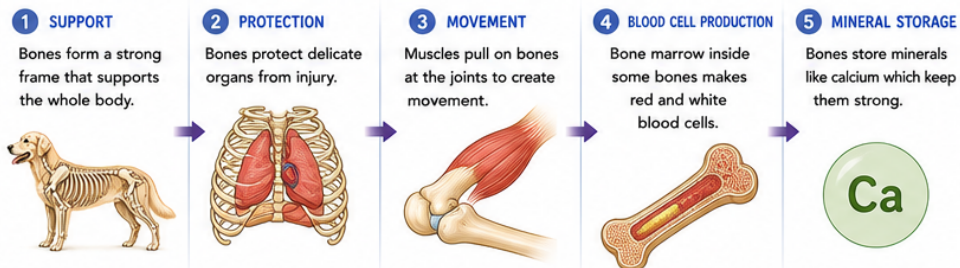
It **supports** the body, **protects** important organs, allows **movement** and makes **blood cells**.



KEY FUNCTIONS

- ✓ Supports the body and gives it shape.
- ✓ Protects vital organs (e.g. brain, heart, lungs).
- ✓ Works with muscles to allow movement.
- ✓ Stores important minerals like calcium and phosphorus.
- ✓ Produces blood cells in the bone marrow.
- ✓ Stores fat in some bones for energy.

HOW THE SKELETAL SYSTEM WORKS



TYPES OF BONES

LONG BONES		Longer than they are wide. Mainly in the legs and arms.	Examples: Femur, humerus
SHORT BONES		Roughly equal in length, width and height.	Examples: Carpal bones (wrist)
FLAT BONES		Thin, flat and often curved. Protect organs.	Examples: Ribs, skull, shoulder blade
IRREGULAR BONES		Odd shapes that don't fit into other categories.	Examples: Vertebrae

KEY POINTS

- 🐾 The skeleton of a dog has over 300 bones!
- 🐾 Puppies have more bones, some fuse together as they grow.
- 🐾 Strong bones + healthy muscles = movement and support.
- 🐾 A balanced diet with calcium, exercise and rest keeps bones strong.



DID YOU KNOW?

- 🐾 The femur (thigh bone) is the longest bone in a dog's body.
- 🐾 Bones are living tissue – they grow, repair and change!
- 🐾 Some animals, like birds, have hollow bones to help them fly.
- 🐾 A healthy skeleton helps animals run, jump, play and explore!



💖 A strong skeleton helps animals stay active, protected and ready for life's adventures! 💖



THE MUSCULAR SYSTEM

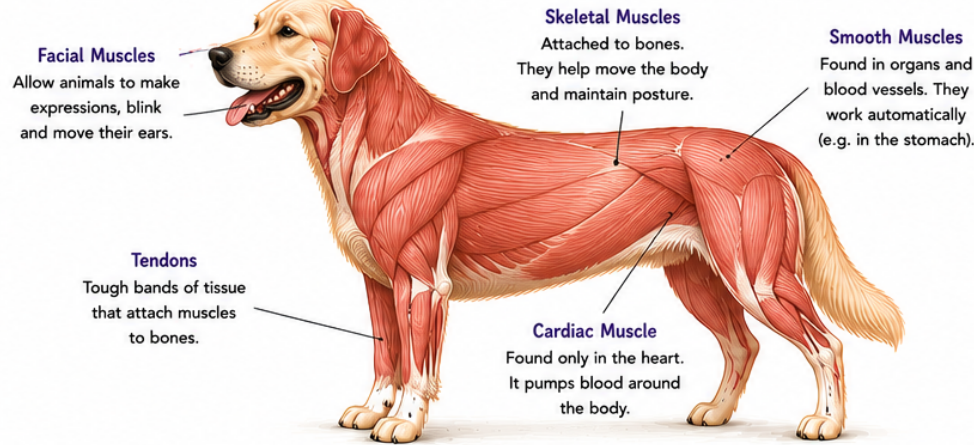


How animals use their muscles to move and stay strong

WHAT IS IT?

The muscular system is the group of **muscles** in the body.

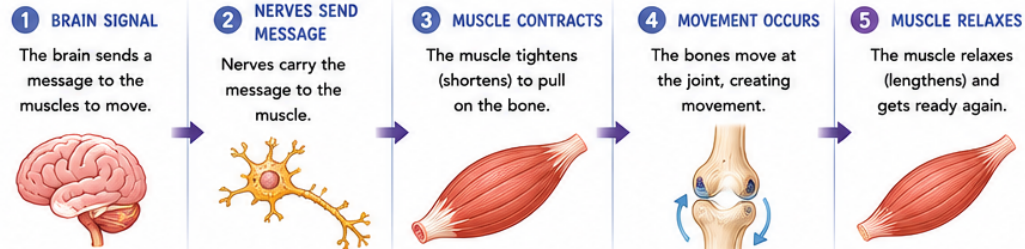
It works with the bones and other systems to help animals **move**, maintain **posture** and carry out everyday **activities**.



KEY FUNCTIONS

- ✓ Allows movement and locomotion.
- ✓ Helps maintain posture and balance.
- ✓ Supports and stabilises joints.
- ✓ Protects internal organs.
- ✓ Generates body heat to keep the body warm.
- ✓ Helps with breathing, swallowing and circulation.

HOW THE MUSCULAR SYSTEM WORKS



TYPES OF MUSCLES

SKELETAL MUSCLES		Attached to bones by tendons. Voluntary (you control them). Examples: leg muscles, jaw muscles.
SMOOTH MUSCLES		Found in the walls of organs and blood vessels. Involuntary (you do not control them). Examples: stomach, intestines.
CARDIAC MUSCLE		Found only in the heart. Involuntary. Contracts to pump blood around the body.

KEY POINTS

- 🐾 Muscles work in pairs – when one contracts, the other relaxes.
- 🐾 Regular exercise keeps muscles strong and healthy.
- 🐾 Animals need good nutrition, water and rest for their muscles to work properly.
- 🐾 Injury, illness or lack of exercise can make muscles weak.



DID YOU KNOW?

- 🐾 A dog has more than 600 muscles in its body!
- 🐾 Muscles make up around 40–50% of a dog's body weight.
- 🐾 Some muscles are very powerful – a dog's jaw muscles are stronger than ours in proportion to body size.
- 🐾 A healthy muscular system helps animals live active, comfortable and happy lives.



Strong muscles help animals move, play, work and enjoy life to the full!





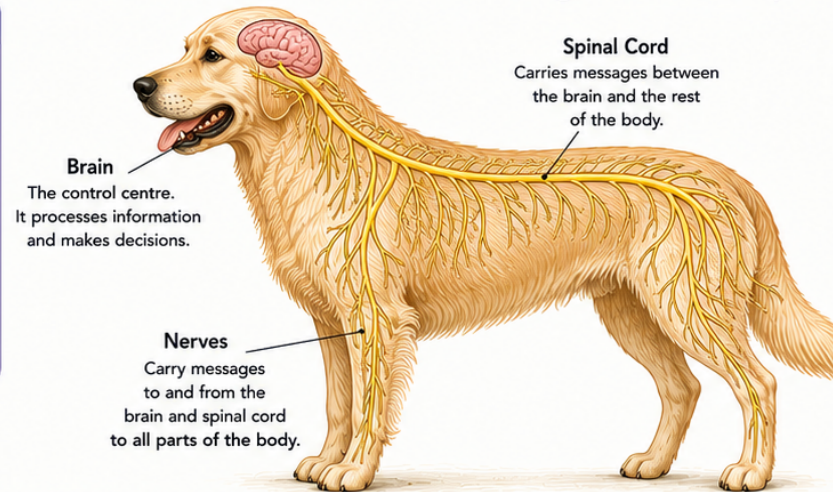
THE NERVOUS SYSTEM



How animals detect changes and respond

WHAT IS IT?

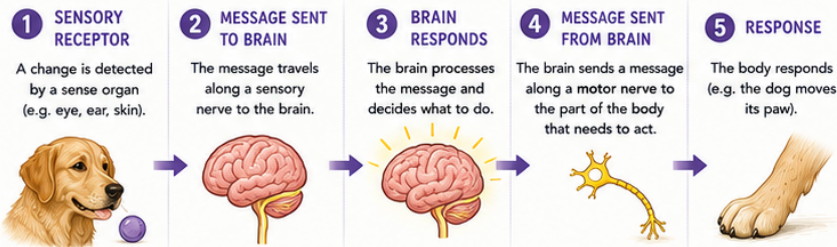
The nervous system is the body's control and communication network. It **detects changes** inside and outside the body and **sends messages** to produce a **response**.



KEY FUNCTIONS

- ✓ Detects changes using the senses.
- ✓ Sends messages around the body.
- ✓ Controls movement and coordination.
- ✓ Allows thinking, learning and memory.
- ✓ Helps maintain balance and posture.
- ✓ Regulates automatic functions (e.g. heartbeat, breathing rate).

HOW NERVE MESSAGES WORK



KEY POINTS



- ✎ The nervous system allows animals to react and adapt to their environment.
- ✎ It works with the endocrine system (hormones) to control body functions.
- ✎ Keeping the nervous system healthy is important for behaviour, coordination and wellbeing.
- ✎ Examples of damage: injury to the brain or spinal cord can affect movement, senses and behaviour.

NERVOUS SYSTEMS IN DIFFERENT ANIMALS

MAMMALS (e.g. Dog)



Well-developed brain and senses. Respond quickly to changes.

BIRDS (e.g. Pigeon)



Good vision and balance. React to sounds and movement.

REPTILES (e.g. Lizard)



Nervous system controls movement and helps them detect danger.

FISH (e.g. Goldfish)



Detect vibrations, light and chemicals in the water. Respond to stimuli.



DID YOU KNOW?

- ✎ A dog's sense of smell is up to 100,000 times stronger than ours!
- ✎ Some animals, like octopuses, have nervous systems in their arms!
- ✎ Fish have a lateral line – a special sense that detects movement and vibrations in water.



♥ A healthy nervous system helps animals think, feel and respond – keeping them safe and happy. ♥



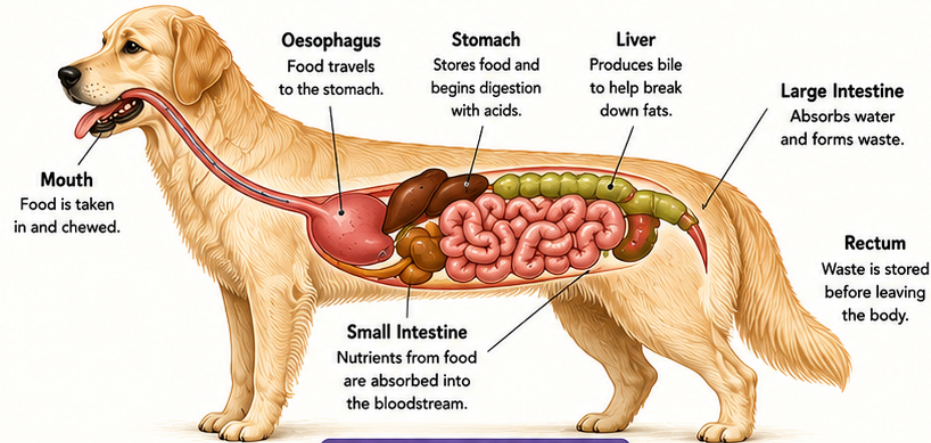
THE DIGESTIVE SYSTEM

How animals break down food and absorb nutrients



WHAT IS IT?

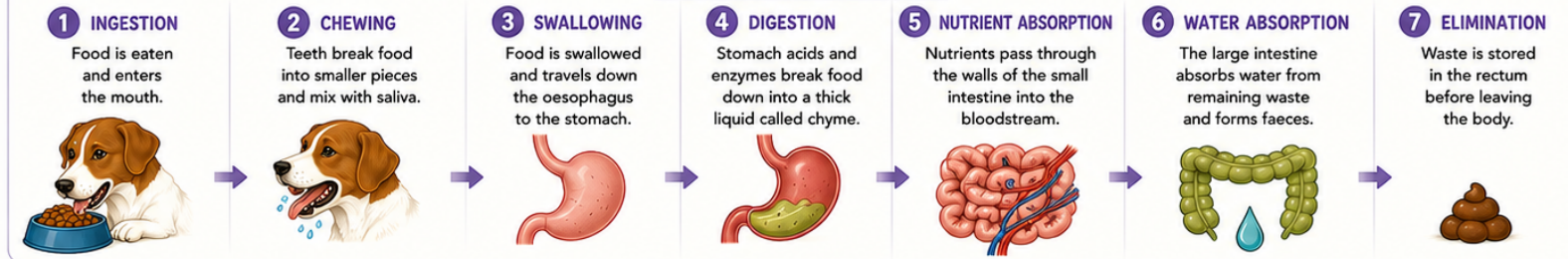
The digestive system is the group of organs that work together to **break down food**, **absorb nutrients** and water, and **remove waste** from the body.



KEY FUNCTIONS

- ✓ Breaks food down into smaller parts.
- ✓ Absorbs nutrients, vitamins, minerals and water.
- ✓ Provides energy for growth, activity and body functions.
- ✓ Removes waste the body does not need.

THE JOURNEY OF FOOD



DIGESTIVE SYSTEMS IN DIFFERENT ANIMALS

HERBIVORES (e.g. Horse, Cow)	CARNIVORES (e.g. Cat, Dog)	OMNIVORES (e.g. Pig, Human)	BIRDS (e.g. Chicken)
Have longer digestive tracts to break down tough plant fibre.	Have shorter digestive tracts as meat is easier to digest.	Have a balanced system that can handle both plant and animal foods.	Use a crop to store food and a gizzard to grind it down.

KEY POINTS

- 🐾 Food provides energy and nutrients.
- 🐾 Different animals have digestive systems suited to their diet.
- 🐾 A healthy diet, clean water and good care keep the digestive system working properly.
- 🐾 Signs of digestive problems include poor appetite, vomiting, diarrhoea or weight loss.



A healthy digestive system = a healthy, happy animal! ❤️



THE IMMUNE SYSTEM

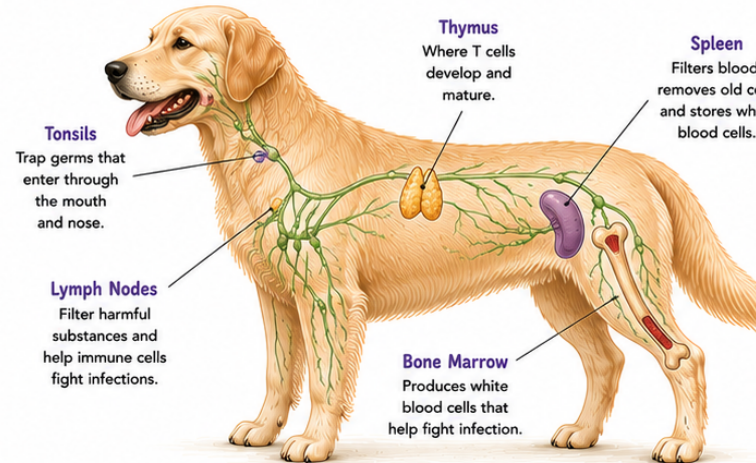
How animals stay healthy and fight disease



WHAT IS IT?

The immune system is the body's **natural** defence against **germs**, **viruses**, **toxins** and other harmful invaders.

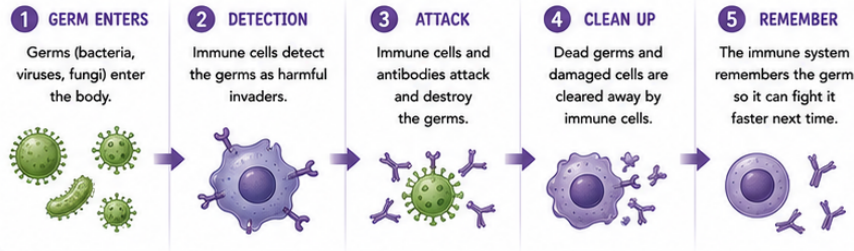
It **protects** the body from disease and helps it stay healthy.



KEY FUNCTIONS

- ✓ Detects and destroys harmful invaders.
- ✓ Produces antibodies to fight infection.
- ✓ Remembers germs so the body can fight them faster next time.
- ✓ Heals wounds and repairs damaged tissue.
- ✓ Keeps the body healthy and strong.

HOW THE IMMUNE SYSTEM WORKS



IMMUNE CELLS & THEIR ROLES

	White Blood Cells	The main defenders. They find and destroy germs and infected cells.
	Lymphocytes (B cells)	Make antibodies that attach to and destroy germs.
	Lymphocytes (T cells)	Attack infected cells and help control the immune response.
	Macrophages	Swallow and digest germs and clean up dead cells and debris.

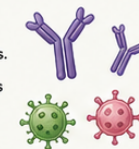
KEY POINTS

- 🐾 The immune system works 24/7 to protect the body.
- 🐾 Vaccinations help the immune system learn to fight diseases safely.
- 🐾 Good nutrition, clean water, exercise and rest keep the immune system strong.
- 🐾 Stress, poor diet and illness can weaken the immune system.



DID YOU KNOW?

- 💡 A dog's nose produces special proteins that help trap germs.
- 🐾 Cats spend up to 50% of their day grooming to keep germs off their fur.
- 🐾 A healthy immune system = a healthy, happy animal!



♥ A strong immune system helps animals fight disease, heal and live a long, healthy life. ♥



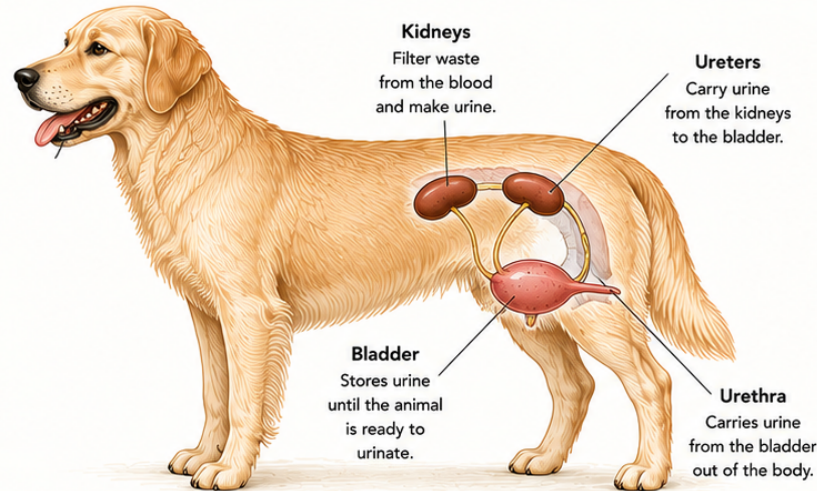
THE URINARY SYSTEM



How animals remove waste and keep the body balanced

WHAT IS IT?

The urinary system is the group of organs that **filter waste** from the blood, **remove excess water** and maintain the body's **balance of fluids and minerals**.



KEY FUNCTIONS

- ✓ Filters waste products from the blood.
- ✓ Removes excess water and toxins from the body.
- ✓ Helps maintain the balance of fluids and minerals.
- ✓ Helps control blood pressure.
- ✓ Supports overall health and wellbeing.

THE JOURNEY OF URINE

1 FILTERING

Kidneys filter waste, excess water and toxins from the blood.



2 TRANSPORT

Ureters carry the urine from the kidneys to the bladder.



3 STORING

The bladder stores urine until the animal is ready to urinate.



4 ELIMINATION

The urethra carries urine from the bladder out of the body.



KEY POINTS



- 🐾 A healthy urinary system keeps the body clean and balanced.
- 🐾 Drinking fresh water is important for kidney function.
- 🐾 Signs of problems can include increased thirst, changes in urination or discomfort.
- 🐾 Always seek veterinary care if you notice any changes.



URINARY SYSTEMS IN DIFFERENT ANIMALS

MAMMALS (e.g. Dog, Cat)



Have two kidneys and a bladder. Urine is stored in the bladder before being eliminated.

BIRDS (e.g. Chicken)



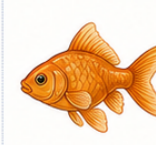
Have kidneys but no bladder. Urine passes directly from the kidneys into the cloaca.

REPTILES (e.g. Lizard)



Have kidneys and a bladder. The bladder helps store urine.

FISH (e.g. Goldfish)



Have kidneys that filter waste. Urine is passed out into the surrounding water.



A healthy urinary system = a healthy, happy animal!





THE CIRCULATORY SYSTEM

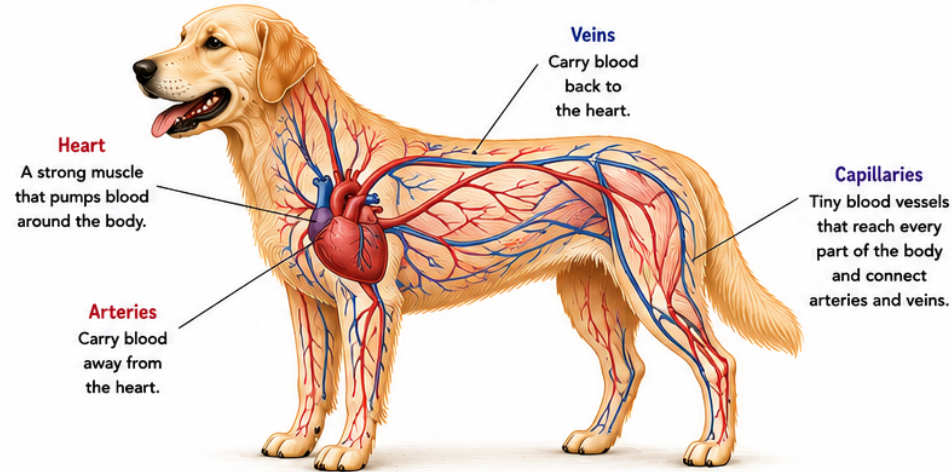


How animals transport blood, oxygen and nutrients around the body

WHAT IS IT?

The circulatory system is a network of the heart, **blood** and **blood vessels** that works together to transport important substances around the body.

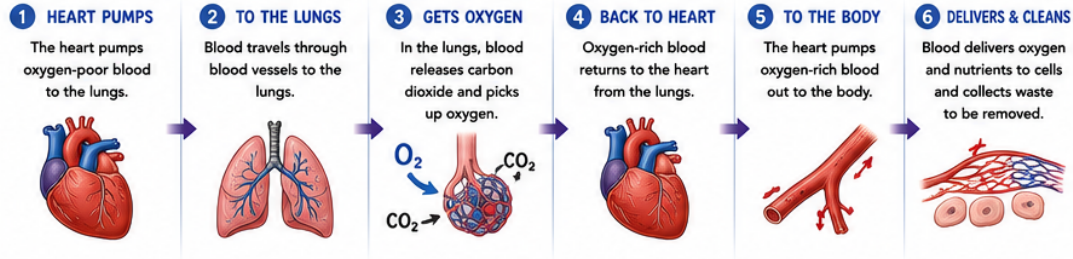
It delivers **oxygen** and **nutrients** to cells and removes **waste products**.



KEY FUNCTIONS

- ✓ Transports **oxygen** from the lungs to all parts of the body.
- ✓ Delivers **nutrients** from food to cells for energy and growth.
- ✓ Removes **waste products** (like carbon dioxide) from cells and carries them to the lungs or kidneys.
- ✓ Helps fight infection by carrying white blood cells.
- ✓ Helps regulate body temperature and pH levels.
- ✓ Helps maintain balance and homeostasis.

HOW THE CIRCULATORY SYSTEM WORKS



MAIN COMPONENTS

	HEART	A muscular organ that pumps blood throughout the body.
	BLOOD	A liquid tissue made of red blood cells, white blood cells, platelets and plasma.
	ARTERIES	Strong blood vessels that carry blood away from the heart.
	VEINS	Blood vessels that carry blood back to the heart.
	CAPILLARIES	Tiny vessels that connect arteries and veins and reach every cell in the body.

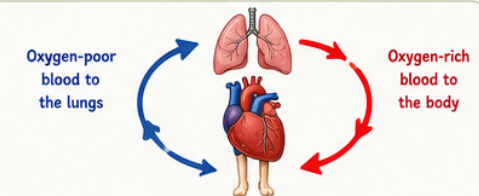
KEY POINTS

- 🐾 A healthy heart keeps blood flowing around the body.
- 🐾 Red blood cells carry oxygen to cells.
- 🐾 White blood cells help protect the body from disease.
- 🐾 Exercise strengthens the heart and improves circulation.
- 🐾 Good nutrition, fresh water and rest keep the circulatory system working well.



DID YOU KNOW?

- 🐾 A dog's heart beats about 70–120 times per minute (faster when they are active).
- 🐾 Blood travels about 12,000 km (7,500 miles) through the body every day!
- 🐾 Puppies have more red blood cells than adult dogs.
- 🐾 Keeping your dog active helps their heart stay strong!



♥ A healthy circulatory system helps animals have energy, stay active and live a long, happy life! ♥



THE ENDOCRINE SYSTEM

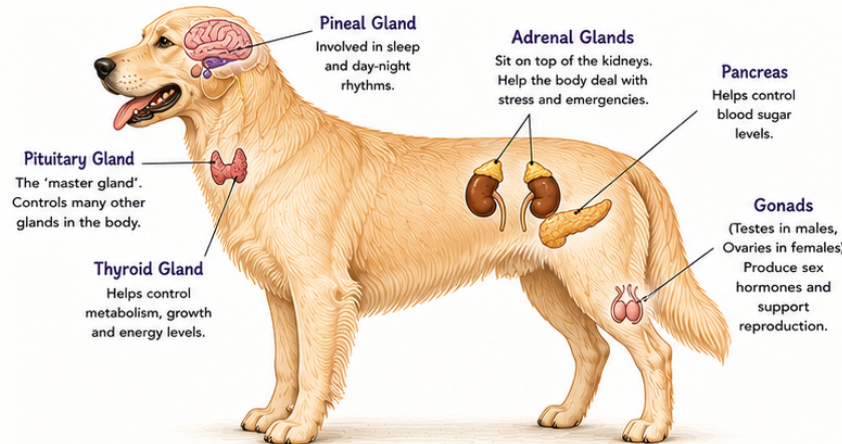


How animals use hormones to control and coordinate body functions

WHAT IS IT?

The endocrine system is a group of glands that produce **hormones**.

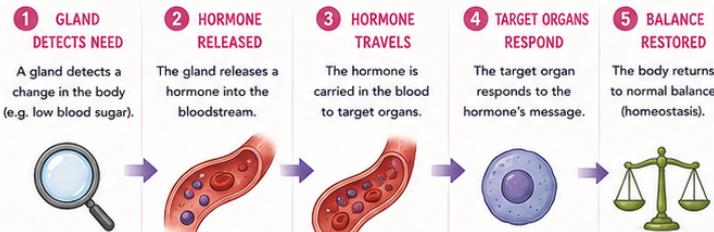
Hormones are chemical messengers that travel in the blood to **control** and **coordinate** many body functions.



KEY FUNCTIONS

- ✓ Produces hormones that act as chemical messengers.
- ✓ Controls growth, metabolism and energy use.
- ✓ Regulates reproduction and development.
- ✓ Maintains balance (homeostasis) in the body.
- ✓ Helps the body respond to stress and change.

HOW THE ENDOCRINE SYSTEM WORKS



MAJOR ENDOCRINE GLANDS & THEIR ROLES

PITUITARY GLAND		The 'master gland'. Controls growth, reproduction, water balance and other glands.
THYROID GLAND		Controls metabolism, energy levels, growth and body temperature.
ADRENAL GLANDS		Help the body manage stress, control blood pressure, and maintain salt and water balance.
PANCREAS		Produces insulin and glucagon to control blood sugar levels.
GONADS (TESTES/OVARIES)		Produce sex hormones (testosterone, oestrogen and progesterone) and support reproduction.

KEY POINTS

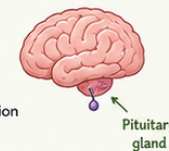
- 🐾 Hormones are powerful chemicals – small amounts can have big effects.
- 🐾 The endocrine system works slowly but has long-lasting effects.
- 🐾 It works closely with the nervous system to keep the body balanced.
- 🐾 Problems with glands or hormones can cause illness or behaviour changes.



DID YOU KNOW?



- 🐾 A tiny gland called the pituitary is only the size of a pea, but it controls many other glands!
- 🐾 Hormones can affect mood, growth, appetite, sleep, reproduction and much more.



A healthy endocrine system helps animals grow, feel good and stay in balance every day!





HOMEOSTASIS

Keeping the body balanced and stable



WHAT IS IT?

Homeostasis is the body's ability to maintain a **stable internal environment**, even when conditions outside the body change.

It keeps everything **balanced** so the body can work properly.



Temperature
Keeping body temperature stable.



Water Balance
Maintaining the right amount of water in the body.



Blood Sugar
Keeping blood sugar levels within a normal range.



Homeostasis helps animals stay healthy and survive.



Oxygen Levels
Keeping the right amount of oxygen in the blood.



pH Balance
Keeping body fluids at the correct acidity (pH) level.



Waste Removal
Removing waste products to prevent them building up.

HOW IT WORKS

The body uses a control system called **negative feedback**.



1. Detects a Change
Sensors detect when something goes above or below the normal level.



2. Sends a Message
The control centre (usually the brain) sends a message to the body.



3. Brings It Back to Normal
The body responds to restore the balance.



4. Balance Restored
The internal environment returns to normal.

EXAMPLES OF HOMEOSTASIS IN ANIMALS

Regulating Body Temperature

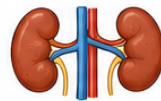


When it's hot, dogs pant and sweat through their paw pads to cool down.
When it's cold, they shiver and their fur traps heat to warm up.



Water Balance

The kidneys adjust how much water is lost in urine to prevent dehydration or excess water.



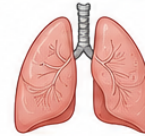
Blood Sugar Levels

The pancreas releases insulin when blood sugar is high and glucagon when it's low.



Oxygen Levels

If oxygen in the blood is low, the body increases breathing rate to take in more oxygen.



pH Balance

The body uses buffers in the blood and organs like the lungs and kidneys to keep pH levels stable.



Waste Removal

The kidneys remove waste from the blood and the body eliminates it in urine, faeces and sweat.



KEY POINTS

- Homeostasis keeps the body's internal conditions within safe limits.
- It allows animals to adapt to changes in their environment.
- Many body systems work together to maintain balance.
- Without homeostasis, cells and organs would not function properly.



DID YOU KNOW?

- A dog's normal body temperature is 38–39°C (100.5–102.5°F).
- Even when it's very hot or cold outside, the body works hard to keep the temperature stable inside.
- Homeostasis happens automatically, 24 hours a day, every day!



Homeostasis helps me stay healthy, active and ready for anything!

