

Saladin 7E
Answer Key
Chapter 16, Sense Organs

Testing Your Comprehension

1. Referred pain results from the fact that cutaneous and visceral sensory pathways converge on the same spinal interneurons, so the brain cannot distinguish the original sources of pain from each other. Scotopic vision is characterized by high light sensitivity, which results from the fact that multiple rods converge on the same bipolar neurons and multiple bipolar neurons converge on the same ganglion cells, thus allowing for spatial summation in the rod pathways.
2. An insect crawling in one's hair would trigger the hair receptors; the throb of a patient's pulse is sensed by lamellar corpuscles in one's fingertips; and reading braille presumably stimulates tactile discs and tactile corpuscles.
3. When the ciliary muscle contracts, the diameter of the ciliary body decreases. Thus, the ciliary body as a whole puts less tension on the suspensory ligament on the lens, allowing the lens to relax into a more strongly convex shape.
4. The anterolateral system contains the spinothalamic tract, which carries pain signals up the spinal cord. Severing this tract above the source of pain would thus block pain signals from reaching the brain. However, it would also deaden many other sensations below that level, including touch, tickle, itch, temperature, and pressure. For a terminally ill patient, such sensory losses may be an acceptable cost of relieving pain.
5. A drug that blocked the receptors for substance P might serve as a powerful analgesic because it would block pain signals from reaching the brain.