

How reflexes work

Bodily actions that can occur independently of conscious control are called reflexes. They are especially important when a rapid involuntary response is required.

The central nervous system is able to perform highly complex tasks, and not all of these require conscious thought. Those actions that are involuntary in nature are called reflexes, pre-programmed and predictable responses to a specific sensory stimulus.

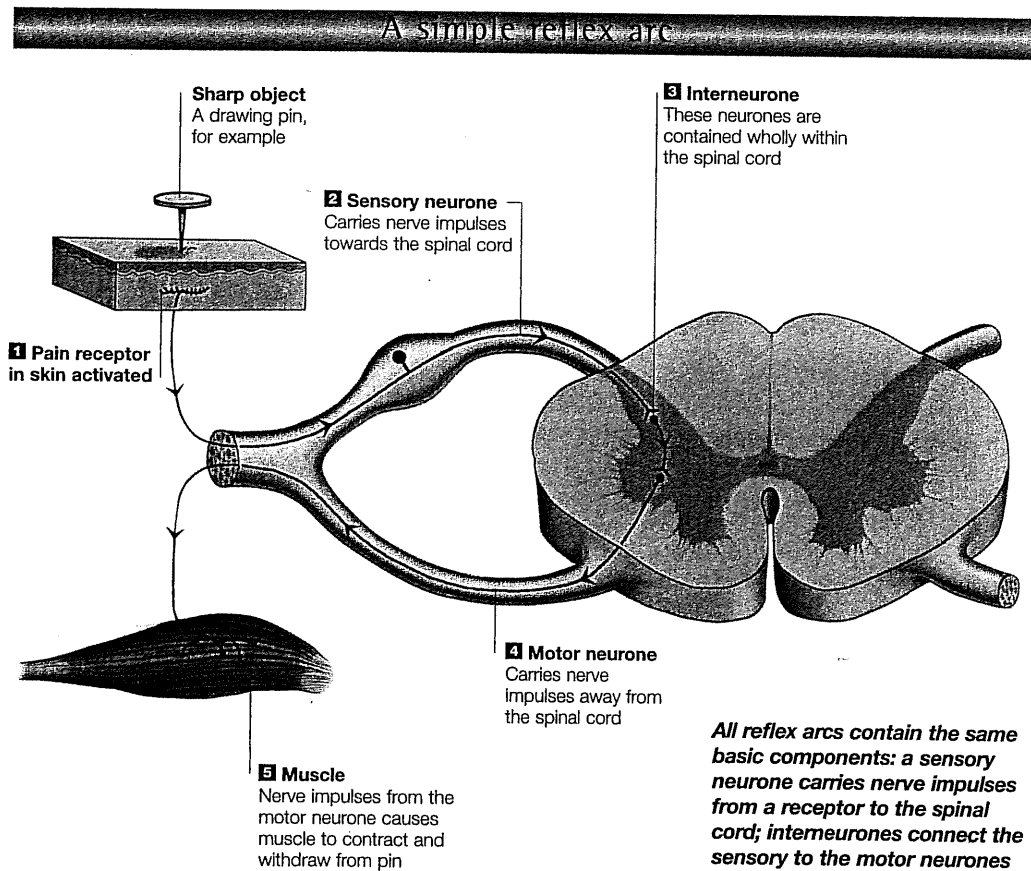
SOMATIC REFLEXES

Somatic reflexes result in the movement of a muscle, or the secretion of a chemical from a gland.

For example, if you were to touch a hot oven, pain receptors in your hand would send nerve impulses to neurones in the spinal cord. These in turn would communicate with the appropriate muscles in your arm telling them to withdraw the hand instantly. Only after the hand was withdrawn, however, would your brain become aware of what had happened.

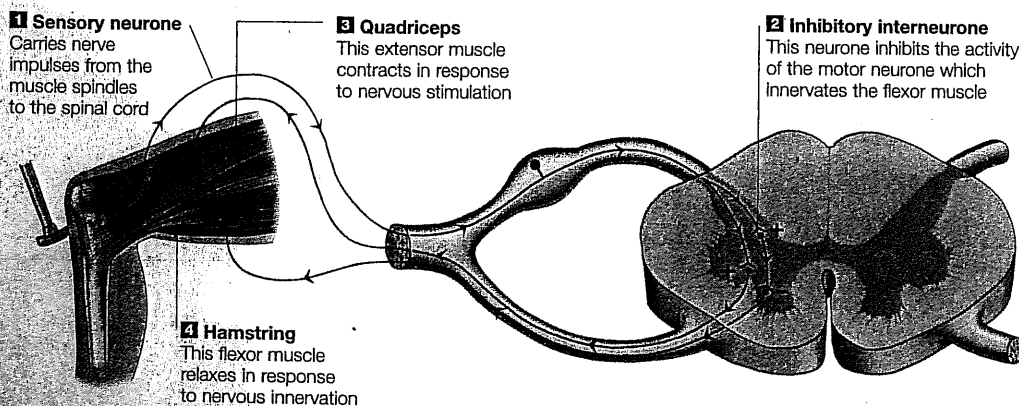
AUTONOMIC REFLEXES

We are not conscious of the outcome of all the reflexes that occur in our bodies. For example, the baroreceptor reflex corrects a rise in arterial blood pressure without us being aware that it is doing so.



All reflex arcs contain the same basic components: a sensory neurone carries nerve impulses from a receptor to the spinal cord; interneurons connect the sensory to the motor neurones which then stimulate appropriate muscles to create a response.

The patellar reflex



The patellar reflex is tested by doctors after a patient has suffered a traumatic injury to determine whether their lower spine has been damaged.

Babies up to about one year old exhibit the Babinski reflex when the sole of the foot is rubbed. This disappears as their nervous system develops.



Clinicians often use the 'patellar reflex' to test the integrity of a patient's lower spine. The patient sits high up so that the legs hang freely. The doctor then lightly taps the patellar tendon (situated just below the knee-cap) and looks for a response.

MUSCLE SPINDLES

In a healthy person, the knock to the tendon stretches the quadriceps muscle. This stretch is detected by structures in the muscle called muscle spindles. These send nervous signals to neurones in the spinal cord,

which in turn send impulses to the quadriceps muscle telling it to contract (to counteract the initial stretch). This causes the foot to spring forward. At the same time the antagonistic muscle, the hamstrings, are inhibited.