

Advanced Physiology – Lecture 6: Sensation & Somatic Sensation

40 Multiple Choice Questions (Last 5 are True/False)

1. Sensation is defined as:
 - A) Conscious control of body movement
 - B) Awareness of changes in the environment
 - C) Emotional response to stimuli
 - D) Motor output from the CNS
2. The main factor determining the *type* of sensation perceived is:
 - A) The size of the receptor field
 - B) The type of neurotransmitter released
 - C) The destination of the sensory impulse in the CNS
 - D) The strength of the stimulus
3. Perception occurs primarily in the:
 - A) Spinal cord
 - B) Cerebellum
 - C) Brainstem
 - D) Cerebral cortex
4. Which statement best describes why some sensory information is never perceived?
 - A) It is blocked by inhibitory interneurons
 - B) It never reaches the cerebral cortex
 - C) It is filtered out at the spinal level
 - D) It has too low frequency
5. Each sensory neuron carries information for:
 - A) Multiple sensory modalities
 - B) One specific sensory modality
 - C) Several senses simultaneously
 - D) Only chemical stimuli
6. The term *sensory modality* refers to:
 - A) The receptor's adaptation rate
 - B) The type of sensation, like touch or pain
 - C) The location of the receptor
 - D) The strength of the neural signal
7. The reason you feel pain in an injured finger rather than in the brain is because:
 - A) Pain receptors exist only in fingers
 - B) Sensory impulses arrive in specific cortical regions representing the finger
 - C) The cerebral cortex projects signals backward
 - D) Sensation occurs only in peripheral neurons
8. Exteroceptors are primarily responsible for detecting:
 - A) Blood pressure changes
 - B) External environmental stimuli
 - C) Muscle stretch
 - D) Internal organ pain
9. Interoceptors are unique because they:
 - A) Are sensitive to light
 - B) Detect internal body conditions
 - C) Are found only in the skin
 - D) Are inactive during sleep
10. Proprioceptors provide information about:
 - A) Blood osmotic pressure
 - B) Joint position and muscle tension

- C) Skin temperature
- D) Internal chemical balance

11. Which receptor type is primarily responsible for detecting physical deformation of tissues?

- A) Thermoreceptor
- B) Mechanoreceptor
- C) Chemoreceptor
- D) Photoreceptor

12. Nociceptors are specialized to detect:

- A) Temperature fluctuations
- B) Chemical odors
- C) Painful stimuli
- D) Muscle tension

13. Photoreceptors are found exclusively in:

- A) The skin
- B) The retina
- C) The cerebral cortex
- D) The muscles

14. Chemoreceptors detect:

- A) Osmotic pressure
- B) Mechanical deformation
- C) Chemicals related to taste and smell
- D) Electromagnetic radiation

15. Osmoreceptors monitor:

- A) pH level
- B) Osmotic pressure of body fluids
- C) Light intensity
- D) Blood oxygen

16. Somatic sensations arise from receptors located in:

- A) Only the spinal cord
- B) Skin, mucous membranes, muscles, and joints
- C) The retina
- D) Only visceral organs

17. The tactile sensations include all except:

- A) Touch
- B) Pressure
- C) Vibration
- D) Pain

18. The main difference between rapidly and slowly adapting touch receptors is:

- A) Their threshold potential
- B) Whether they respond at stimulus onset or throughout stimulus duration
- C) Their neurotransmitter type
- D) Their location in the brain

19. Rapidly adapting touch receptors are most active:

- A) Throughout prolonged touch
- B) Only at the start of stimulation
- C) During pain reception
- D) During thermal changes

20. Slowly adapting touch receptors:

- A) Cease firing immediately after stimulus
- B) Keep firing while the stimulus is present
- C) Respond to light but not pressure

D) Are found only in viscera

21. Pressure sensation differs from touch mainly because it:

- A) Involves superficial receptors
- B) Is felt over a larger area and deeper tissues
- C) Is faster to adapt
- D) Depends on photoreceptors

22. Vibration sensations are generated by:

- A) Pain receptors
- B) Rapid repetitive sensory signals from tactile receptors
- C) Stretch reflexes
- D) Thermal receptors

23. Itch sensations usually result from:

- A) Excessive heat
- B) The activity of hair root receptors
- C) Inflammatory chemicals like bradykinin
- D) High-frequency vibration

24. The tickle sensation uniquely occurs when:

- A) You touch yourself
- B) Another person touches you
- C) The brain is fatigued
- D) The stimulus is painful

25. Thermal sensations are classified into:

- A) Hot, cold, and neutral
- B) Coldness and warmth
- C) Pressure and tension
- D) Pain and touch

26. Cold and warm receptors both:

- A) Are the same type of receptor
- B) Adapt rapidly at the start but continue at a lower frequency
- C) Do not adapt at all
- D) Are located in deep tissues only

27. Pain sensation serves primarily to:

- A) Increase motor activity
- B) Protect the body from damage
- C) Maintain temperature balance
- D) Enhance tactile precision

28. Which statement explains why pain may persist after removing the stimulus?

- A) Pain neurons regenerate
- B) Pain-mediating chemicals linger in tissues
- C) The cerebral cortex re-stimulates pain fibers
- D) The receptors fail to adapt

29. Superficial somatic pain arises from receptors located in:

- A) Muscles
- B) Skin
- C) Internal organs
- D) Joints

30. Deep somatic pain originates in:

- A) Skeletal muscles, joints, and tendons
- B) Skin only
- C) Visceral organs
- D) The brainstem

31. Visceral pain results from stimulation of receptors in:
A) Muscles and bones
B) Visceral organs
C) Skin
D) The retina
32. A patient describes pain as dull and widespread; this most likely represents:
A) Superficial pain
B) Deep somatic pain
C) Reflex pain
D) Photoreceptor malfunction
33. Why might thermoreceptors signal pain at very high or low temperatures?
A) They share axons with nociceptors
B) Pain receptors become activated at extreme temperatures
C) The CNS misinterprets the signal
D) Temperature adaptation fails
34. Which type of receptor contributes most to maintaining posture?
A) Exteroceptor
B) Proprioceptor
C) Photoreceptor
D) Nociceptor
35. Why does tactile adaptation occur?
A) To prevent overstimulation by constant stimuli
B) To enhance memory of touch
C) To increase sensitivity to pressure
D) To block nociceptor activity
36. Sensation and perception occur in the same region of the brain. (T/F)
37. Thermoreceptors are responsible for detecting osmotic pressure. (T/F)
38. Nociceptors adapt slowly or not at all to continuous stimulation. (T/F)
39. Pain can help diagnose disease by indicating the location of tissue damage. (T/F)
40. Proprioceptors are located in the skin and detect light touch. (T/F)

Answer Key

1-B 2-C 3-D 4-B 5-B 6-B 7-B 8-B 9-B 10-B 11-B 12-C 13-B 14-C 15-B 16-B 17-D 18-B 19-B 20-B 21-B 22-B
23-C 24-B 25-B 26-B 27-B 28-B 29-B 30-A 31-B 32-B 33-B 34-B 35-A 36-F 37-F 38-T 39-T 40-F