

Medical Neuroscience | Tutorial Notes

Functional Microanatomy of Neurons

MAP TO NEUROSCIENCE CORE CONCEPTS¹

- NCC1. The brain is the body's most complex organ.
- NCC2. Neurons communicate using both electrical and chemical signals.

LEARNING OBJECTIVES

After study of the assigned learning materials, the student will:

1. Differentiate the basic classes of cells found in the central nervous system (CNS).
2. Characterize the “functional microanatomy” of neurons (differentiate neuronal cell bodies, dendrites, axons and synapses).
3. Describe the microanatomical composition of gray matter and white matter in the CNS.

TUTORIAL OUTLINE

- I. Functional microanatomy of neurons
 - A. general features of neurons
 1. *Neurons are the fundamental unit of function in the CNS*
 2. possess all cellular and metabolic machinery common to all other somatic cells (see [Figure 1.3](#)²)
 3. but they are distinguished from most other somatic cells by their:
 - a. rich diversity in morphology (shape)
 - b. bioelectrical properties (they generate electrical signals)
 - c. specializations for intercellular communication
 - B. survey of neuronal microanatomy (see [Figure 1.2](#))
 1. **cell body**, also called a soma (= “body”; plural = *somata*)
 - a. contains nucleus, nucleic acids, and the usual organelles
 - b. typically, neurons are very active metabolically in order to support neural signaling and the synthetic requirements that are necessary to maintain the intricate protoplasmic processes that arise from neuronal somata

¹ Visit [BrainFacts.org](https://www.brainfacts.org) for Neuroscience Core Concepts (©2012 Society for Neuroscience) that offer fundamental principles about the brain and nervous system, the most complex living structure known in the universe.

² Figure references to Purves et al., *Neuroscience*, 5th Ed., Sinauer Assoc., Inc., 2012. [[click here](#)]