The Unipolar Neuron

The unipolar neuron is a sensory neuron and carries an electrical signal to the CNS. However, the anatomy of unipolar neurons is subject to different interpretations. As the unipolar neuron develops, there is a single protoplasmic process which extends from the neuron's soma. This process splits immediately into two segments: 1) a proximal segment which enters the spinal cord; 2) a distal segment which extends out into the body and terminates in tissue as a "receptor". Some refer to the two processes as "axons" while others refer to only the proximal process as an axon and the distal process as the dendrite. Saladin chooses the former while others (including myself!) choose the latter interpretation.

Here is the critical issue. The receptor (i.e. dendrite) in the target tissue is stimulated and generates an action potential that moves towards the spinal cord (either in the dendrite or axon depending on which interpretation you choose). As the electrical signal approaches the soma, **it does not need to create a local potential within the soma** and the action potential continues to propagate the signal beyond the protoplasmic process of the soma. At the point of the soma's protoplasmic process, the action potential does not enter the soma, but simply continues uninterrupted along the path to the spinal cord.

Competing Definitions:

1. Unipolar neurons have but one process from the cell body. However, that single, very short, process splits into longer processes (a dendrite plus an axon). Unipolar neurons are sensory neurons - conducting impulses into the central nervous system.

2. A neuron with a cell body that emits a single axonal process resulting from the fusion of two polar processes during development; at a variable distance from the cell body, the process divides into a peripheral axon branch extending outward as a peripheral afferent (sensory) nerve fiber and a central axon branch that enters into synaptic contact with neurons in the spinal cord or brainstem. With the single known exception of the neurons composing the mesencephalic nucleus of the trigeminus, unipolar neurons are the **exclusive neural elements of the sensory ganglia.** The lack of dendritic processes of these primary sensory neurons is only apparent: **the dendritic pole of the unipolar neuron is represented by the unmyelinated terminal ramifications of the peripheral axon branch.** *(The information shown above for **unipolar neuron** is provided by Stedman's. Stedman's, part of Lippincott Williams & Wilkins, provide a comprehensive line of health-science publications for healthcare professionals and medical students.)*

Unipolar Sensory Neuron:

- Afferent Neuron – Moving away from a central organ or point
- Relays messages from receptors to the brain or spinal cord