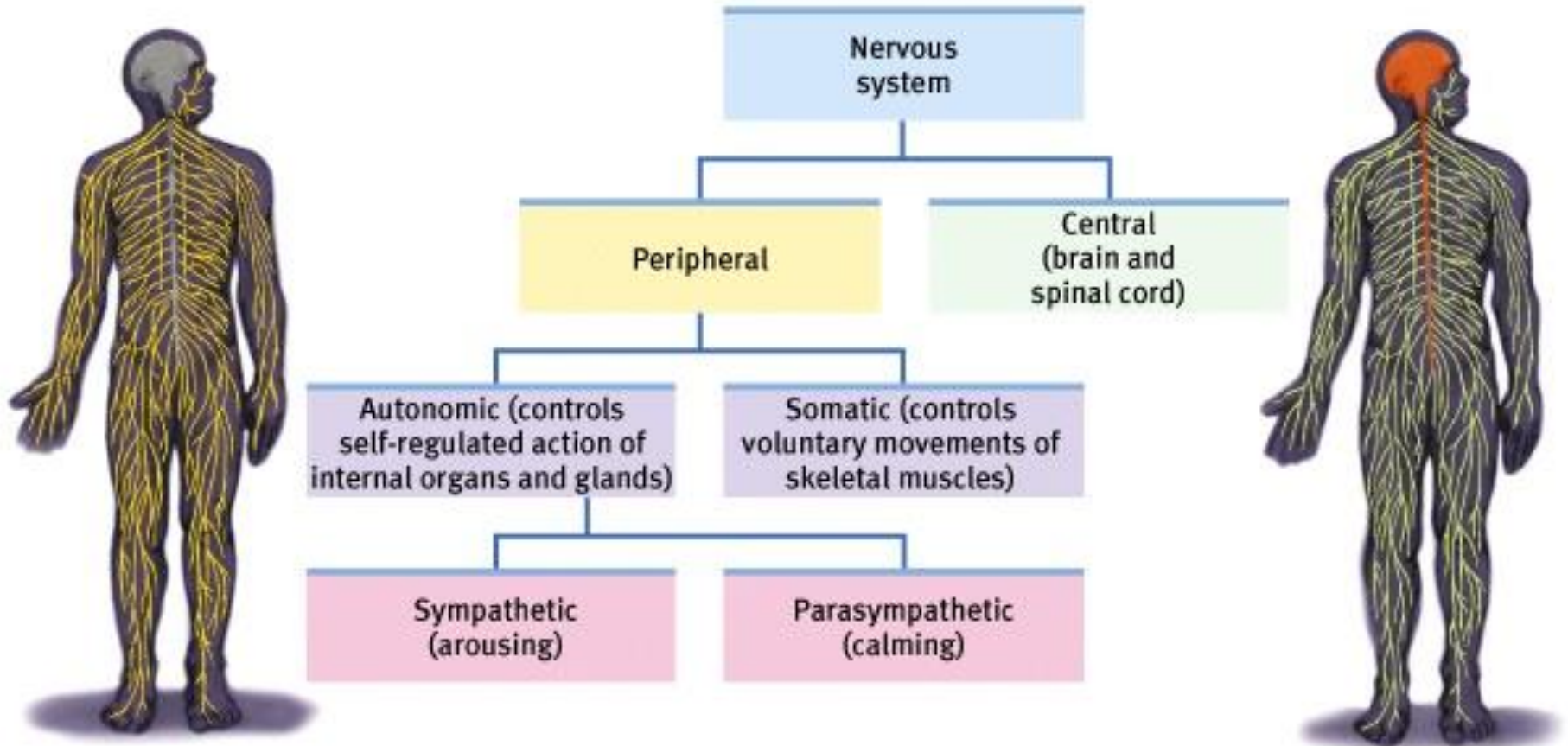


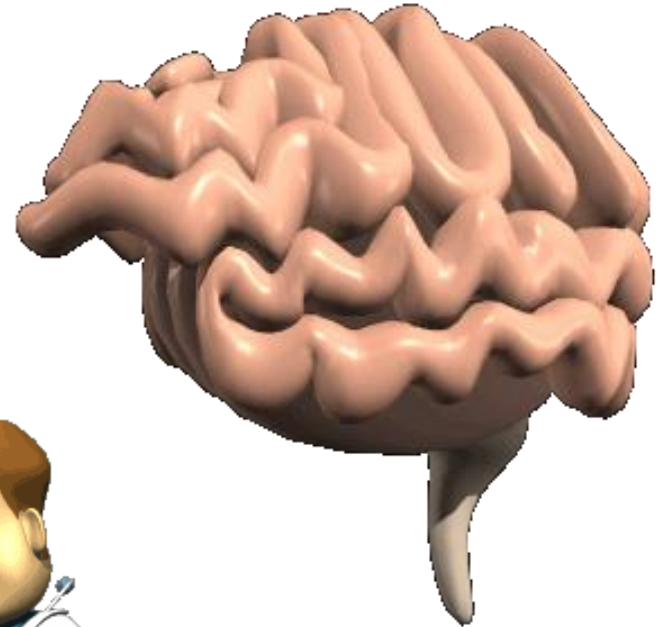
The Nervous System



Central Nervous System (CNS)

- The Brain
- Spinal Cord

*(transmits
information into
and out of the
brain)*

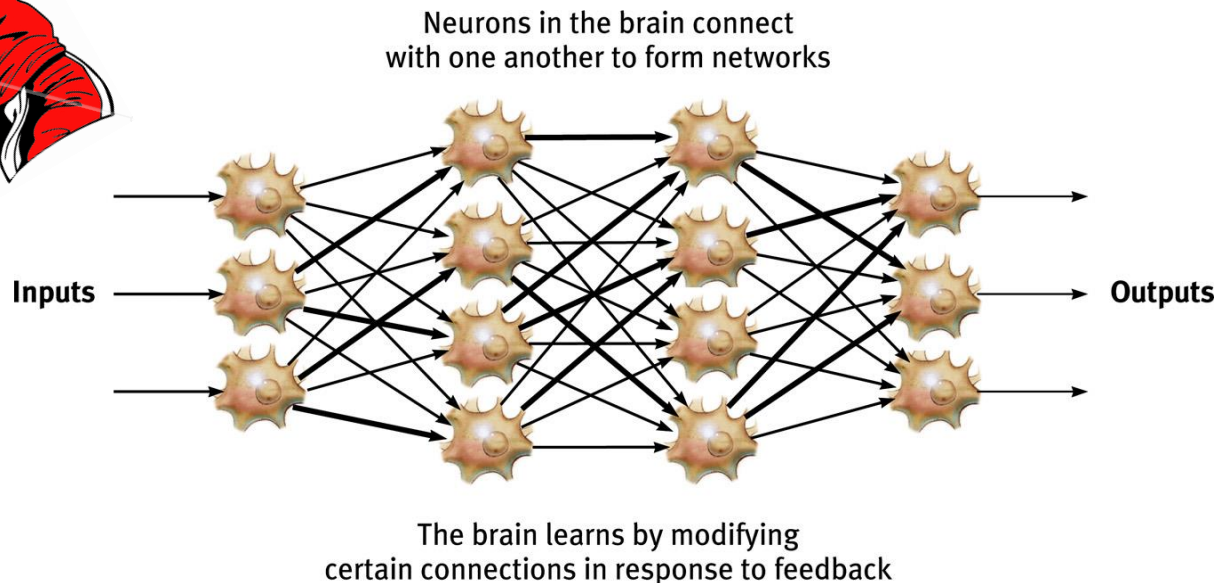


Reflexes have:

Adaptive
Value

Central Nervous System

- *Neural Networks form from learning and practice*
 - *Increases the speed messages are sent*
 - *Allows us to process several stimuli at one time.*



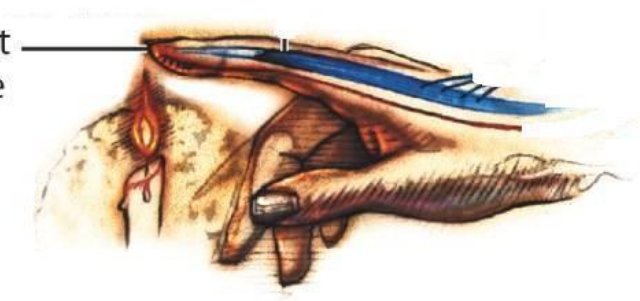
A Neural Chain

1 2 3 4

100

1. **Skin receptors**

Skin receptors detect the heat of the flame and generate nerve impulses.

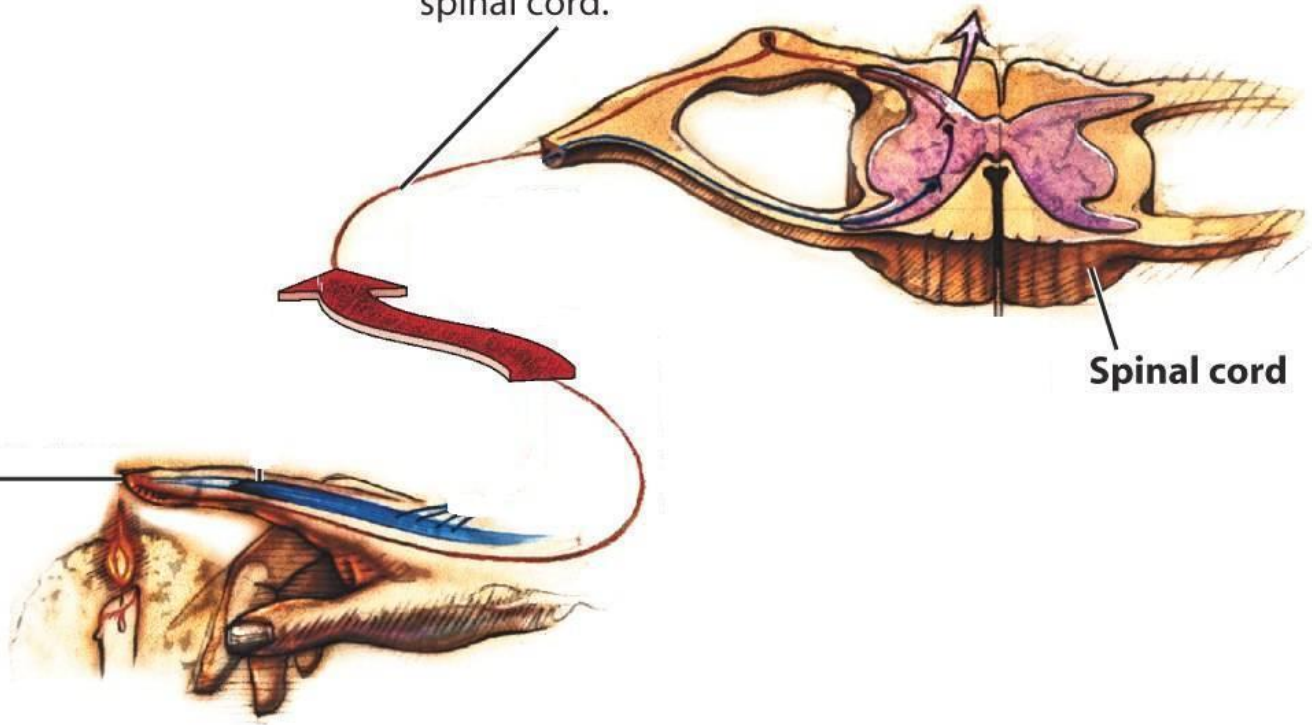


A Neural Chain

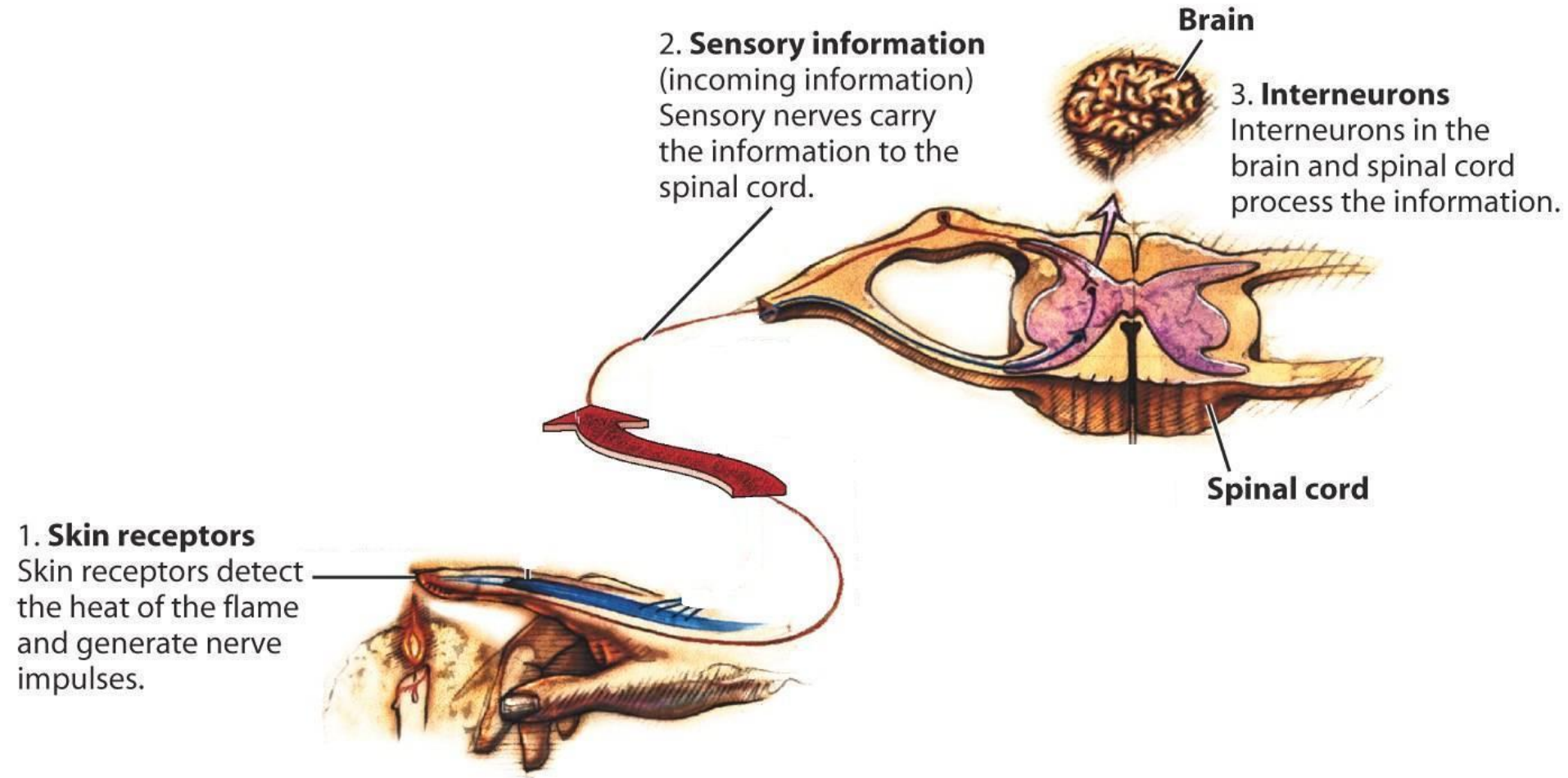
2. Sensory information
(incoming information)
Sensory nerves carry
the information to the
spinal cord.

Spinal cord

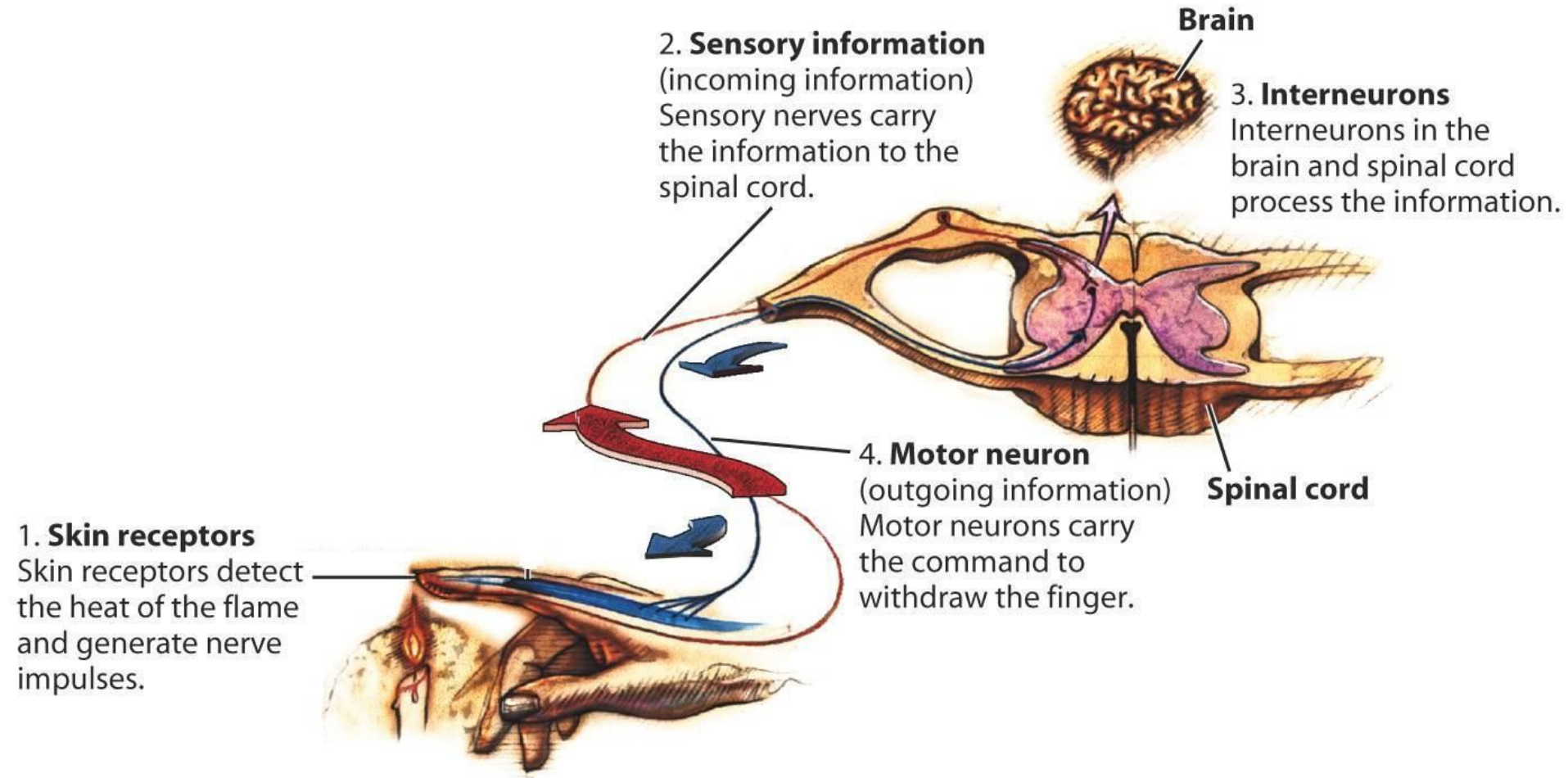
1. Skin receptors
Skin receptors detect
the heat of the flame
and generate nerve
impulses.



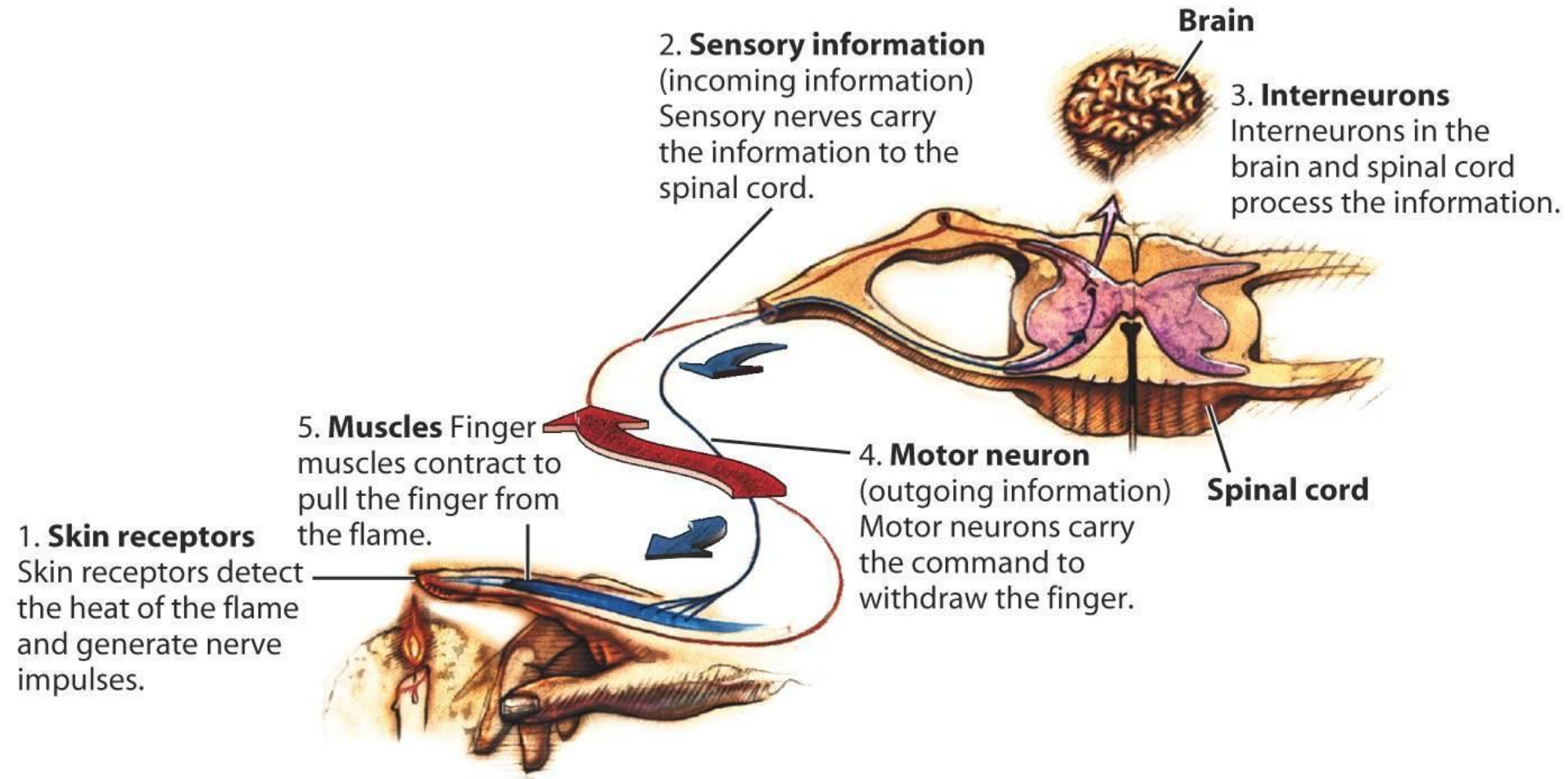
A Neural Chain



A Neural Chain

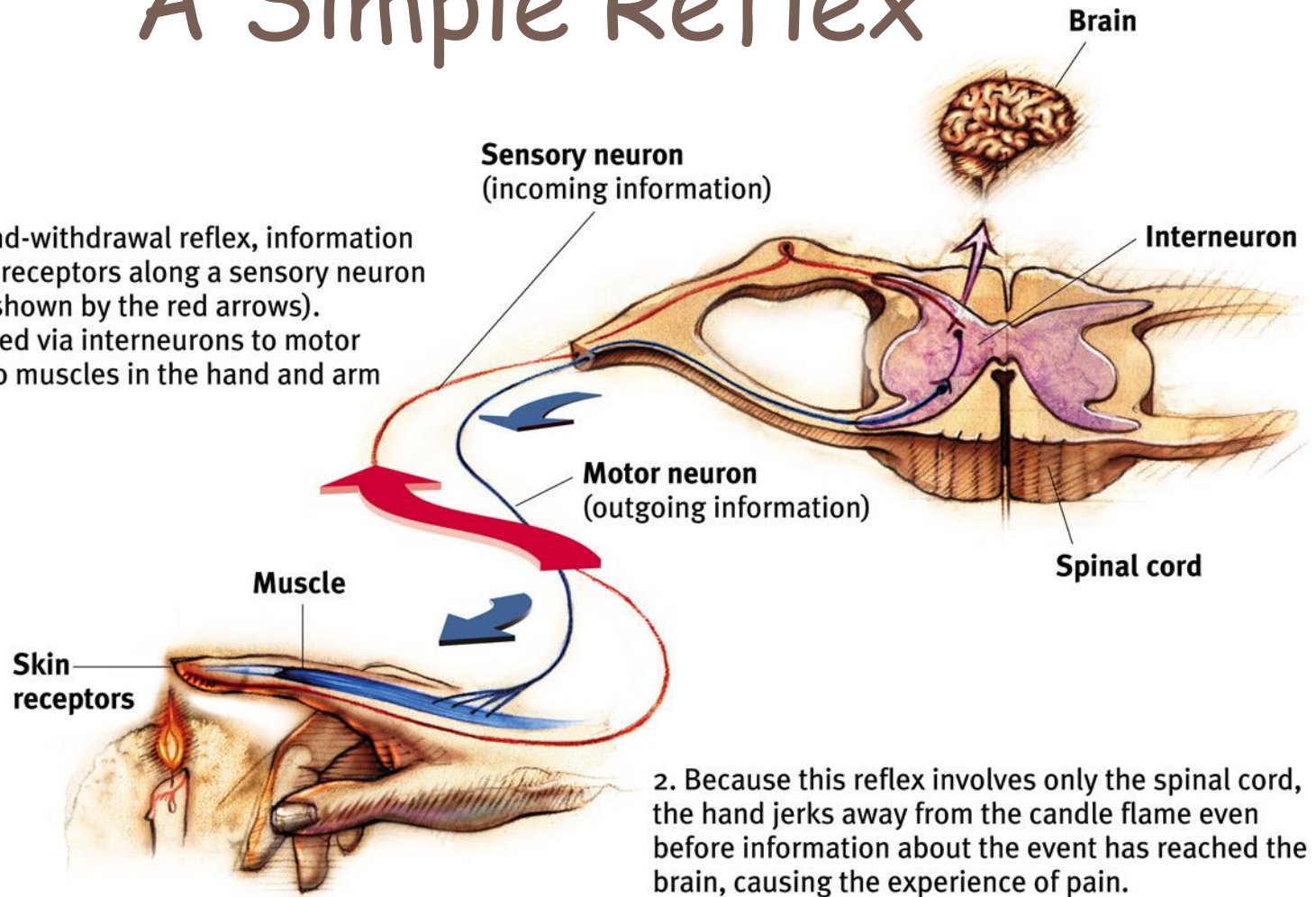


A Neural Chain



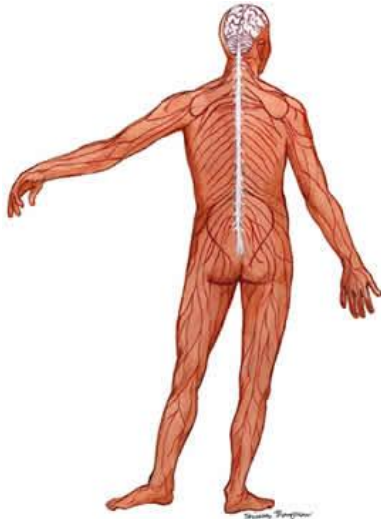
A Simple Reflex

1. In this simple hand-withdrawal reflex, information is carried from skin receptors along a sensory neuron to the spinal cord (shown by the red arrows). From here it is passed via interneurons to motor neurons that lead to muscles in the hand and arm (blue arrows).



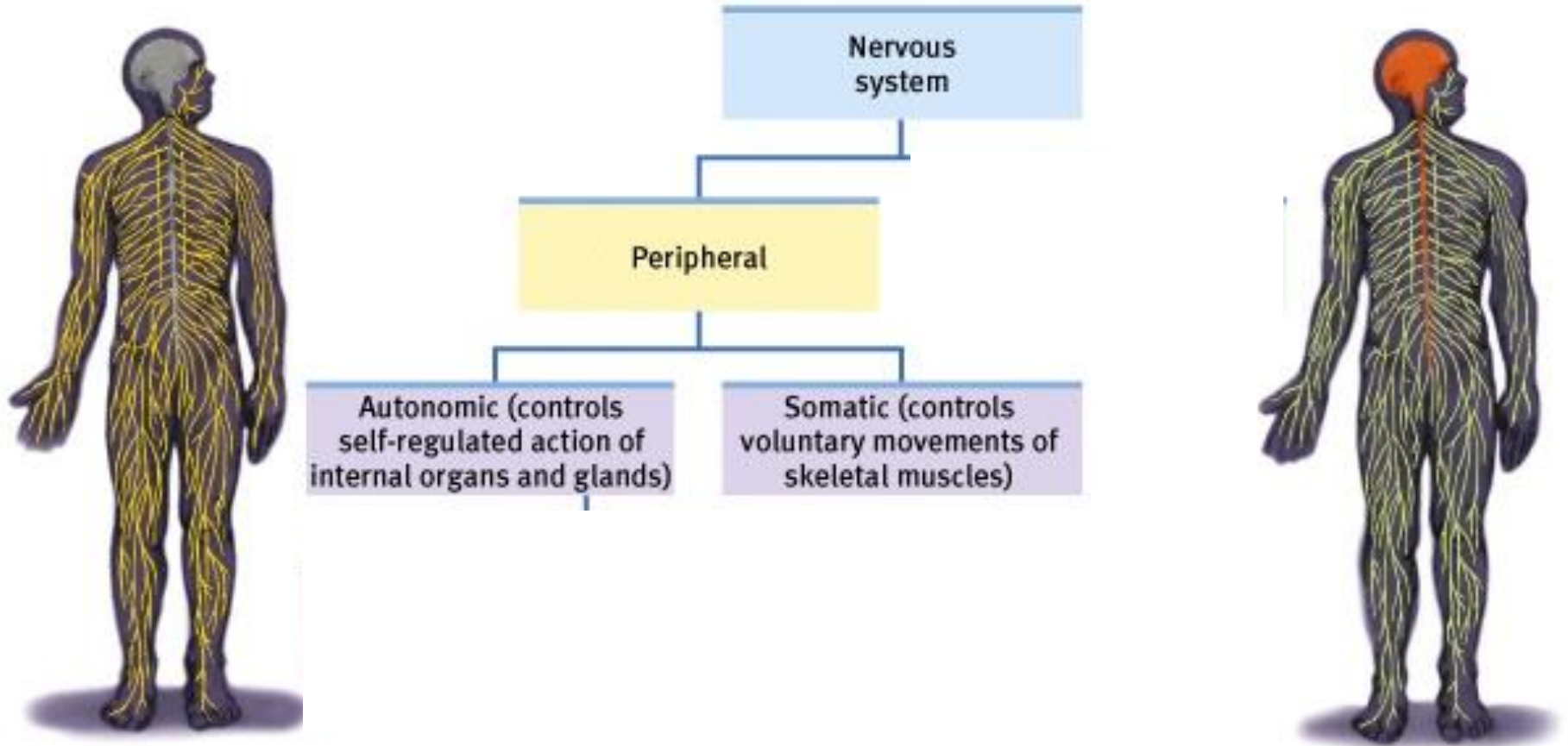
2. Because this reflex involves only the spinal cord, the hand jerks away from the candle flame even before information about the event has reached the brain, causing the experience of pain.

Peripheral Nervous System (PNS)



- All nerves that are not encased in bone.
- Everything but the brain and spinal cord.
- Consist of “cables” that contain many neurons that connect muscles, glands and sense organs to the CNS.
- Is divided into two categories... **somatic** and **autonomic**.

The Nervous System

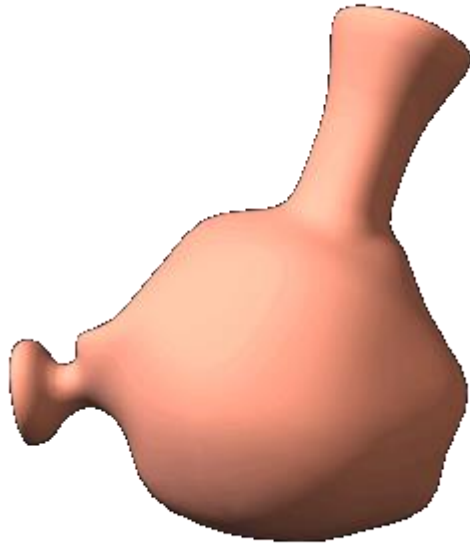


Somatic Nervous System

- Connects to sensory receptors and controls skeletal muscles.
- Controls voluntary muscle movement.
- Uses motor (efferent) neurons.

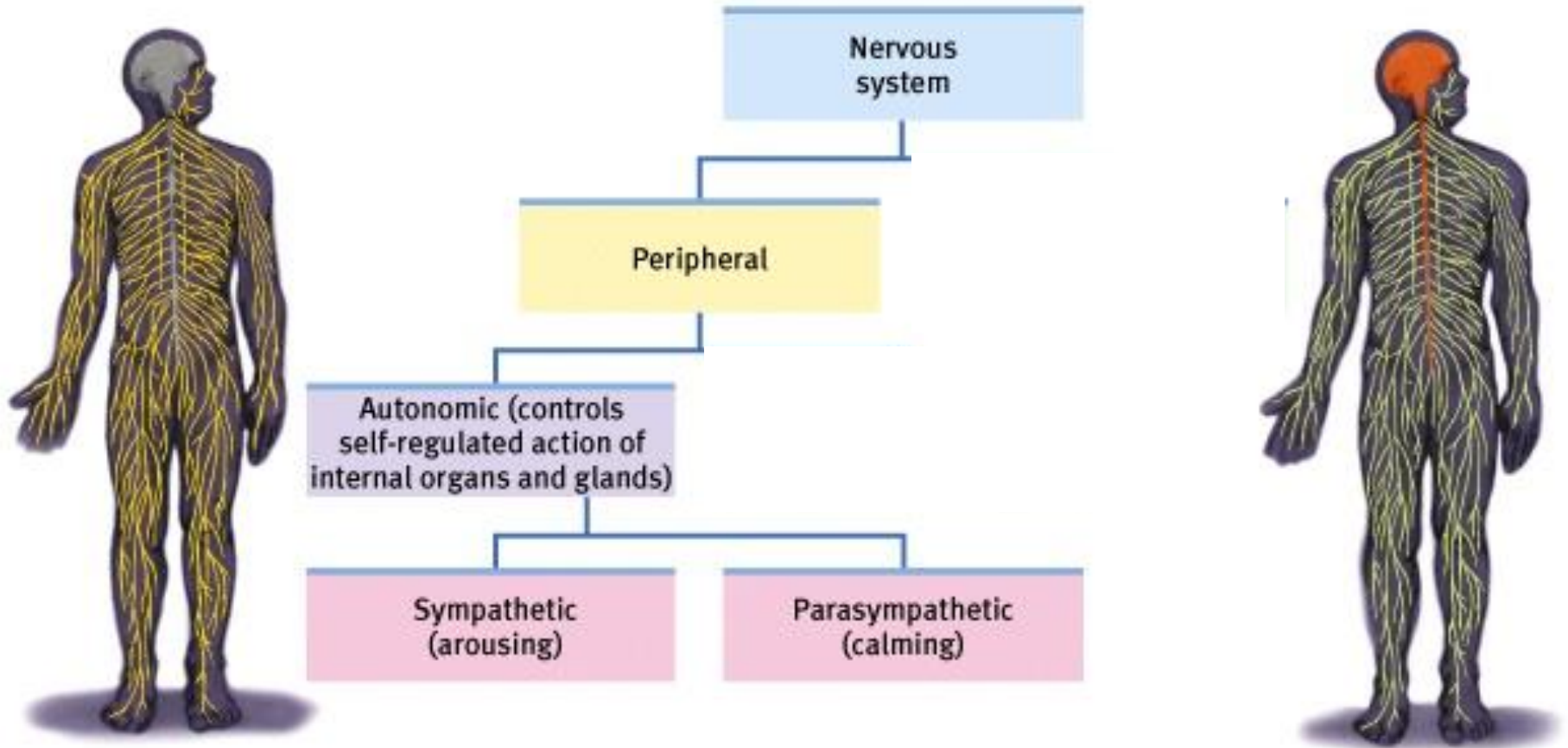


Autonomic Nervous System



- Controls the involuntary (automatic) functions of the body.
- Divided into two categories...the sympathetic and the parasympathetic

The Nervous System



Sympathetic Nervous System

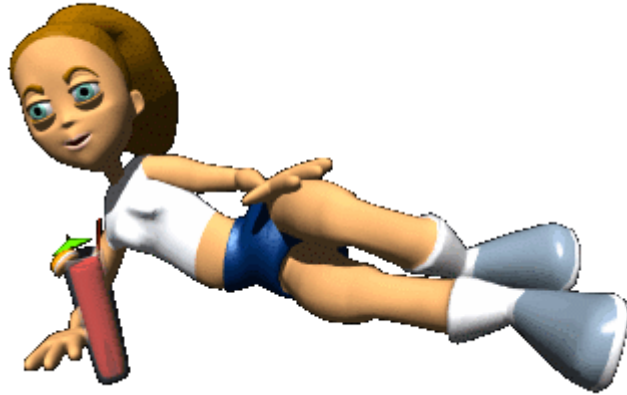
- *Fight or Flight Response.*
- *Automatically accelerates heart rate, breathing, dilates pupils, slows down digestion.*



Arouses



*Para*sympathetic Nervous System



- Automatically slows the body down after a stressful event.
- Heart rate and breathing slow down, pupils constrict and digestion returns to normal.

Calms

The Endocrine System

- *A system of glands that secrete hormones directly into the bloodstream.*
- *Similar to nervous system, except hormones work a lot slower than neurotransmitters.*



Hormones



Neurotransmitters

Hormones

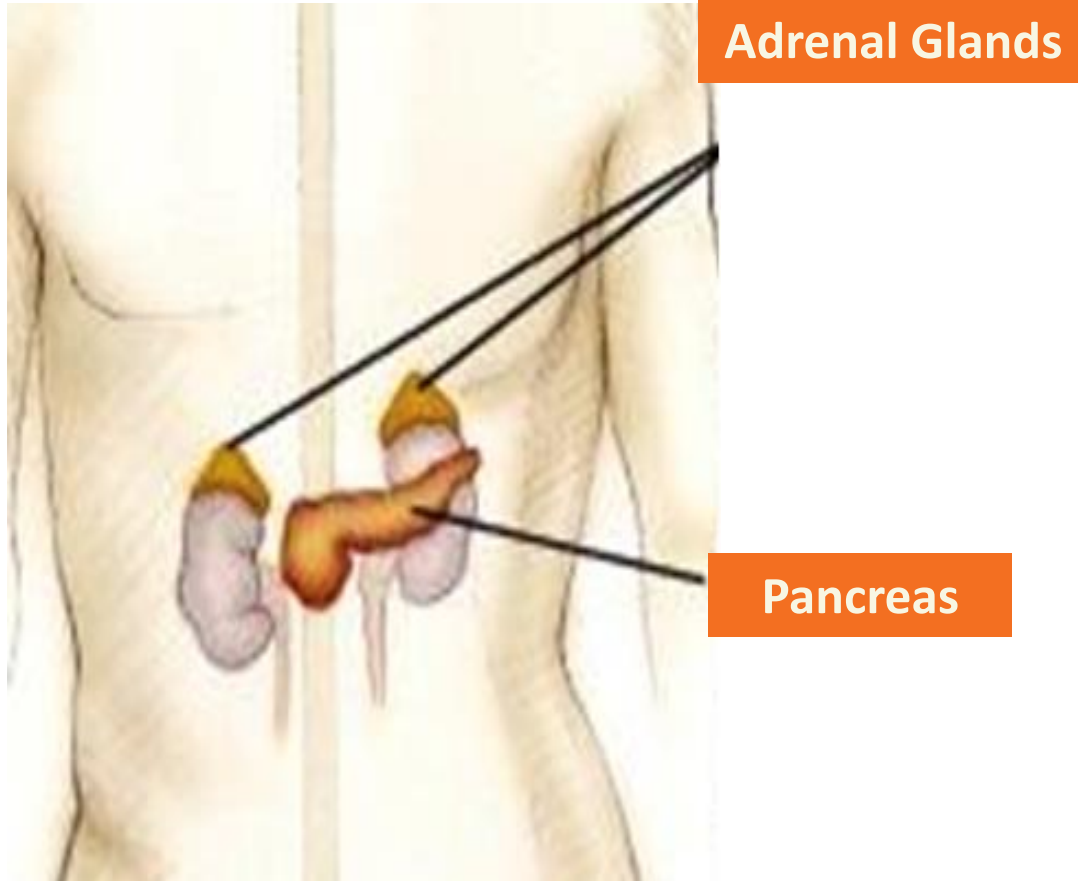
Hormones are chemicals synthesized by the endocrine glands that are secreted in the bloodstream. Hormones affect the brain and many other tissues of the body.

Instead of neurotransmitters communicating at nearby synapses, hormones travel throughout the body, carrying messages to any cell that will listen.

The messages of hormones last a lot longer than neural messages.

Adrenal Glands

produce hormones such as adrenaline/epinephrine, noradrenaline/norepinephrine, and cortisol.



1. The sympathetic “fight or flight” nervous system responds to stress by sending a message to adrenal glands to release the hormones listed above.
2. Effect: increased heart rate, blood pressure, and blood sugar. These provide ENERGY for the fight or flight!

Pituitary Gland

- Is called the “master gland” because it releases hormones that regulate other glands.

- Controlled by the hypothalamus

- Secretes growth hormone: too little - dwarfism



too much - gigantism

Also secretes oxytocin,
the “bonding hormone.”



Pituitary gland
(secretes many different
hormones, some of which
affect other glands)