

Coordination and response

Nervous control

Nervous system

CNS: brain, spinal cord PNS: nerves outside
Coordination and regulation

Neurones carry impulses

Sensory Relay Motor

Reflex arc

Receptor Sensory, relay, motor neurones
Effector: muscle or gland

Reflex action

Automatic Rapid Protects body

Synapse: junction between neurones **Supplement**

Vesicles Synaptic gap Receptor proteins
One direction only

Homeostasis

Constant internal environment

Body temperature Blood glucose

Negative feedback **Supplement**

Set point Change detected Change reversed

Insulin lowers blood glucose

Made by pancreas

Glucagon and the liver **Supplement**

Glucagon from pancreas Glucose to glycogen
Glycogen to glucose

Type 1 diabetes **Supplement**

Insulin injections Monitor glucose Diet

Skin structures **Supplement**

Hairs and erector muscles Sweat glands
Receptors and neurones Fatty tissue

Temperature control **Supplement**

Sweating Shivering Vasodilation Vasoconstriction

Sense organs

Sense organs: receptor cells

Light Sound Touch Temperature, chemicals

Parts of the eye

Cornea refracts Iris controls light Lens focuses
Retina, optic nerve

Pupil reflex

Bright: smaller pupil Dim: larger pupil

Iris muscles antagonistic **Supplement**

Circular narrows pupil Radial widens pupil

Accommodation **Supplement**

Near: thick lens Distant: thin lens
Ciliary muscles and ligaments

Rods, cones and fovea **Supplement**

Rods: night vision Cones: colour Fovea: sharpest vision

Tropic responses

Gravitropism

Shoots: away Roots: towards

Phototropism

Shoots: towards light Roots: away from light

Investigating tropisms

One variable Control set Dark for gravity

Auxin **Supplement**

Made in shoot tip Diffuses Unequal distribution
Cell elongation

Chemical control of growth **Supplement**

Light Gravity

Hormones

Hormone definition

Chemical substance Made by a gland Carried in blood
Target organs

Endocrine glands

Adrenal: adrenaline Pancreas: insulin
Testes: testosterone Ovaries: oestrogen

Nervous vs hormonal

Speed Duration of effect

Adrenaline: fight or flight

Breathing rate up Heart rate up Pupils wider

Adrenaline and metabolism **Supplement**

Blood glucose up Heart rate up