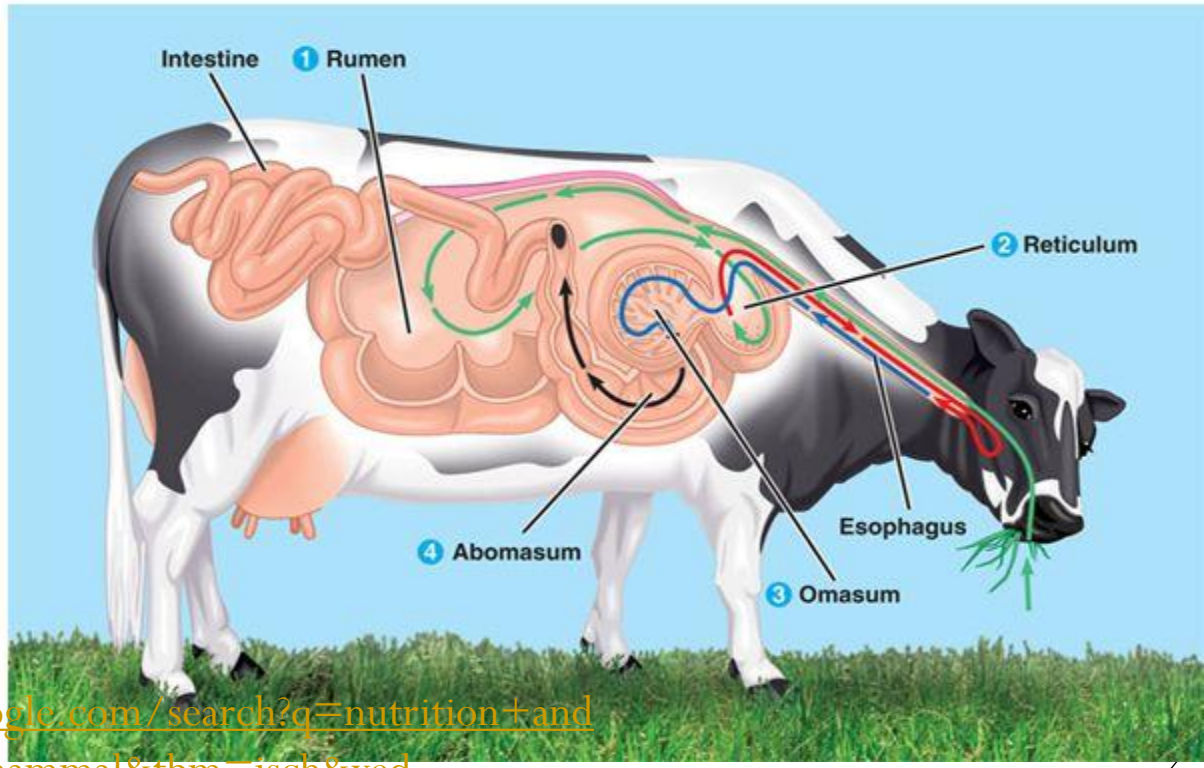
Mammals: Biological functions

NUTRITION AND DIGESTION

- ADAPTATIONS OF VERTEBRATE DIGESTIVE SYSTEMS REFLECT DIET
  - HERBIVOROUS ANIMALS HAVE LONGER DIGESTIVE TRACTS
  - RUMINANT MAMMALS → HAVE A MORE ELABORATE SYSTEM FOR CELLULAR DIGESTION



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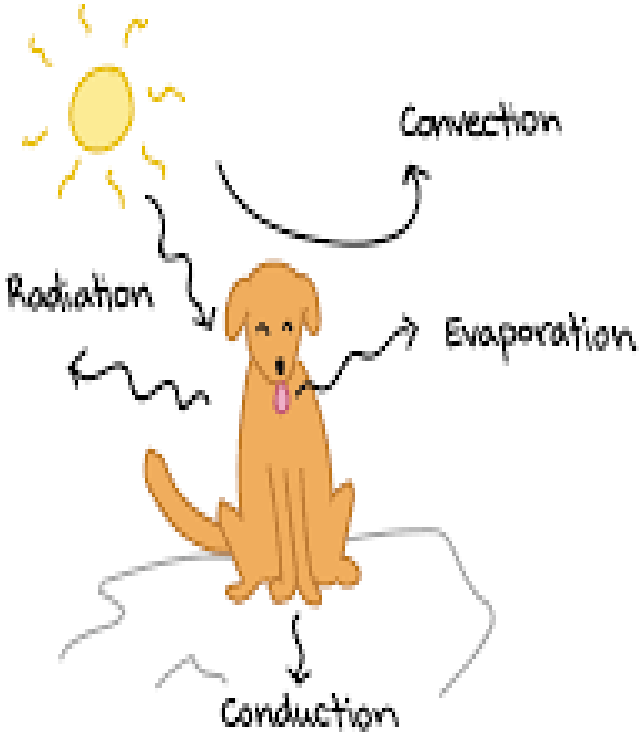
- Dental formula
- Herbivores, carnivores, omnivores, insectivores
- **Circulation and gas exchange:**
- Heart is completely divided
- Role of diaphragm
- placenta

Endothermy

- **An endotherm is an animal *whose body temperature is controlled from within***
  - **Birds and mammals are endotherms, which means they can generate and retain heat inside their bodies**
- ***Endotherms have relatively high metabolic rates that generate a significant amount of heat, even when they are resting***
  - Birds conserve body heat primarily through **insulating feathers**, such as down
  - Mammals have **body fat and hair** for insulation
- **Mammals can get rid of excess heat by panting, as dogs do, or by sweating, as humans do**

In low temperatures, the main source of heat in the body of endotherms is that generated as a result of the **metabolic activity** of their cells, particularly the muscle and liver cells. The **size of the animals** body also plays a significant role in temperature regulation– a small body loses heat much more quickly and so small mammals often have a high metabolic rate.
Some endotherms have special heat-producing tissue **called brown fat**, which can be quickly metabolised in cold conditions. E.g. Bat

Role of **winter sleep and hibernation**



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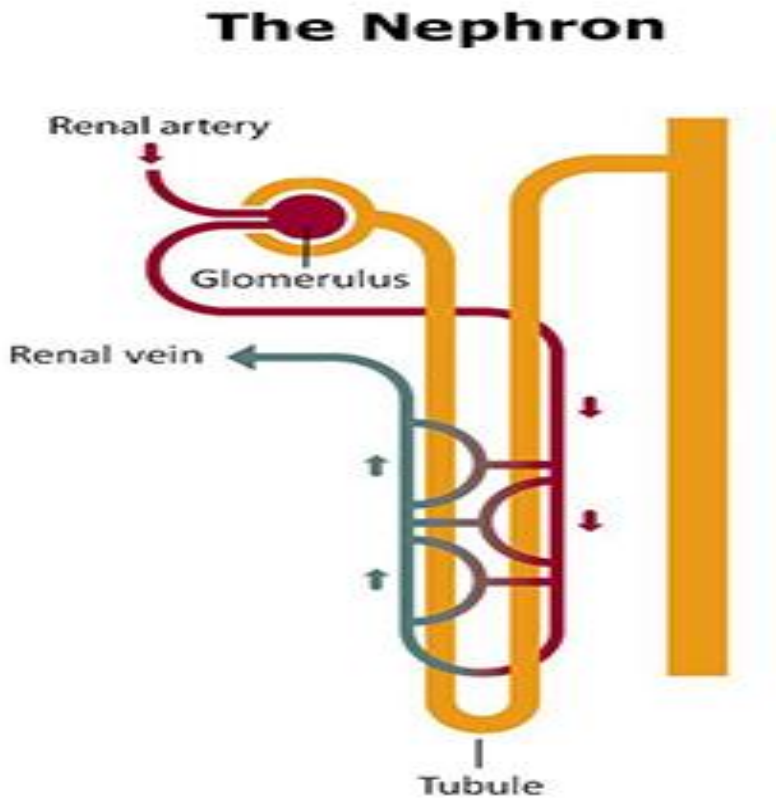
Excretion and osmoregulation

- Metanephric kidneys
- Kangaroo rat



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Visual communication

- Large amount of information can be conveyed in short time
- Primates have both the abilities (color vision and bright patterns)
- Visual signal is present at all the times

- **Acoustic communication:**
- Herd animals stay together as far as familiar sounds remain interrupted
- human **speech**

Tactile communication

- The **receptors in vertebrates** skin help for tactile communication

TACTILE COMMUNICATION

- Information transmitted in the form of **physical contact** (touch signal) is called tactile communication.
- Antennae of ants, termites and honeybees are involved in this process
- Eg. 1) **Female primates** often hold and frequently cuddle their young. Helps in establishing a bond

  2) **Termites** – blind workers totally depend on his phenomenon.

Two worker *ants* in tactile communication

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- **Territoriality:**
- Use of scent glands by cat
- Sea lions
- Embryonic diapause
- **Mode of development:**
- Oviparous: monotremes
- Marsupials mammals (uterine milk)
- Eutherian or placental mammals

Reproductive Cycles

- Most mammals have mating seasons timed to coincide with most favorable time to rear young.
- Female mammals usually restrict mating to a fertile period during the periodic estrous cycle.
- This time of female receptivity is known as heat or estrous.
- Some animals lengthen gestation period by delayed implantation; the blastocyst remains dormant while its implantation in the uterine wall is postponed to align birth with a favorable season.
- Animals with only one breeding season a year are monestrous; recurrent breeding is polyestrous.

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