

### Question Set 1 (Autumn 2013)

(1) Name the three types of neurons in the CNS

Sensory neurons, motor neurons, interneurons.

1. **Sensory neurons** are sensitive to various non-neural stimuli. There are sensory neurons in the skin, muscles, joints, and organs that indicate pressure, temperature, and pain. There are more specialized neurons in the nose and tongue that are sensitive to the molecular shapes we perceive as tastes and smells. Neurons in the inner ear are sensitive to vibration, and provide us with information about sound. And the rods and cones of the retina are sensitive to light, and allow us to see.

2. **Motor neurons** are able to stimulate muscle cells throughout the body, including the muscles of the heart, diaphragm, intestines, bladder, and glands.

3. **Interneurons** are the neurons that provide connections between sensory and motor neurons, as well as between themselves. The neurons of the central nervous system, including the brain, are all interneurons

(2) What is the general term for the type of ions that maintain the negative charge of a neuron at rest? Page 17. Chloride (Cl<sup>-</sup>) and organic anions(A<sup>-</sup>).

(3) What is the name of the neurotransmitter released between motor neurons and muscle fibres?  
somatic neuromuscular junction

(4) What is the name of the junction where communication between neurons occurs? Page 137  
neuromuscular junction. SYNAPSE

(5) Are neurotransmitter receptors primarily found pre-synaptically or post-synaptically? (choose the best answer) (page 25) The highest concentration of receptors are found on dendrites

(6) Define the term "reuptake" (page 24)

**Reuptake**, or **re-uptake**, is the reabsorption of a [neurotransmitter](#) by a [neurotransmitter transporter](#) of a [pre-synaptic neuron](#) after it has performed its function of transmitting a [neural impulse](#).

Reuptake is necessary for normal synaptic physiology because it allows for the recycling of [neurotransmitters](#) and regulates the level of neurotransmitter present in the synapse and controls how long a signal resulting from neurotransmitter release lasts. Because neurotransmitters are too large and hydrophilic to diffuse through the membrane, specific [transport proteins](#) are necessary for the reabsorption of neurotransmitters. Much research, both biochemical and structural, has been performed to obtain clues about the mechanism of reuptake.

**(7)** What are the four lobes of the brain called?

1. **Frontal lobe**—conscious thought; damage can result in mood changes, social differences, etc. The frontal lobes are the most uniquely human of all the brain structures.
2. **Parietal lobe**—plays important roles in integrating sensory information from various senses, and in the manipulation of objects; portions of the parietal lobe are involved with [visuospatial processing](#)
3. **Occipital lobe**—sense of sight; lesions can produce hallucinations
4. **Temporal lobe**—senses of smell and sound, as well as processing of complex stimuli like faces and scenes.

**(8)** What chemical substance do astrocytes release? (page 29)

The largest and most abundant type of glia cell in the brain, accounting for nearly half of all glial tissue volume, is the astrocyte. Astrocytes provide structural support with their interweaving extensions acting as a scaffolding to anchor neurons in place (this is especially helpful to make sure they get a regular blood supply). They also have many other vital functions, for example, they control the ionic composition of the extracellular fluid, help break down neurotransmitters in the synaptic cleft (some contain monoamine oxidase, for instance) and release growth factors which are chemicals involved in the growth and repair of nerve cells.

**(9)** Name five behaviours associated with activity of the parasympathetic nervous system (page 32-33)

**(10)** Name five behaviours associated with activity of the sympathetic nervous system (page 32-33)

### Question Set 8 (Autumn 2013)

See Chapter 9 for help

- (1) What is the name for the neural reaction whereby, following repeated presentations, an organism learns to ignore a stimulus. Page 333. Habituation.
- (2) Name four areas of the brain which exhibit long-term potentiation. Page 337. Thalamus, motor cortex, cerebellum and amygdala.
- (3) If a drug is used to *prevent* calcium from entering a neuron during depolarisation, will this increase or decrease the probability of long-term potentiation? Page 338. Increase calcium = enhance LTP, prevent calcium = stops LTP from occurring.
- (4) Which brain region appears to be important in allowing permanent memories to be consolidated in the cerebral cortex? Medial temporal lobes (page 341). The hippocampus, amygdala and surrounding temporal cortex (page 345).
- (5) The posterior hippocampus appears most active when encoding or retrieving memories? Page 347. Encoding of information into memory.
- (6) What is the most common form of clinical amnesia? Page 349. Korsakoff's syndrome.
- (7) Where are the mammillary bodies located? Page 44, 568. Found at the back (posterior part) of the hypothalamus.
- (8) Define semantic memory. Page 354. Semantic memory is our store of facts and information, that is, our basic knowledge of the world.
- (9) Does hippocampal damage affect *reference memory*? Page 356-357. No.
- (10) Hippocampal cells that fire in response to a particular location are called? Page 357. Place cells.