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Introduction to neuroscience
The regulatory role of nervous system

Contact

Kamil Ďuriš

Department of Pathological Physiology (A18)

kduris@med.muni.cz

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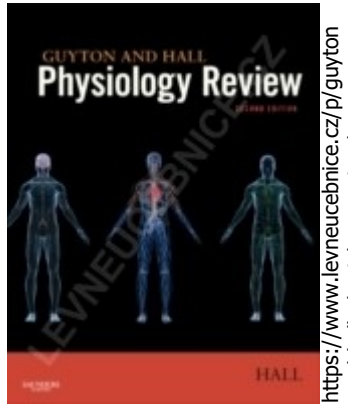
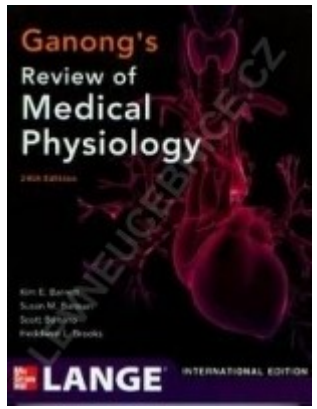
Literature

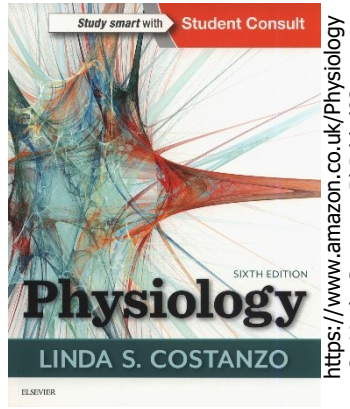
- Ganong's Review of Medical Physiology
- Boron - Medical Physiology
- Guyton - Physiology Review
- Constanzo - Physiology



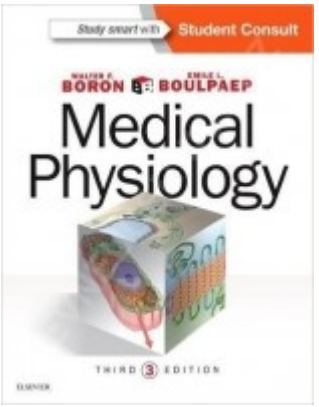
https://www.levneucebnice.cz/p/guyton-and-hall-physiology-review/



https://www.levneucebnice.cz/p/ganong-s-review-of-medical-physiology-9781259009624/



https://www.amazon.co.uk/Physiology-6e-Linda-Costanzo-PhD/dp/03



https://www.levneucebnice.cz/p/medical-physiology-3rd-ed//

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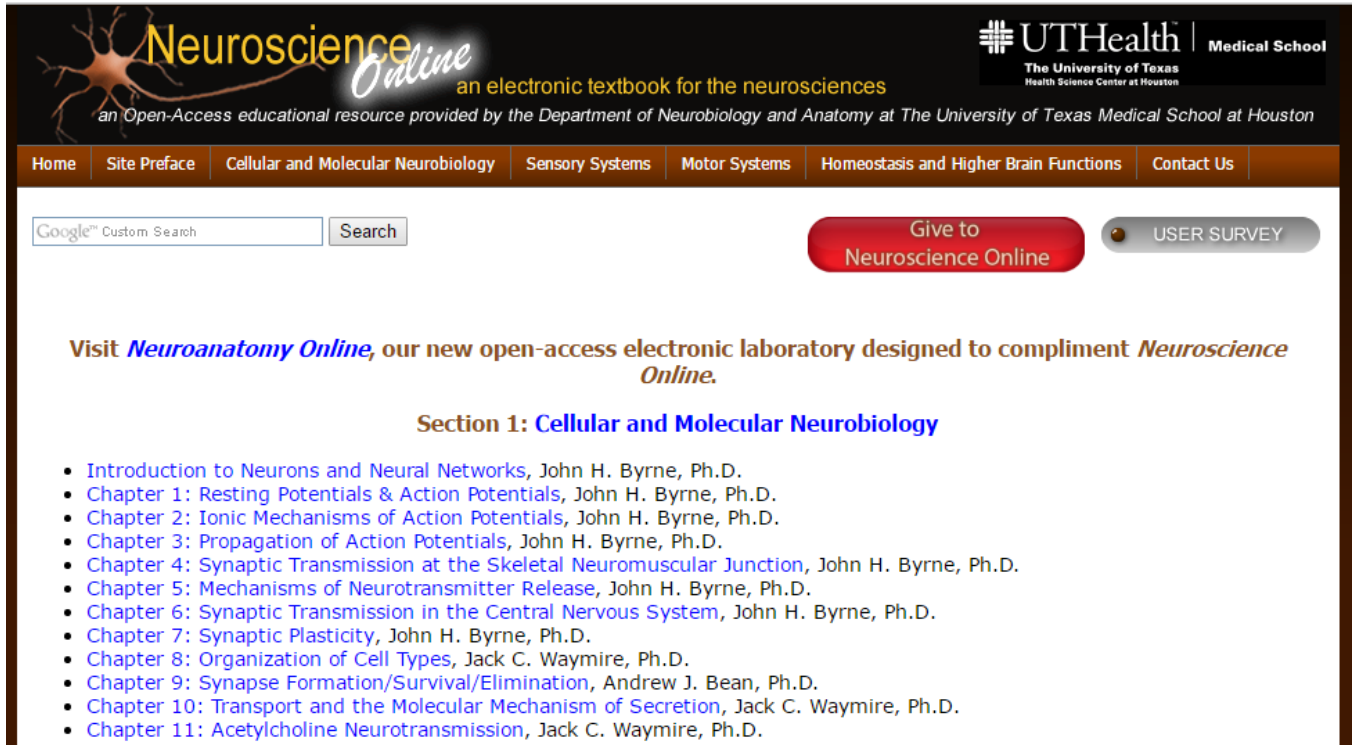
The other sources

– Neuroscience Online, The University of Texas



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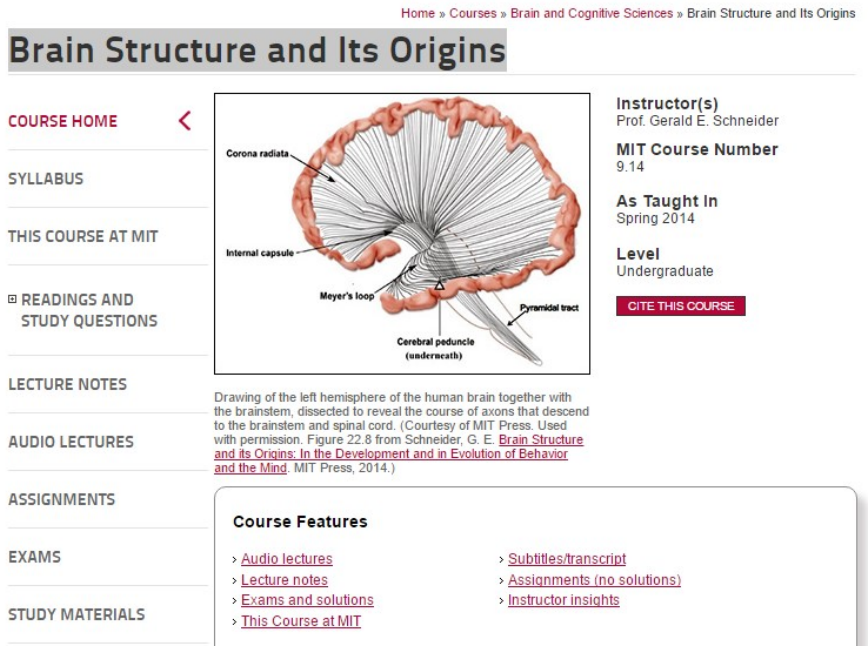
The other sources

- MIT - Brain Structure and Its Origins
- http://ocw.mit.edu/courses/brain-and-cognitive-sciences/9-14-brain-structure-and-its-origins-spring-2014/#



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The objetives

Basic understanding of the role and function of nervous system

Why and how to STUDY neuroscience

FACTS

Neuroscience: Brain

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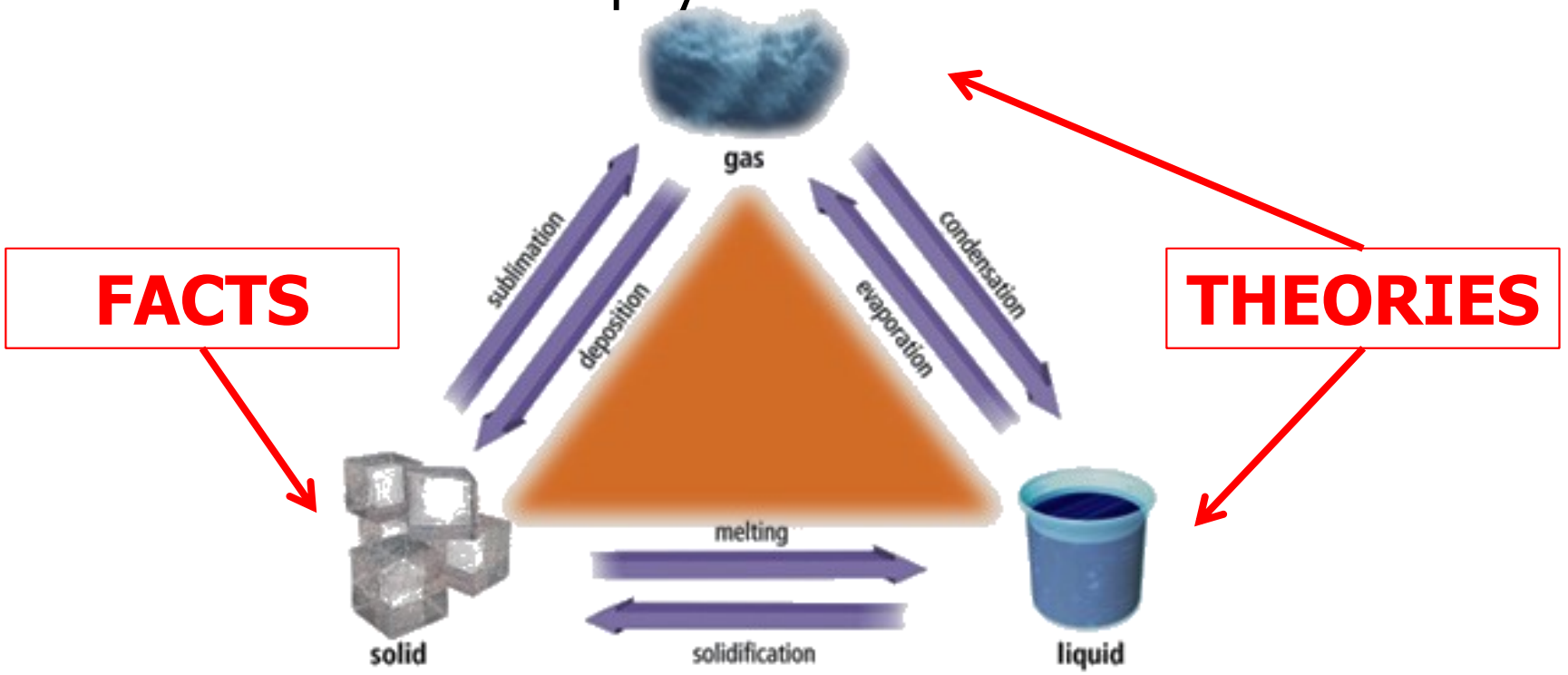
Why and how to STUDY neuroscience

Philosophy : Mind behind Mind

PS Deb



Neuroscience: Brain

Psychology : Mind

http://www.slideshare.net/drpsdeb/presentations

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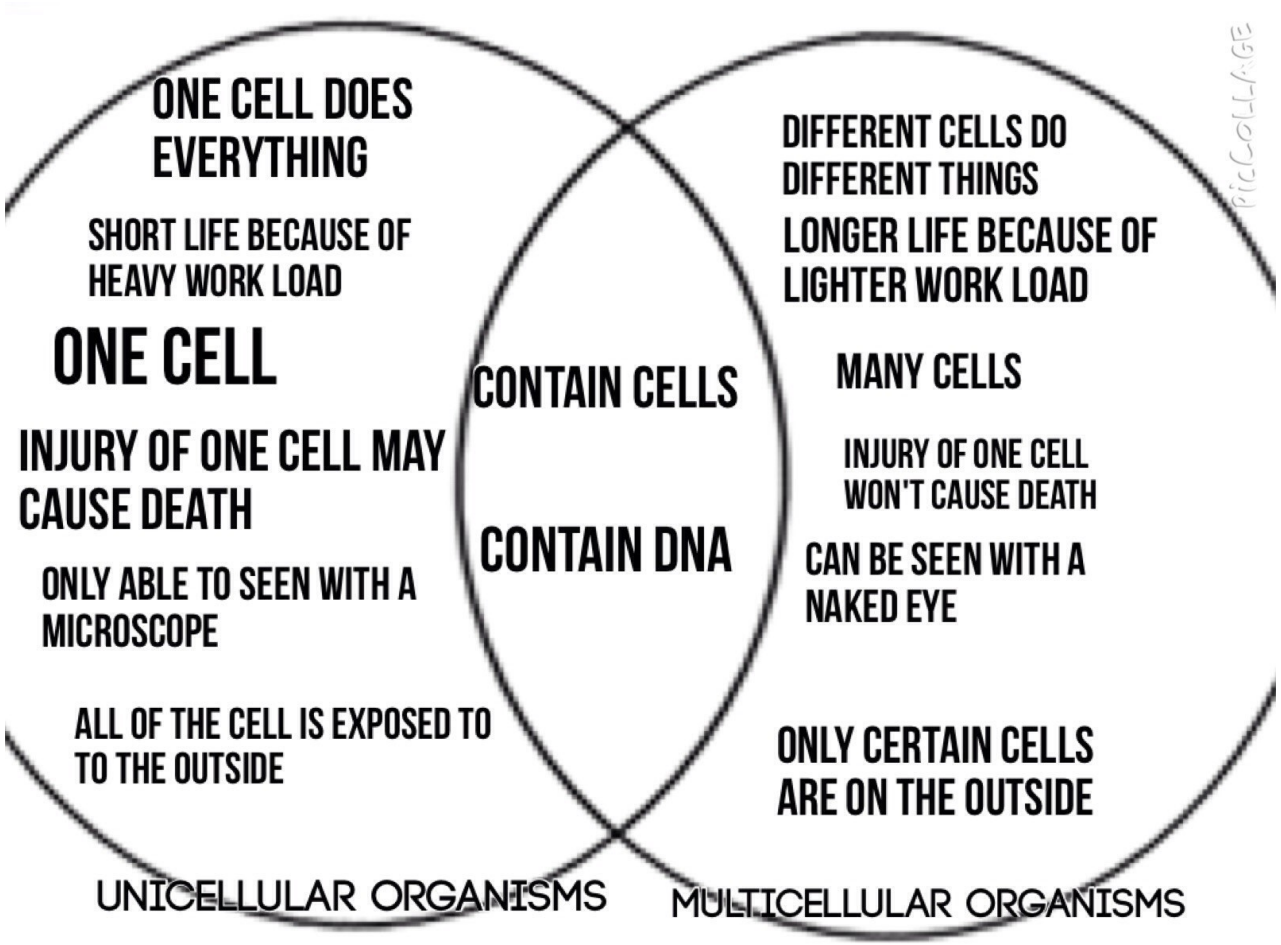
What is nervous system good for?

The role of nervous system



http://edublog.amdsb.ca/

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The role of nervous system

Unicellular organism

- One cell has to do everything- lower effectivity
- Total dependence on environment
- High level of stress
- Short life time

Multicellular organism

- Functional specialization of particular cells – higher effectivity
- Inner environment – homeostasis
- Lower level of stress
- Longer life time

Compartmentalization

- Cellular specialization leads to compartmentalization on several levels
  - Tissue level
  - Organ level
  - Organ system level

Compartmentalization

- Cellular specialization leads to compartmentalization on several levels
  - Tissue level
  - Organ level
  - Organ system level
- There are barriers in between compartments
- Properties/content may vary among different compartments

The role of nervous system

- The essentials for survival of multicellular organism
  - To maintain homeostatis
  - To coordinate bodily functions

The role of nervous system

- The essentials for survival of multicellular organism
  - ➢ To maintain homeostatis
  - ➢ To coordinate bodily functions

- ➢ Maintaining homeostasis
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- ➢ Coordination of bodily functions
  - – To receive signals from outer and inner environment
  - – To process this information
  - – To respond in a coordinate manner to these stimuli

The role of nervous system

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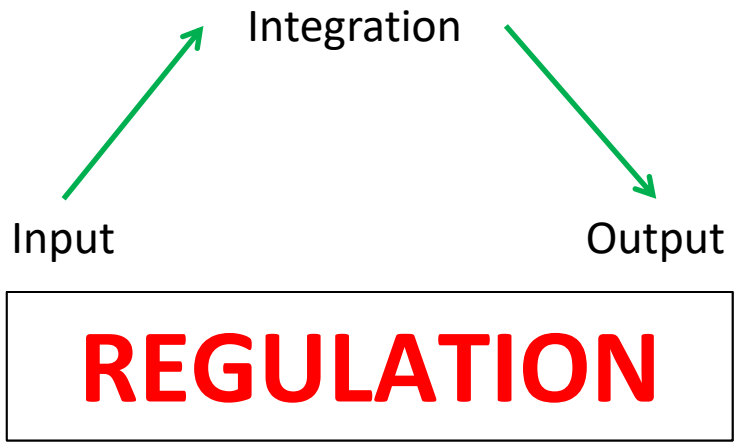

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The role of nervous system

- Regulation
  - Nervous
  - Humoral

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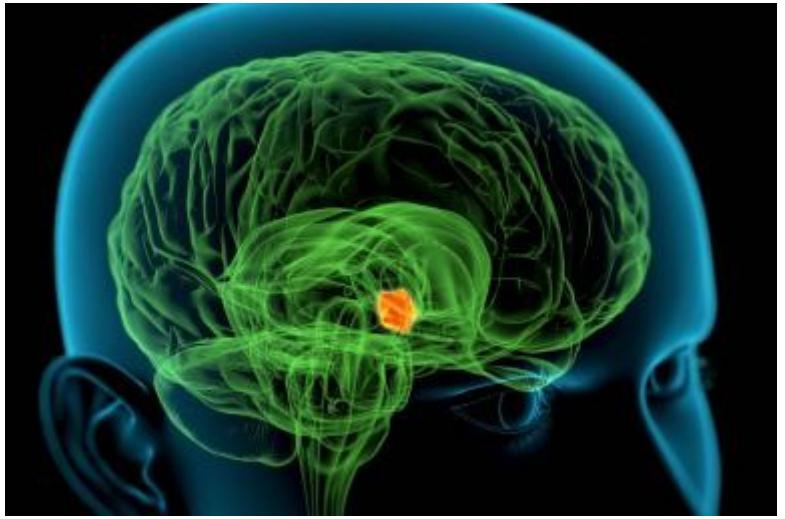

http://biology.about.com/od/anatomy/p/Hypothalamus.htm

Central nervous system controls both types of regulations

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The role of nervous system

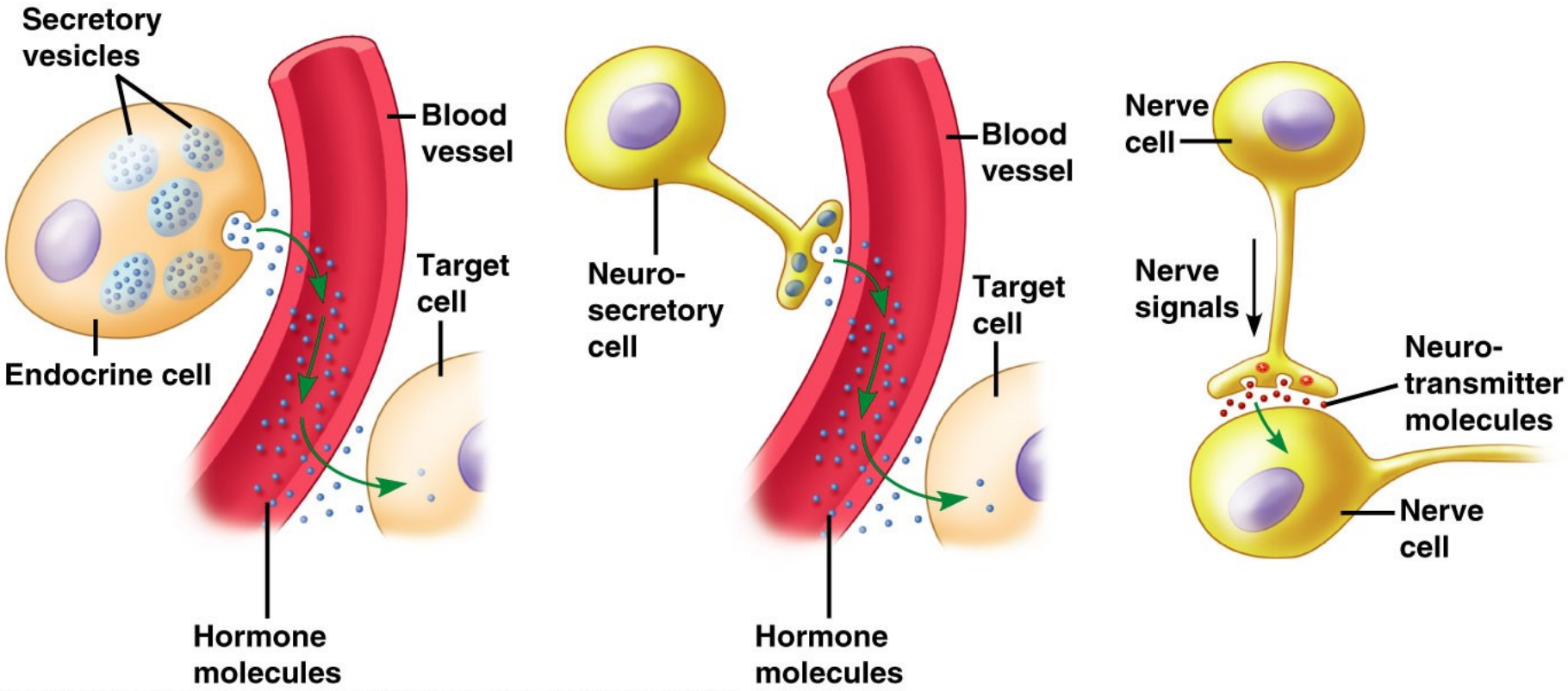
Humoral regulations

- Hormone
- Non-specific channel of conduction (blood stream)
- Target site defined by specific receptor
- Low energetical demands
- Slow
- Long duration

Nervous regulations

- Neurtransmitters
- Specific channel of conduction
- Target site defined by infrastructure
- High energetical demands
- Fast
- Short duration

Hormonal and nervous regulations



http://www.austincc.edu/

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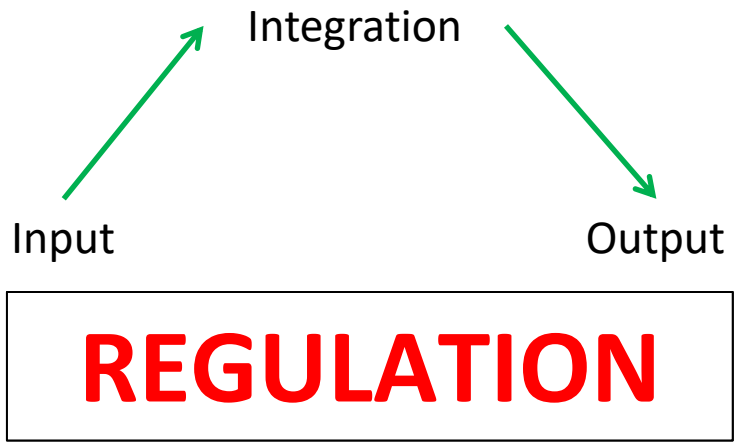
The role of nervous system



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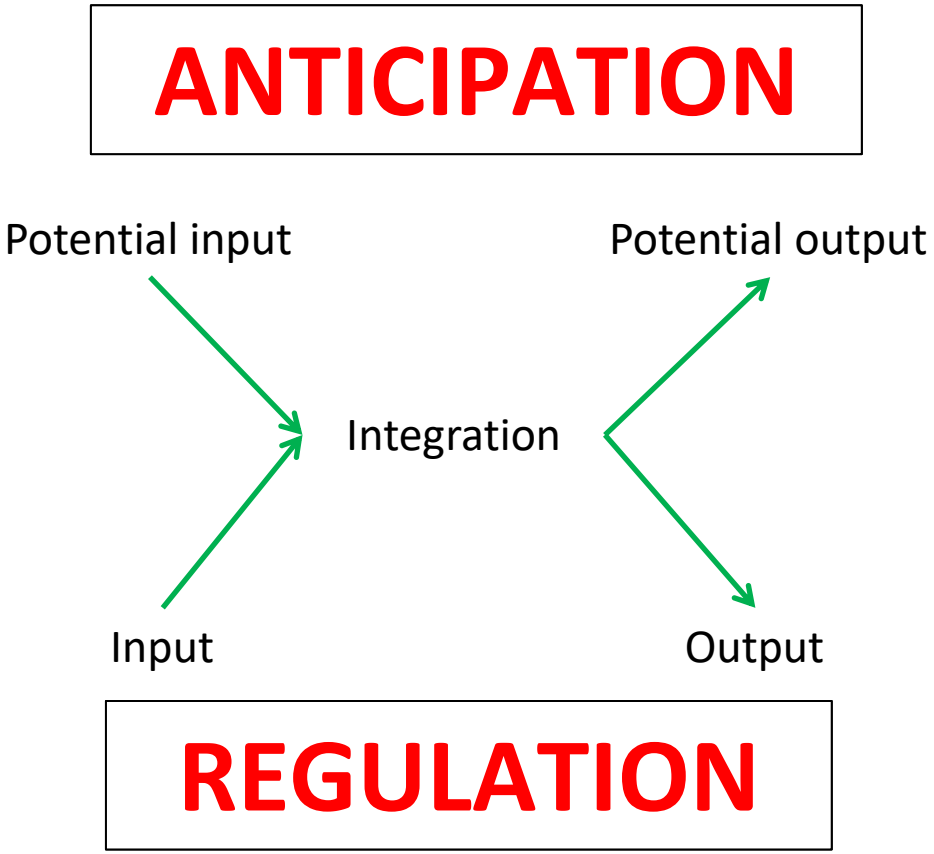

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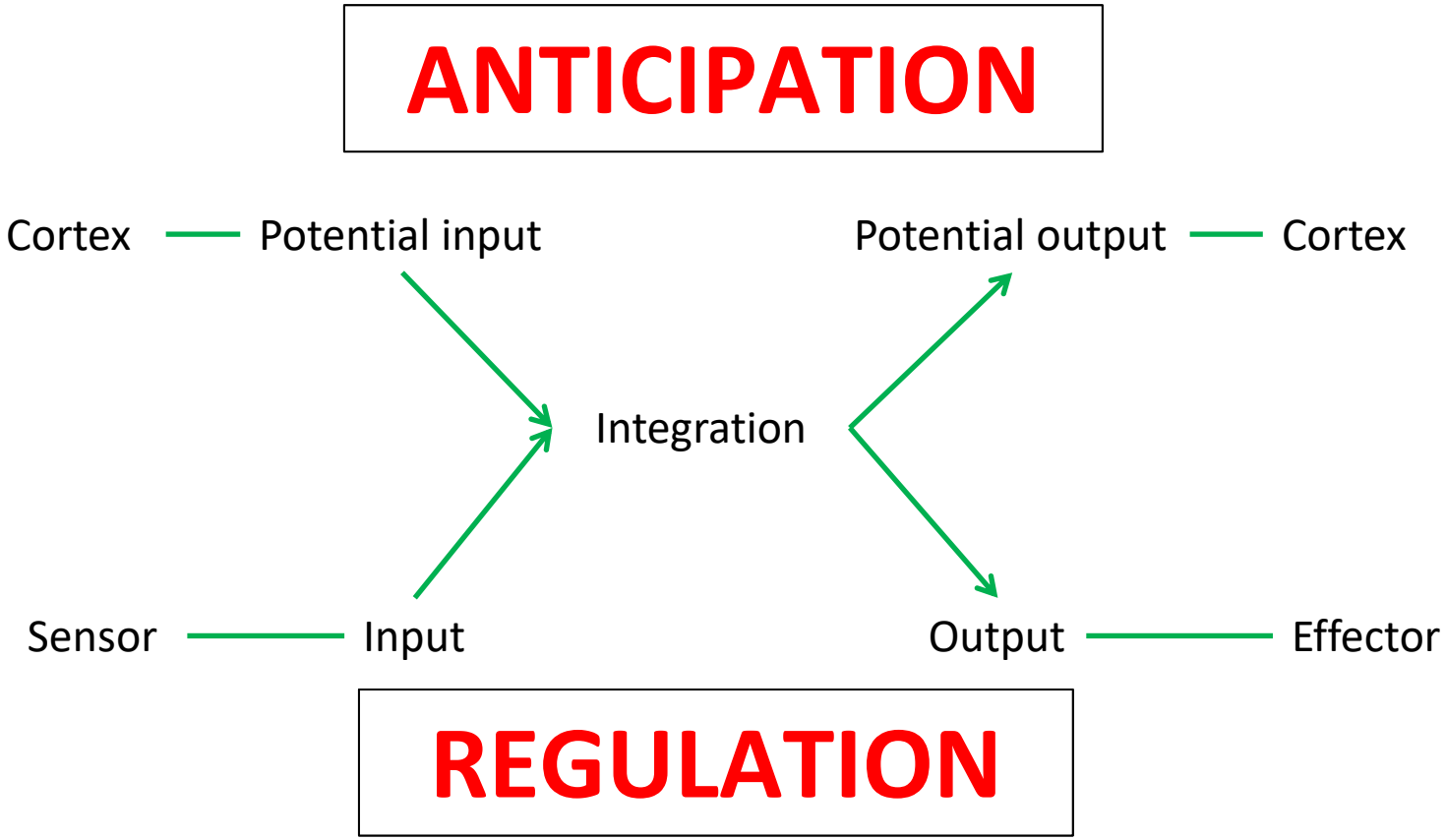
The role of nervous system



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Evolutionary approach

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Evolutionary approach
Evolution is not revolution

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Evolutionary approach

- Evolutionary old structures have not been replaced by new ones during evolution, but the old has been kept and the new added

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- Evolutionary old structures have not been replaced by new ones during evolution, but the old has been kept and the new added

- Evolutionary younger structures were associated with new functions or with the improvement in existing functions

- It is important to ask what is any particular function good for and how it has been improved in course of evolution

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67. The importance and the regulatory role of nervous system

- ✓ Unicellular versus multicellular organisms, compartmentalization, control is essential
- ✓ Nervous system is essential for multicellular organisms
  - Homeostasis maintenance
  - Bodily functions coordinations
- ✓ Regulation
  - Definition
  - Nervous vs. humoral
- ✓ Regulation vs. anticipation

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