

7.1.1 What happens in Reflex Actions?

'Reflex' is a word we use very commonly when we talk about some sudden action in response to something in the environment. We say 'I jumped out of the way of the bus reflexly', or 'I pulled my hand back from the flame reflexly', or 'I was so hungry my mouth started watering reflexly'. What exactly do we mean? A common idea in all such examples is that we do something without thinking about it, or without feeling in control of our reactions. Yet these are situations where we are responding with some action to changes in our environment. How is control and coordination achieved in such situations?

Let us consider this further. Take one of our examples. Touching a flame is an urgent and dangerous situation for us, or in fact, for any animal! How would we respond to this? One seemingly simple way is to think consciously about the pain and the possibility of getting burnt, and therefore move our hand. An important question then is, how long will it take us to think all this? The answer depends on how we think. If nerve impulses are sent around the way we have talked about earlier, then thinking is also likely to involve the creation of such impulses. Thinking is a complex activity, so it is bound to involve a complicated interaction of many nerve impulses from many neurons.

If this is the case, it is no surprise that the thinking tissue in our body consists of dense networks of intricately arranged neurons. It sits in the forward end of the skull, and receives signals from all over the body which it thinks about before responding to them. Obviously, in order to receive these signals, this thinking part of the brain in the skull must be connected to nerves coming from various parts of the body. Similarly, if this part of the brain is to instruct muscles to move, nerves must carry this signal back to different parts of the body. If all of this is to be done when we touch a hot object, it may take enough time for us to get burnt!

How does the design of the body solve this problem? Rather than having to think about the sensation of heat, if the nerves that detect heat were to be connected to the nerves that move muscles in a simpler way, the process of detecting the signal or the input and responding to it by an output action might be completed quickly. Such a connection is commonly called a reflex arc (Fig. 7.2). Where should such reflex arc connections be made between the input nerve and the output nerve? The best place, of course, would be at the point where they first meet each other. Nerves from all over the body meet in a bundle in the spinal cord on their way to the brain. Reflex arcs are formed in this spinal cord itself, although the information input also goes on to reach the brain.

Of course, reflex arcs have evolved in animals because the thinking process of the brain is not fast enough. In fact many animals have very little or none of the complex neuron network needed for thinking. So it is quite likely that reflex arcs have evolved as efficient ways of functioning in the absence of true thought processes. However, even after complex neuron networks have come into existence, reflex arcs continue to be more efficient for quick responses.

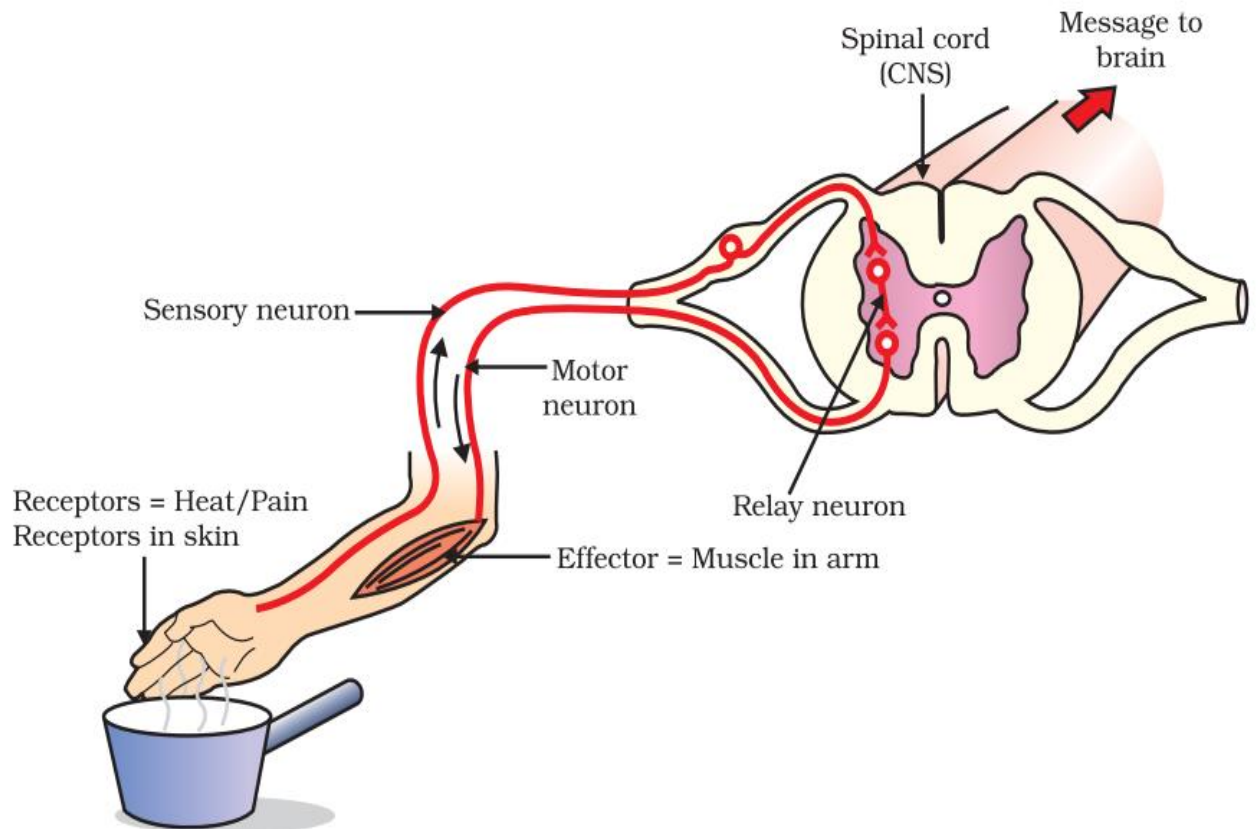
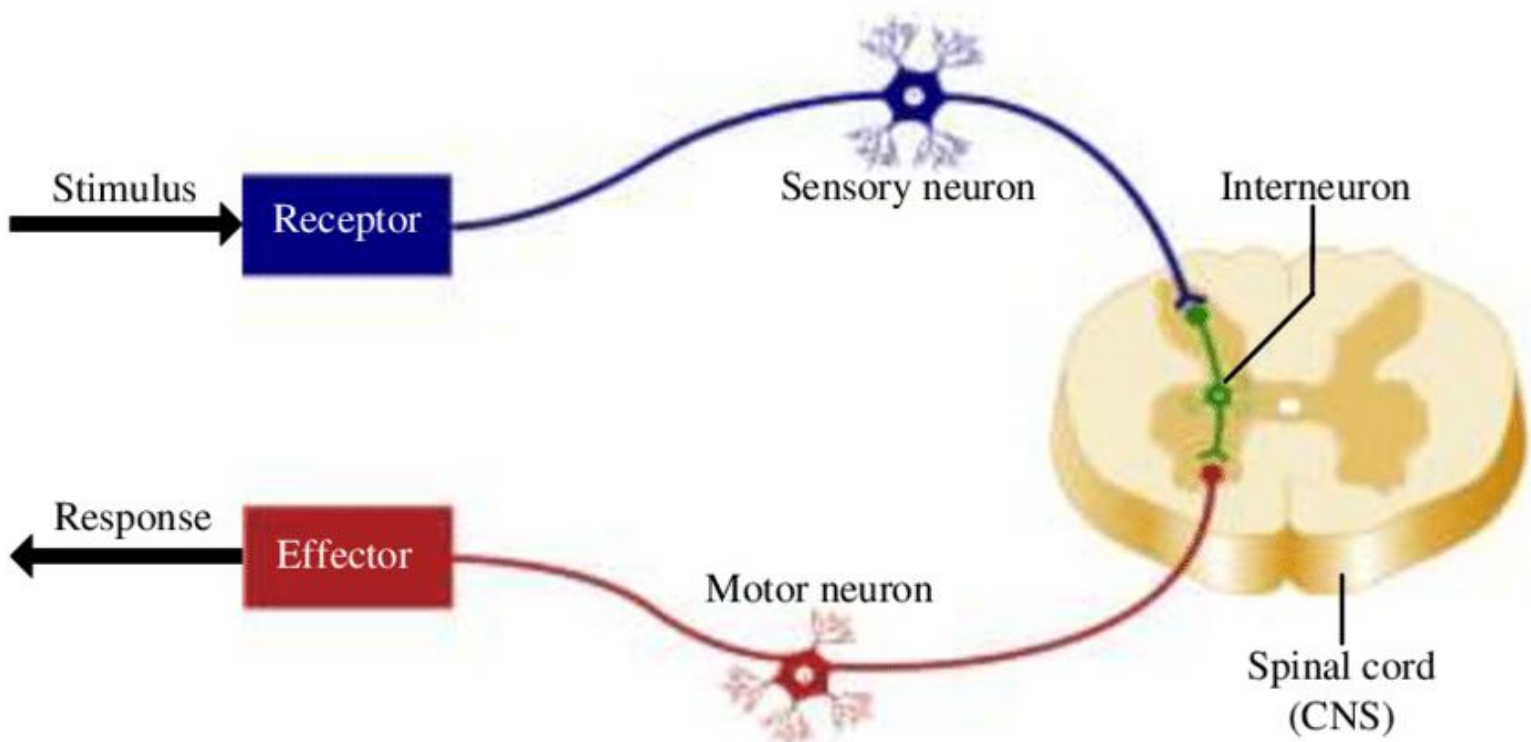


Figure 7.2 *Reflex arc*

Can you now trace the sequence of events which occur when a bright light is focussed on your eyes?



ASSIGNMENT NO. 11 (control and coordination)

1. Describe the parts of neurone with a well labelled diagram.
2. What are receptors? How do they function? Give two examples of receptors and write their respective function.
3. How does the information acquired at the dendrite tip of one neurone will be passed on to the next neurone?
4. Name the place where tip of axon meets muscle fibre. How does it work?
5. Name the following receptors: 1. For taste 2. For smell

ASSIGNMENT NO. 12 (control and coordination)

1. What is reflex action? Why it has been developed by animals in their body?
2. Draw reflex arc and write the function of its different component.
3. Give two examples of reflex action.