Chapter 12, Nervous Tissue

“Apply What You Know” Answers

p. 438—Nerve cells and muscle fibers share the properties of excitability and conductivity, but neurons also carry out secretion and muscle fibers undergo contraction.

p. 441— The cytoskeleton stiffens and strengthens the nerve fiber, protecting what might otherwise be a very delicate and vulnerable structure from physical injury. Microtubules of the cytoskeleton also provide trackways for the axonal transport of organelles and chemicals up and down the axon.

p. 456—No, if all Loewi had done was what the question describes, the result would not have been conclusive. It would remain possible that saline alone slows down the heart, or that the saline taken from the first frog had picked up a chemical unrelated to the vagus nerves, and this other chemical slowed down the second frog’s heart. This could be ruled out by removing saline from a frog whose vagus nerves had not been stimulated, bathing a second frog’s heart with this saline, and watching for an effect. (Even this is not conclusive, but is at least a starting point for ruling out alternative explanations of the effect Loewi observed.)

p. 459—The peptide-synthesizing organelles of a neuron are limited to the soma, so neuropeptides can only be synthesized there.

p. 464—In neural recruitment, additional neurons are activated as stimulus intensity increases. In motor nerves, this is the basis for multiple motor unit (MMU) summation. When a stronger muscle contraction is needed, more motor nerve fibers fire (neural recruitment), thus activating more motor units in the muscle.