

## Nervous System Concept Questions

- Which part of the nervous system is involved in each of the following?
  - throwing a ball
  - releasing bicarbonate from the pancreas
  - falling asleep
  - increasing your breathing rate slightly
  - running away from a vampire
- Imagine you cut yourself and some nerves are severed. What effect would this have on the transmission of impulses?
- Imagine an accident victim suffers a spinal cord injury at the neck, resulting in paralysis. Explain the effect this would have on the affected parts of the body.
- Describe the advantage of a reflex response to an organism.
- You accidentally touch a hot iron. Your hand quickly moves away from the iron.
  - What type of reaction is this?
  - Do you feel pain before you pull your hand away? Explain.
  - Describe what happens in the central nervous system to allow you to react so quickly.
- Pain receptors are far more abundant in the skin than are cold receptors. Explain why this is adaptive for survival.
- Suppose that your skin was not sensitive to pressure or pain. What might happen to the muscles and internal organs beneath the skin?
- Some neurons are wrapped in a coating called the myelin sheath.
  - What are the advantages of myelinated nerve axons?
  - How does this explain the symptoms of MS?
- What causes the resting neuron to be polarized?
- Describe the distribution of ions across the cell membrane as it changes from a resting potential to an action potential and then into refractory period?
- How is the membrane potential of the resting cell restored after a nerve impulse has passed?
- Tetrodotoxin is a toxin present in the spines of the puffer fish. It has the capability of blocking the function of voltage-regulated sodium channels. What effect do you suppose this substance would have on the contractions of muscles?
- Draw a fully-labelled graph showing the potential of the neural membrane as it fires.
- What is meant by the all-or-none response?
  - If a stimulus causes an all-or-none response, how can the level of pain you feel vary?
- Use the idea of threshold levels to explain why some individuals can tolerate more pain than others.
- How does the nerve impulse cross the space between two nerve cells?
- Use the idea of a synapse to explain why a nerve impulse can move from neuron A to neuron B but not *vice versa*.
- Explain the functions of acetylcholine and cholinesterase in the transmission of nerve impulses.
- Use the idea of a synapse and neurotransmitters to explain the concept of summation.
- How can drugs act as stimulants or depressants?
- What is an endorphin? How does it work?