Foundations of Psychophysiology

Part 2.1: Overview of the human nervous system

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NEUROADAPTIVE
HUMAN-COMPUTER
INTERACTION

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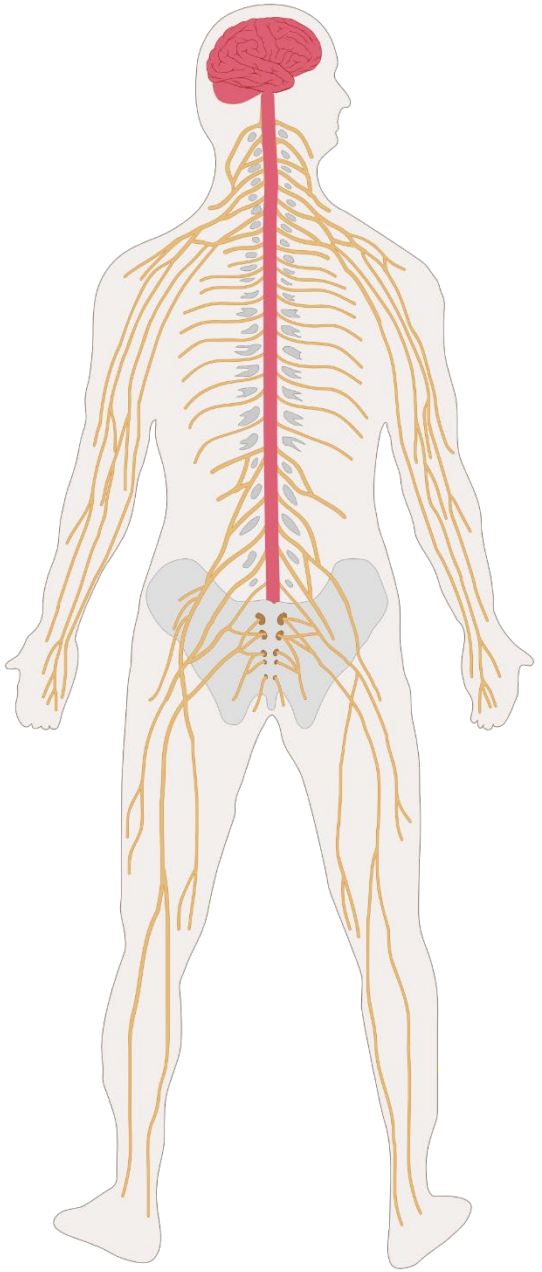
Structural definition

The nervous system refers to the collection of neurons and supportive glial cells in the body.

The central nervous system (CNS) refers to the brain and spinal cord, contained within the dorsal body cavity.

The peripheral nervous system (PNS) refers to (parts of) neurons outside of the brain and spinal cord.



Functional definition

The nervous system transmits signals between different parts of the body in order to coordinate physical action and process sensory information.

Neural activity is not the *only* communication system in the body: the endocrine system uses hormones for communication. (But is largely controlled by the nervous system.)

Functional definition

- Somatic nervous system

  Controls interaction with the external environment:
  - Carries sensory impressions to the CNS
  - Controls activity of (voluntary) striated muscles

- Autonomic nervous system

  Controls the internal environment:
  - Controls activity of glands
  - Controls activity of organs
  - Controls smooth (involuntary) and cardiac muscles

Functional definition

The autonomic nervous system can be divided into two separate systems.

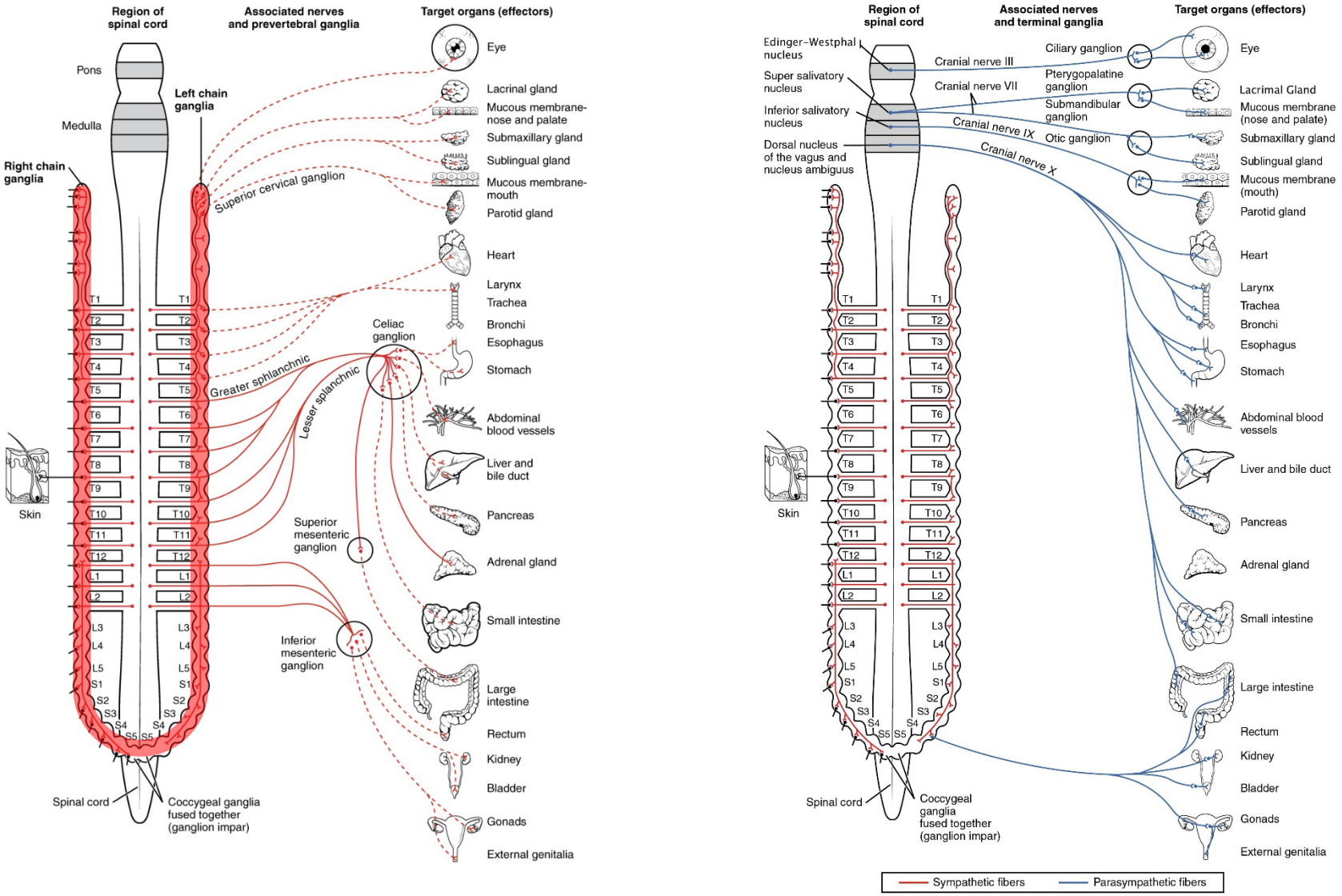
- Sympathetic nervous system

  Dominant in “fight or flight” situations

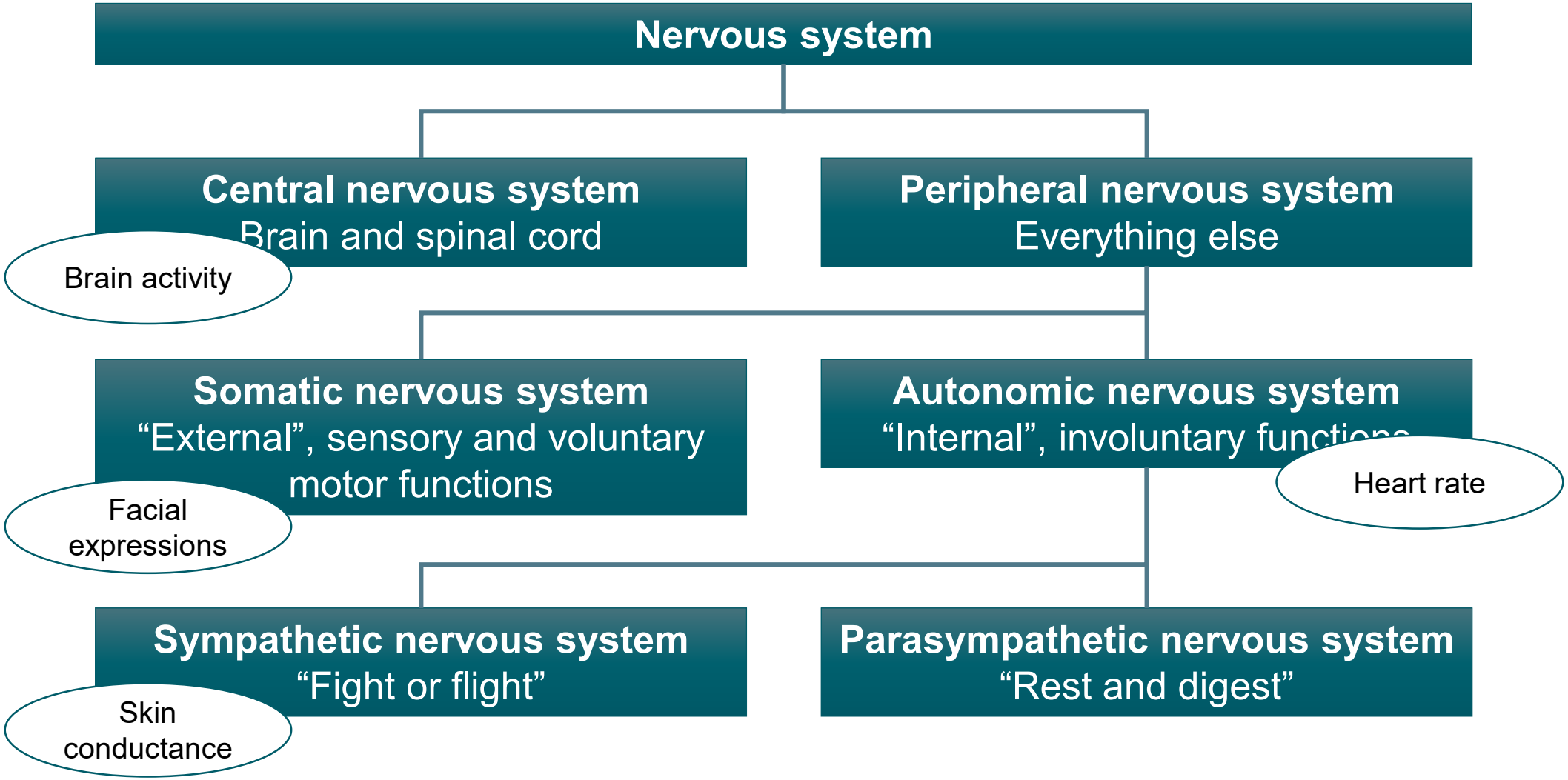
- Parasympathetic nervous system

  Dominant in “rest and digest” situations

Sympathetic and parasympathetic innervation



Overview


Nervous system
Central nervous system
Brain and spinal cord
Peripheral nervous system
Everything else
Brain activity
Somatic nervous system
"External", sensory and voluntary motor functions
Autonomic nervous system
"Internal", involuntary functions
Heart rate
Facial expressions
Sympathetic nervous system
"Fight or flight"
Parasympathetic nervous system
"Rest and digest"
Skin conductance

Nervous system

The human nervous system can be divided into structurally and functionally separate systems.

We have the central, peripheral, somatic, and autonomic nervous systems.

The autonomic nervous system furthermore consists of the sympathetic and parasympathetic nervous systems which behave antagonistically between “fight or flight” and “rest and digest”.

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