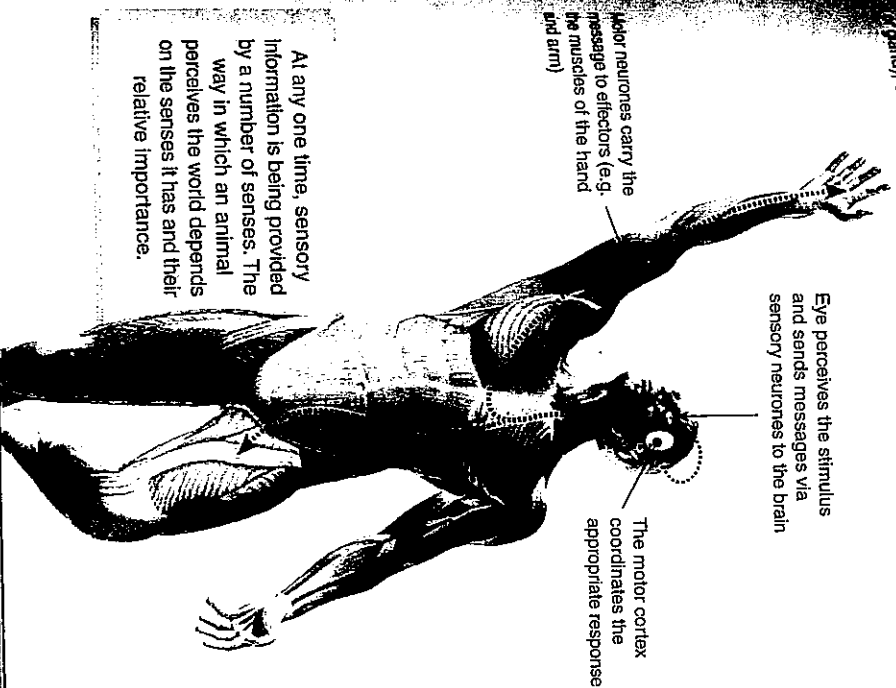


Nerves and Senses

Nervous system is the body's control and communication system. It has three broad functions: detecting stimuli, interpreting them, and bringing about appropriate responses. The vertebrate nervous system consists of the **central nervous system** (brain and spinal cord), and the nerves and receptors outside (the **peripheral nervous system**). Sensory input to receptors

The body's activities are coordinated through the **central nervous system** (CNS). Information received by the brain or spinal cord is interpreted and a response is coordinated. **Peripheral nerves** all enter or leave the CNS. They can be **sensory** (from sensory receptors), **motor** (turning to a muscle gland), or **mixed** (containing sensory and motor nerve cells).



At any one time, sensory information is being provided by a number of senses. The way in which an animal perceives the world depends on the senses it has and their relative importance.

Comparison of nervous and hormonal control			
	Nervous control	Hormonal control	
Communication	Impulses across synapses	Hormones in the blood	
Speed	Very rapid (within a few milliseconds)	Relatively slow (over minutes, hours, or longer)	
Duration	Short term and reversible	Longer lasting effects	
Target pathway	Specific (through nerves) to specific cells	Hormones broadcast to target cells everywhere	
Action	Causes glands to secrete or muscles to contract	Causes changes in metabolic activity	

comes via both internal and external stimuli. Information about the effect of a response is provided by **feedback mechanisms** so that the system can be continually readjusted. The basic organisation of the nervous system can be simplified into a few key components: the sensory receptors, a processing point, and the effectors which bring about the response (below).

Senses and Sense Organs

Our senses enable us to perceive and respond appropriately to the external and internal environment. Motor nerves carry messages (nerve impulses) from sensors to effectors (the muscles and glands).



Eyes: vision



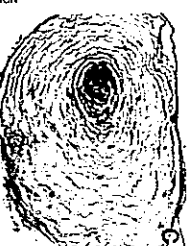
Ears: hearing



Taste buds: taste



Skin: touch



Pacinian corpuscle: pressure



Nose: smell

Effectors: Muscle and Glands

Effectors bring about the actions coordinated by the central nervous system in response to sensory input from senses and sense organs.



Skeletal muscle: voluntary (conscious) body movement



Salivary gland: involuntary (unconscious) secretion



Cardiac muscle: involuntary (unconscious) contraction



Smooth muscle: involuntary movement (e.g. gut, uterus)

1. Identify the basic components of a nervous system and explain their role in maintaining equilibrium:

2. Describe two differences between nervous control and endocrine (hormonal) control of body systems. For each, explain the significance of the difference:

(a) _____

(b) _____

3. In the vertebrate nervous system, describe the structure and role of each of the following:

(a) The central nervous system: _____

(b) The peripheral nervous system: _____

4. For each of the senses (A-F) on the previous page, identify the type of sensory reception involved (e.g. photoreception, mechanoreception), and describe the role of the sensory response in maintaining equilibrium:

(a) _____

(b) _____

(c) _____

(d) _____

(e) _____

(f) _____

5. For each of the effectors (G-J) on the previous page, describe the **motor response** (e.g. muscle contraction) and comment on the role of the effector in maintaining equilibrium:

(a) G: _____

(b) H: _____

(c) I: _____

(d) J: _____