

Communication and homeostasis

Control of body temperature

Animals are classed as either ectotherms or endotherms, depending on how they control their body temperature.

Ectotherms

Ectotherms can't control their body temperature internally – they control their temperature by changing their behaviour.

Example – a lizard is an ectotherm. When its internal temperature drops it will move to a warmer area such as the sunshine. When its internal temperature gets too low it will move to somewhere cooler such as a burrow beneath the sand.

This means the internal temperature of an ectotherm depends on the external temperature. Ectotherms have a variable metabolic rate as they can't keep their internal environment constant. This means the activity of an ectotherm relies on the external temperature. They're more active at higher temperatures.

Endotherms

Endotherms control their body temperature internally by homeostasis, as well as altering behaviour.

Example – an elephant is an endotherm. Its temperature is mainly controlled by homeostasis, however it can also change its behaviour (flap its ears) to alter temperature internally.

The internal temperature of endotherms is less affected by external temperature as opposed to ectotherms. Endotherms have a high constant metabolic rate. They generate a lot of heat from metabolic reactions. Their activity levels are independent from external temperature.

Mechanisms to reduce body temperature

- **Sweating** - more sweat is secreted from sweat glands when the body is too hot. The water in sweat evaporates from the surface of the skin and takes heat from the body. The skin is cooled
- **Hairs lie flat** – mammals have a layer of hair that provides insulation by trapping air. When it's hot, the erector pili muscles relax and the hairs lie flat. Less air is trapped, so the skin is less insulated and heat can escape the body
- **Vasodilation** – when it's hot, arterioles near the surface of the skin dilate. More blood flows through the capillaries in the surface layers, so heat is lost through the skin by radiation.