Homeostasis

Homeostasis; the maintenance of a constant internal environment despite fluctuations in both the body's activities and the external environment

It is important as various body systems work cooperatively to ensure that the composition of blood and tissue fluid remains within tolerable limits. Such homeostatic controls ensure that factors such as blood, pH, temperature and water potential are kept within normal limits. Enzymes control cellular biochemical reactions; their activity is affected by fluctuating pH and temperature.

Negative feedback occurs when feedback causes the corrective measures to be turned off returning a system to its normal level. It involves *deviation* of a factor from normal value or set point, *receptors* that detect any deviations from the norm, and *effectors* that are activated by receptors and correct the deviation by mechanisms that restore the norm.

Positive feedback is the opposite of negative feedback, reinforcing the original stimulus. E.g. in child birth oxytocin hormone is released and the increased contractions causes more release so there's more contractions until the baby is born. E.g. if a small area of heart tissue triggers a heart attack, the heart pumps inadequate blood so the heart is blood deprived, so more cells die.

Dynamic equilibrium; a system in a steady state since the forward and backward reactions occur at the same rate

Homeostasis examples:

- Control of blood osmotic potential
- Control of blood glucose level
- Control of blood pH
- Control of body core temperature
- Control of ion concentrations in the blood

Ecological advantages; allows animals to adapt to a changing environment, especially temperature changes, keeping body temperature at optimum for body cells and enzymes to function

<u>The kidney</u>

We have 2 kidneys, which have 3 areas; the cortex, medulla, and the region where the ureter joins the pelvis.