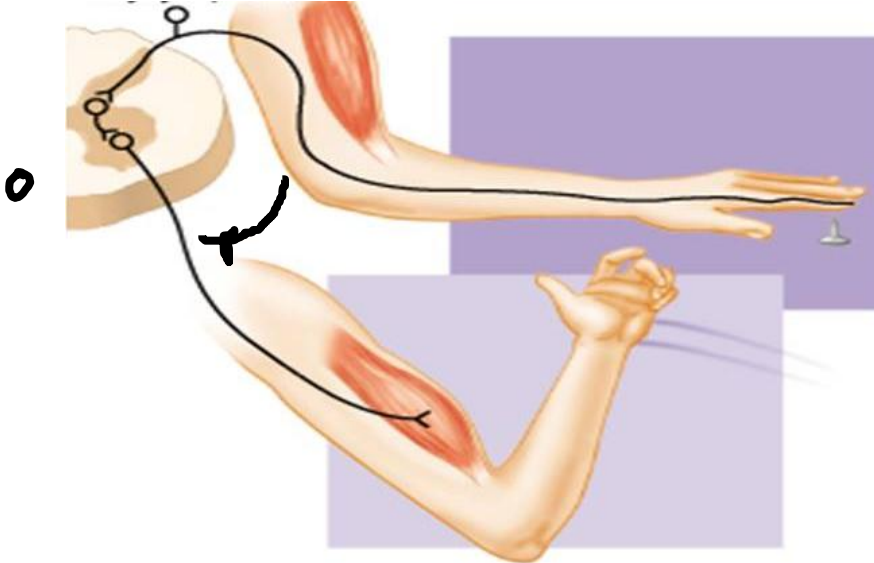


Reflex Arcs – The simplest neural circuits

"Why do I pull my hand back from a hot stove before I even feel the heat?"

Model 1: A somatic reflex arc



Critical Thinking Questions

1. Reflexes are an automatic **response** to a **stimulus**. According to the model, what is the stimulus?

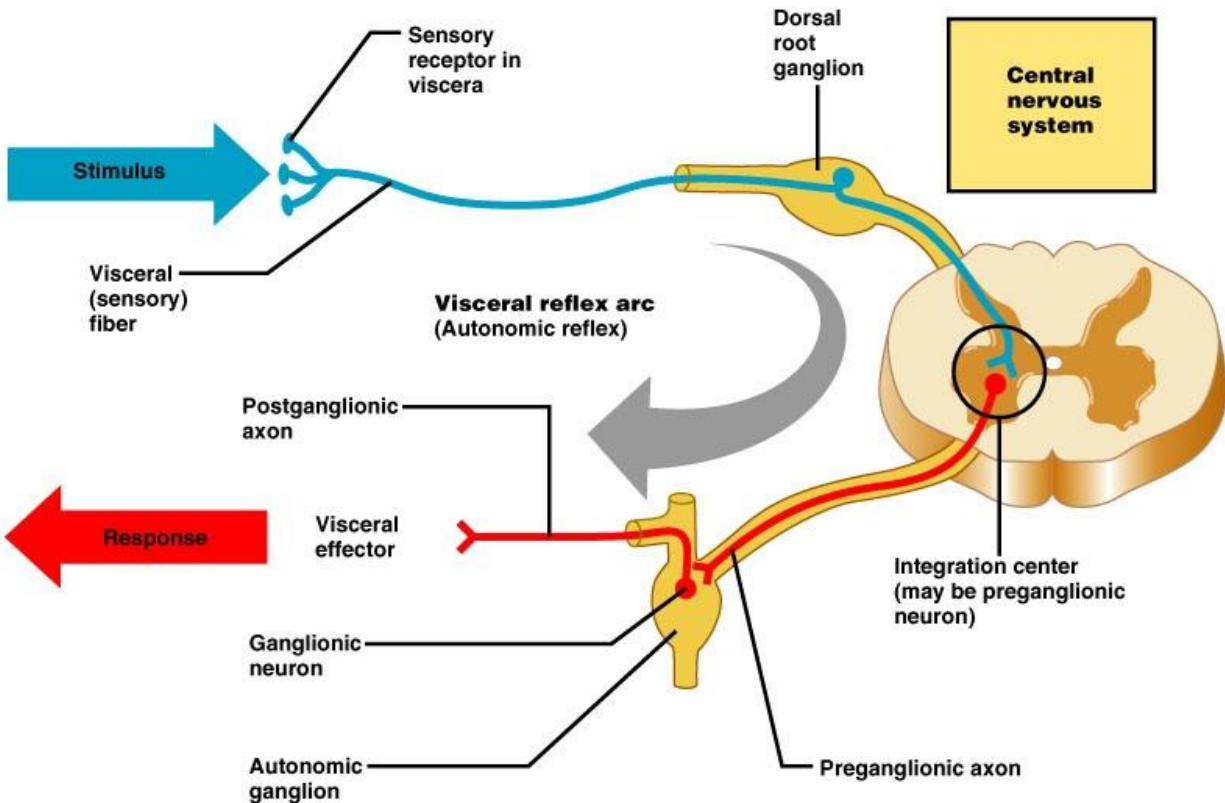
a. What is the response?

2. Does it appear, based on the model, that the brain is involved at all in this particular reflex action?

3. Somatic reflex arcs have five essential components. Based on your knowledge of vocabulary label the following five components on the model above:

- Receptor
- Sensory neuron
- Integrating center
- Motor neuron
- Effector

Model 2: A visceral autonomic reflex arc



Copyright © 2004 Pearson Education, Inc., publishing as Benjamin Cummings.

4. Based on this model, what are the primary structural differences between a somatic and visceral reflex arc (what does this one have that the first one didn't)?
5. According to this model, where is the integration center located? [be as specific as possible]
6. Is it possible to have some visceral reflex arcs with integration centers in the brain?
7. In the space below, list at least three locations in the brain that are likely to serve as integration centers for visceral reflex arcs (i.e. they receive inputs and communicate out to the internal organs).

Application

8. Some people suffer from a condition known as congenital insensitivity to pain, in which they cannot detect painful stimuli at all, yet all their motor skills are normal. Which portion(s) of the somatic reflex arc might be defective in people with this condition?

9. There is a related condition known as congenital indifference to pain in which people can detect painful stimuli but they don't react properly to that stimulus. Essentially, these people don't feel pain as all that painful. People with this condition, like people with congenital insensitivity to pain, have normal motor function. Which portion of the somatic reflex arc might be defective in these people?

10. When your small intestine begins to fill with food, a signal is sent to the brainstem which initiates contraction of the smooth muscle in the abdominal wall and movement of the food through the intestines.

a. Is this an example of a somatic or visceral reflex arc?

Exercises

1. In the space below, fill in the table with the appropriate components of somatic and visceral reflex arcs.

	Visceral Reflex	Somatic Reflex
Input components		
Processing Component		
Output components		