

Unit 3 Neurobiology and communication

1. The nervous system

Divisions of the nervous system

- Describe the role of the nervous system.
- Describe the structures and functions of the central nervous system (CNS).
- Describe the structures and functions of the somatic nervous system (SNS).
- Describe the role of sensory and motor neurons in the SNS.
- Explain how homeostatic control is brought about by neurons.
- Describe the structures and functions of the peripheral nervous system (PNS).
- Describe the structures and functions of the autonomic nervous system (ANS).
- Describe the antagonistic action of the sympathetic and parasympathetic systems on heart rate, breathing rate and digestive processes.

Parts of the brain

- Describe the functions of the medulla and cerebellum in the central core.
- Describe the functions of the limbic system.
- Describe the functions of the cerebral cortex.
- Describe the functions of the sensory areas, motor areas and the association areas concerning language, personality, imagination and intelligence.
- State that information from one side of the body is processed in the opposite side of the cerebrum.
- Describe the role of the corpus callosum.

Perception

- State that perception is the process by which the brain analyses and makes sense out of incoming sensory information.
- Define the term segregation of objects.
- Describe the use of perceptual organisation and visual cues.
- Explain how humans can judge distances.
- Explain the importance of shape rather than detail in the recognition of objects.
- Explain how past experience, context or expectation influences the way a stimulus is perceived.
- Describe the effect of recognition on perception.

Memory

- Define memory.
- Describe the role of short-term memory.
- State that short term memories are passed to long term memory or discarded.
- Define sensory memory.
- Explain what is meant by the term working memory.
- Explain how items are maintained in STM by rehearsal or lost by displacement and decay.
- Describe how STM can be improved by 'chunking'.
- Explain the terms memory span and the serial position effect.
- Explain how items are transferred from STM to LTM.
- Describe the roles of shallow and elaborate encoding.
- Explain how retrieval of memories from LTM can be aided.
- State that episodic and semantic memories are stored in the cortex.
- State that procedural memories (skills) are linked to the motor cortex.
- State that emotional memories involve links between the cortex and the limbic system.
- State that spatial memory is located in the limbic system.
- Explain the terms episodic and semantic memory and state where they are stored.

The cells of the nervous system

- Describe the structure and function of neurons to include dendrites, cell body and axons.
- Describe the function of the myelin sheath and associated disorders.
- State that myelination continues from birth to adolescence.
- Describe the roles of sensory, motor and inter neurons.
- Describe the role of glial cells.

Neurotransmitters at synapses

- Explain how neurotransmitters are transmitted at synapses.
- Explain why and how neurotransmitters are removed by enzymes or re-uptake.
- Describe the role of receptors at a synapse.
- State that synapses can filter out weak stimuli arising from insufficient secretion of neurotransmitters.
- State that neurotransmitters must be removed from the synaptic cleft to prevent continuous stimulation of post-synaptic neurones.

Neurotransmitters at synapses continued

- Describe the function of converging, diverging and reverberating neural pathways.
- Explain what is meant by the term plasticity of response.
- Describe the role of reverberating pathway neurones.
- Describe the functions of endorphins and dopamine.
- Explain what is meant by the term reward pathway.
- Give some examples of neurotransmitter related disorders and their treatment.
- Describe the role of agonists and antagonists.
- State that recreational drugs may stimulate the release of neurotransmitters, imitate their action (agonists), block their binding (antagonists), and/or inhibit their re-uptake/enzymatic degradation.
- State that changes in neurochemistry alter mood, cognition, perception and behaviour.
- State that many recreational drugs affect neurotransmission in the reward circuit of the brain.
- Explain the terms sensitisation and desensitisation and their role in addiction.

2. Communication and social behaviour

The effect of infant attachment

- Explain the importance of early infant attachment.
- State that attachment becomes evident between 6 and 9 months.
- Describe how attachment can be measured.
- Describe examples of secure attachment and insecure attachment.
- State that infants that form secure attachments are more likely to investigate their immediate environment helping the development of cognitive abilities.
- State that humans have a long period of dependency on adults providing time for socialisation and learning to occur.
- Explain the difference between authoritative control and permissive control.

The effect of communication

- Describe the importance of non-verbal communication in the formation of relationships between individuals and signalling attitudes and emotions as well as acting as an aid to verbal communication.
- Explain what verbal communication is used for.
- State that language uses symbols to represent information and enables it to be organised into categories and hierarchies thus accelerating learning and intellectual development.

The effect of experience

- Define learning.
- Explain how a motor pathway can be established.
- State that human behaviour may be learned by observation and imitation.
- State that reinforcement is when behaviour patterns that have positive consequences for the individual are likely to be repeated.
- State that shaping is the rewarding of behaviour that approximates to the desired behaviour.
- State that extinction happens when behaviour patterns are not rewarded and so are likely to disappear.
- Describe the effects of generalisation and discrimination.

The effect of group behaviour and social influence

- Describe the effects of social facilitation.
- Describe the effects of de-individuation.
- State that de-individuation is often used to explain the anti-social behaviour of some groups which would not be shown by individuals from these groups on their own.
- Explain what is meant by the term internalisation.
- Explain what is meant by the term identification.