

CHAPTER 13 READING QUESTIONS

These reading questions are designed to help you focus your reading on the most important points in the chapter. They are arranged using chapter section headers so that the file can be easily edited to reflect the material covered in class.

13.1 NEURAL REFLEXES

1. List the steps in a neural reflex.
2. Distinguish between negative feedback and feedforward responses.

Neural Reflex Pathways Can Be Classified Different Ways

3. Define the following terms used to classify neural reflex pathways. (Tbl. 13.1; Fig.

13.1)

somatic reflexes

autonomic reflexes

spinal reflexes

cranial reflexes

innate reflexes

learned reflexes (conditioned reflexes)

monosynaptic reflex

polysynaptic reflex

convergent pathway

divergent pathway

13.2 AUTONOMIC REFLEXES

4. List locations where autonomic reflex integration centers can be found.

5. Describe the influences that emotions and higher brain centers can have on autonomic reflexes.
6. Autonomic reflexes are always _____ (monosynaptic or polysynaptic?).
(Fig. 13.1c)

13.3 SKELETAL MUSCLE REFLEXES

7. As a response to a stimulus, what is the only way to achieve skeletal muscle relaxation?
8. What are proprioceptors? What are the three types found in the body? (Fig. 13.2)
9. What are alpha motor neurons? (Fig. 13.2a)
10. What are extrafusal muscle fibers?
11. List the components of skeletal muscle reflexes.

Golgi Tendon Organs Respond to Muscle Tension

12. Sketch a Golgi tendon organ and describe its function. (Fig. 13.2b)

Muscle Spindles Respond to Muscle Stretch

13. Sketch a muscle spindle. Identify the intrafusal fibers, gamma motor neurons, and capsule.
(Fig. 13.2a)
14. Describe how muscle spindles sense muscle stretch. What is muscle tone? (Fig. 13.3a)
15. Describe the stretch reflex using the standard steps of a reflex. (Figs. 13.3b, 13.5a–c) What is the protective purpose of the stretch reflex?
16. Explain alpha-gamma coactivation. (Fig. 13.4)

Stretch Reflexes and Reciprocal Inhibition Control Movement around a Joint

17. What is a myotatic unit?

18. Describe a monosynaptic stretch reflex, the knee jerk (patellar tendon) reflex, using the standard steps of a reflex. (Fig. 13.6)
19. Describe reciprocal inhibition in the knee jerk reflex using the standard steps of a reflex. (Fig. 13.6)
20. How can a single stimulus, transmitted through a single sensory neuron, create two opposing responses?

Flexion Reflexes Pull Limbs Away from Painful Stimuli

21. Describe the flexion reflex in Figure 13.7 using the standard steps of a reflex.
22. Why does this reflex take longer than the knee jerk reflex?
23. Now describe the crossed extensor reflex that would accompany this flexion reflex. (Fig. 13.7)

13.4 THE INTEGRATED CONTROL OF BODY MOVEMENT

Movement Can Be Classified as Reflex, Voluntary, or Rhythmic

24. Name and briefly describe the three categories of movement.
25. What are central pattern generators (CPGs), and what role do they play in movement?
26. What roles do feedforward reflexes and feedback mechanisms play in voluntary movement?

The CNS Integrates Movement

27. What three levels of the nervous system control movement? (Tbl. 13.3)
28. What are the three phases of voluntary movement? (Fig 13.8)
29. Describe the role of the following in planning and executing movement: (Figs. 13.8, 13.9, 13.10; Tbl. 13.3)

spinal cord

brain stem

thalamus

cerebellum

basal ganglia

cerebral cortex

30. Describe the role of the corticospinal tract in controlling voluntary movement. (Fig. 13.11)
31. Explain and give an example of a feedforward postural reflex. (Fig. 13.12)

Symptoms of Parkinson's Disease Reflect Basal Ganglia Function

32. What functions of the basal ganglia were discovered through research into Parkinson's?

13.5 CONTROL OF MOVEMENT IN VISCERAL MUSCLES

33. How does reflex control of visceral muscles differ from reflex control of skeletal muscles?