

1

Introduction to neuroscience
The regulatory role of nervous
system

Contact

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The objectives

Basic understanding of the role and function of nervous system

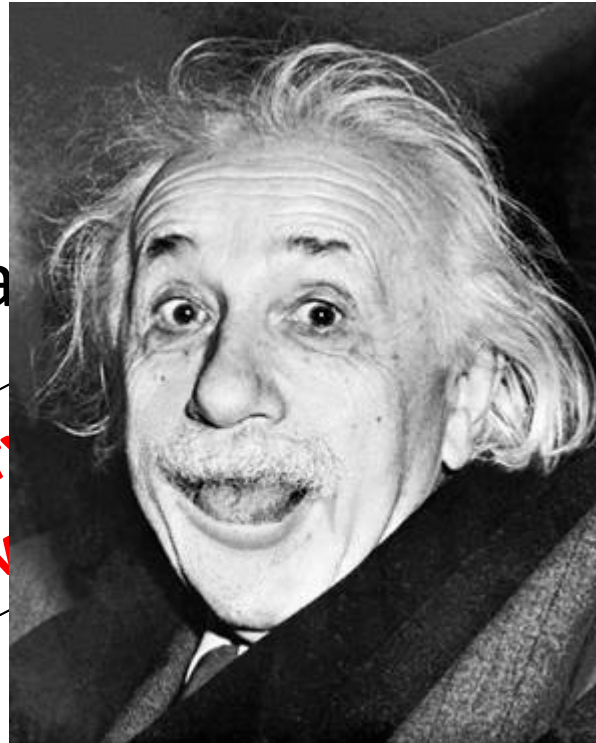
The objectives

Basic understanding of the structure and function of the nervous system

Central nervous system is the most complex known structure in the universe !!!

The objectives

Basic understand



most complex
verse !!!

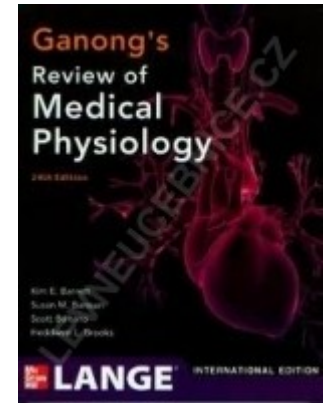
and function of

Central nervous
know

http://vignette4.wikia.nocookie.net/uncyclopedia/images/2/2a/Albert_Einstein_terrified.jpg/revision/latest?cb=20091027204038

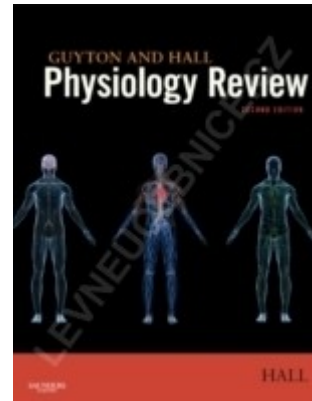
Literature

- Ganong's Review of Medical Physiology



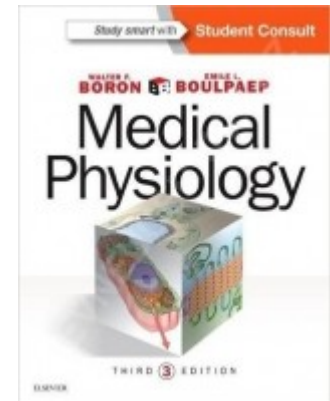
<https://www.levneucebnice.cz/p/ganong-s-review-of-medical-physiology-9781259009624/>

- Guyton - Physiology Review



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

- Boron - Medical Physiology



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

The other sources

- SlideShare
- <http://www.slideshare.net/CsillaEgri/presentations>

The screenshot shows the SlideShare profile of Csilla Egri. The profile includes a profile picture, a 'Follow' button, and statistics: 14 SlideShares, 21 Followers, and 0 Clipboards. The main content area displays a grid of 8 presentation thumbnails, each with a title, a brief description, and view statistics. The presentations are: 'Muscle senses & Reflex organization' (3,336 views), 'Somatosensory System' (4,999 views), 'The Science of Sleep' (613 views), 'Cerebellum and basal ganglia' (6,281 views), 'The Vestibular System' (4,343 views), 'Anatomy and Physiology of the...' (3,177 views), 'Autonomic nervous system' (1,192 views), and 'Generation and conduction of ...' (3,715 views). The interface also features a search bar, navigation tabs (Home, Technology, Education, More Topics, My Clipboards), and an 'Upload' button.

SlideShare | Search

Home Technology Education More Topics My Clipboards For Uploaders Collect Leads

Csilla Egri

14 SlideShares
21 Followers
0 Clipboards

14 presentations | documents | videos | infographics **Latest** | Most Popular

Muscle senses & Reflex organization
1 year ago
3,336 views

The Somatosensory System
1 year ago
4,999 views

The Science of Sleep
1 year ago
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Cerebellum and basal ganglia
1 year ago
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The Vestibular System
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Anatomy and Physiology of the Auditory System
1 year ago
3,177 views

Autonomic nervous system
1 year ago
1,192 views

Generation and conduction of ...
1 year ago
3,715 views

The other sources

- SlideShare
- <http://www.slideshare.net/drpsdeb/presentations>

The screenshot shows a SlideShare profile for 'PS Deb'. The profile includes a profile picture of a man in a white lab coat, a 'Follow' button, and statistics: 165 SlideShares, 338 Followers, and 1 Clipboard. The main content area displays a grid of 8 presentation thumbnails with titles and view counts. The navigation bar at the top includes 'Home', 'Technology', 'Education', 'More Topics', 'My Clipboards', 'For Uploaders', and 'Collect Leads'. The search bar and 'Upload' button are also visible.

PS Deb
165 SlideShares
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1 Clipboard

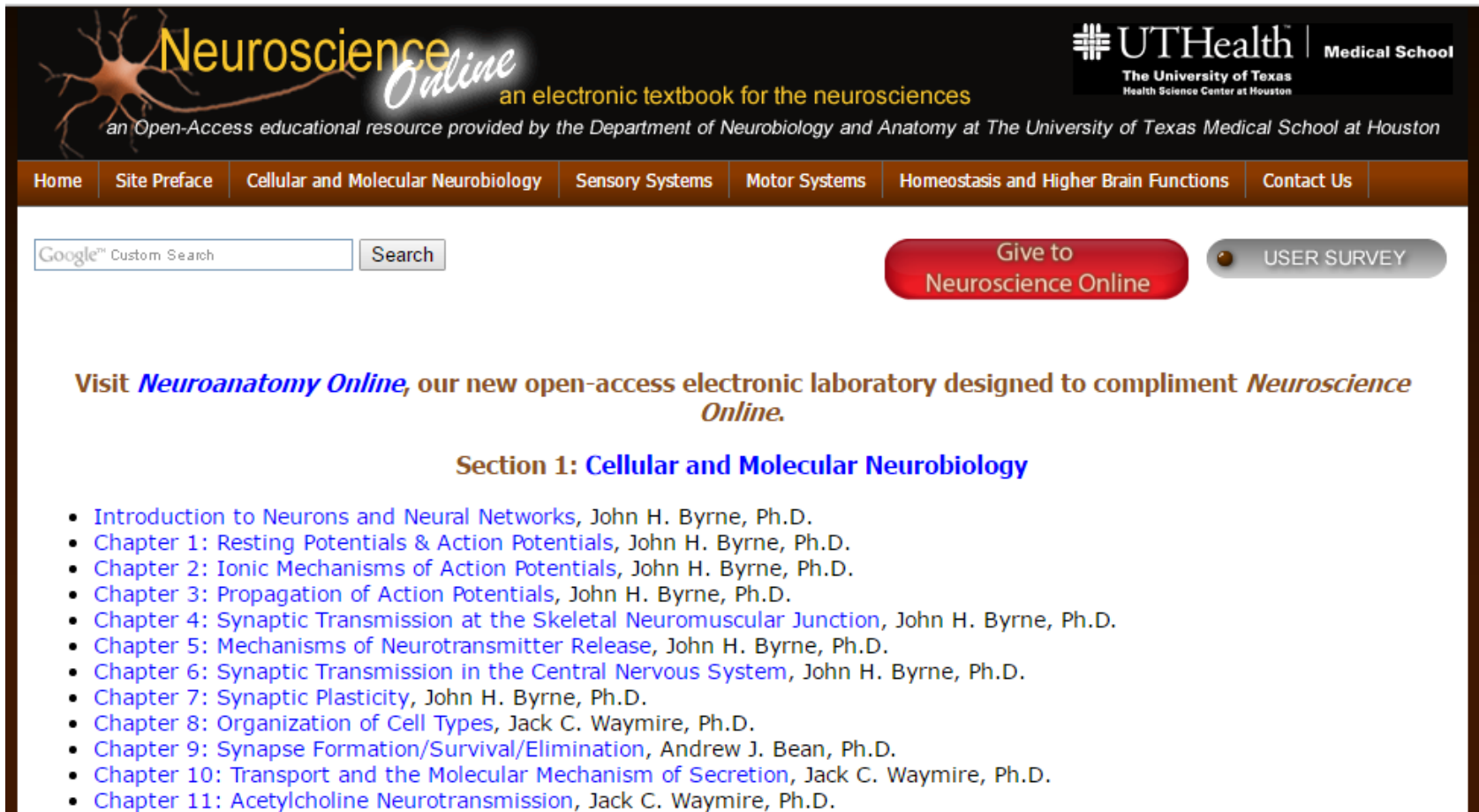
165 presentations documents videos infographics

Latest Most Popular

- 10a motor system locomotion**
6 years ago
19 views
- 08d visual signal processing ...**
6 years ago
2 views
- 08c vision processing stereopsis**
6 years ago
24 views
- 08b vision processing form an...**
6 years ago
17 views
- 08b vision processing form an...**
6 years ago
47 views
- 08a vision processing overview**
6 years ago
9 views
- 08a vision processing intordu...**
6 years ago
2 views
- 07 auditory taste and smell s...**
6 years ago
998 views

The other sources

- Neuroscience Online
- <http://neuroscience.uth.tmc.edu/toc.htm>



The screenshot shows the Neuroscience Online website. At the top left is a logo of a neuron with the text "Neuroscience Online" and "an electronic textbook for the neurosciences". Below this is the text "an Open-Access educational resource provided by the Department of Neurobiology and Anatomy at The University of Texas Medical School at Houston". On the top right is the "UTHealth Medical School" logo, with "The University of Texas Health Science Center at Houston" below it. A navigation bar contains links: Home, Site Preface, Cellular and Molecular Neurobiology, Sensory Systems, Motor Systems, Homeostasis and Higher Brain Functions, and Contact Us. Below the navigation bar is a Google Custom Search box with a "Search" button, a red "Give to Neuroscience Online" button, and a "USER SURVEY" button. The main content area features a promotional message: "Visit *Neuroanatomy Online*, our new open-access electronic laboratory designed to compliment *Neuroscience Online*." Below this is a section header "Section 1: Cellular and Molecular Neurobiology" followed by a list of 11 chapters with their authors.

Neuroscience Online
an electronic textbook for the neurosciences
an Open-Access educational resource provided by the Department of Neurobiology and Anatomy at The University of Texas Medical School at Houston

UTHealth Medical School
The University of Texas Health Science Center at Houston

Home | Site Preface | Cellular and Molecular Neurobiology | Sensory Systems | Motor Systems | Homeostasis and Higher Brain Functions | Contact Us

Google™ Custom Search Search

Give to Neuroscience Online USER SURVEY

Visit *Neuroanatomy Online*, our new open-access electronic laboratory designed to compliment *Neuroscience Online*.

Section 1: Cellular and Molecular Neurobiology

- [Introduction to Neurons and Neural Networks](#), John H. Byrne, Ph.D.
- [Chapter 1: Resting Potentials & Action Potentials](#), John H. Byrne, Ph.D.
- [Chapter 2: Ionic Mechanisms of Action Potentials](#), John H. Byrne, Ph.D.
- [Chapter 3: Propagation of Action Potentials](#), John H. Byrne, Ph.D.
- [Chapter 4: Synaptic Transmission at the Skeletal Neuromuscular Junction](#), John H. Byrne, Ph.D.
- [Chapter 5: Mechanisms of Neurotransmitter Release](#), John H. Byrne, Ph.D.
- [Chapter 6: Synaptic Transmission in the Central Nervous System](#), John H. Byrne, Ph.D.
- [Chapter 7: Synaptic Plasticity](#), John H. Byrne, Ph.D.
- [Chapter 8: Organization of Cell Types](#), Jack C. Waymire, Ph.D.
- [Chapter 9: Synapse Formation/Survival/Elimination](#), Andrew J. Bean, Ph.D.
- [Chapter 10: Transport and the Molecular Mechanism of Secretion](#), Jack C. Waymire, Ph.D.
- [Chapter 11: Acetylcholine Neurotransmission](#), Jack C. Waymire, Ph.D.

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/#>

[Home](#) » [Courses](#) » [Brain and Cognitive Sciences](#) » Brain Structure and Its Origins

Brain Structure and Its Origins

COURSE HOME <

SYLLABUS

THIS COURSE AT MIT

READINGS AND
STUDY QUESTIONS

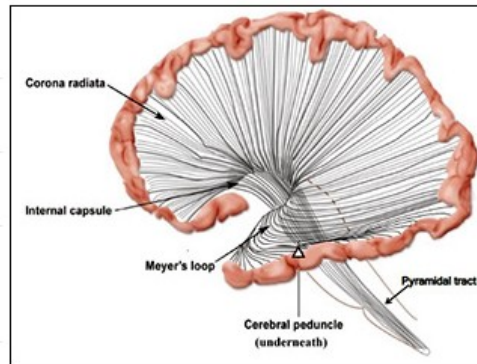
LECTURE NOTES

AUDIO LECTURES

ASSIGNMENTS

EXAMS

STUDY MATERIALS



Drawing of the left hemisphere of the human brain together with the brainstem, dissected to reveal the course of axons that descend to the brainstem and spinal cord. (Courtesy of MIT Press. Used with permission. Figure 22.8 from Schneider, G. E. [Brain Structure and its Origins: In the Development and in Evolution of Behavior and the Mind](#). MIT Press, 2014.)

Instructor(s)

Prof. Gerald E. Schneider

MIT Course Number

9.14

As Taught In

Spring 2014

Level

Undergraduate

[CITE THIS COURSE](#)

Course Features

> [Audio lectures](#)

> [Lecture notes](#)

> [Exams and solutions](#)

> [This Course at MIT](#)

> [Subtitles/transcript](#)

> [Assignments \(no solutions\)](#)

> [Instructor insights](#)

Evolutionary approach

Evolution is not revolution



Evolutionary approach

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

Evolutionary approach

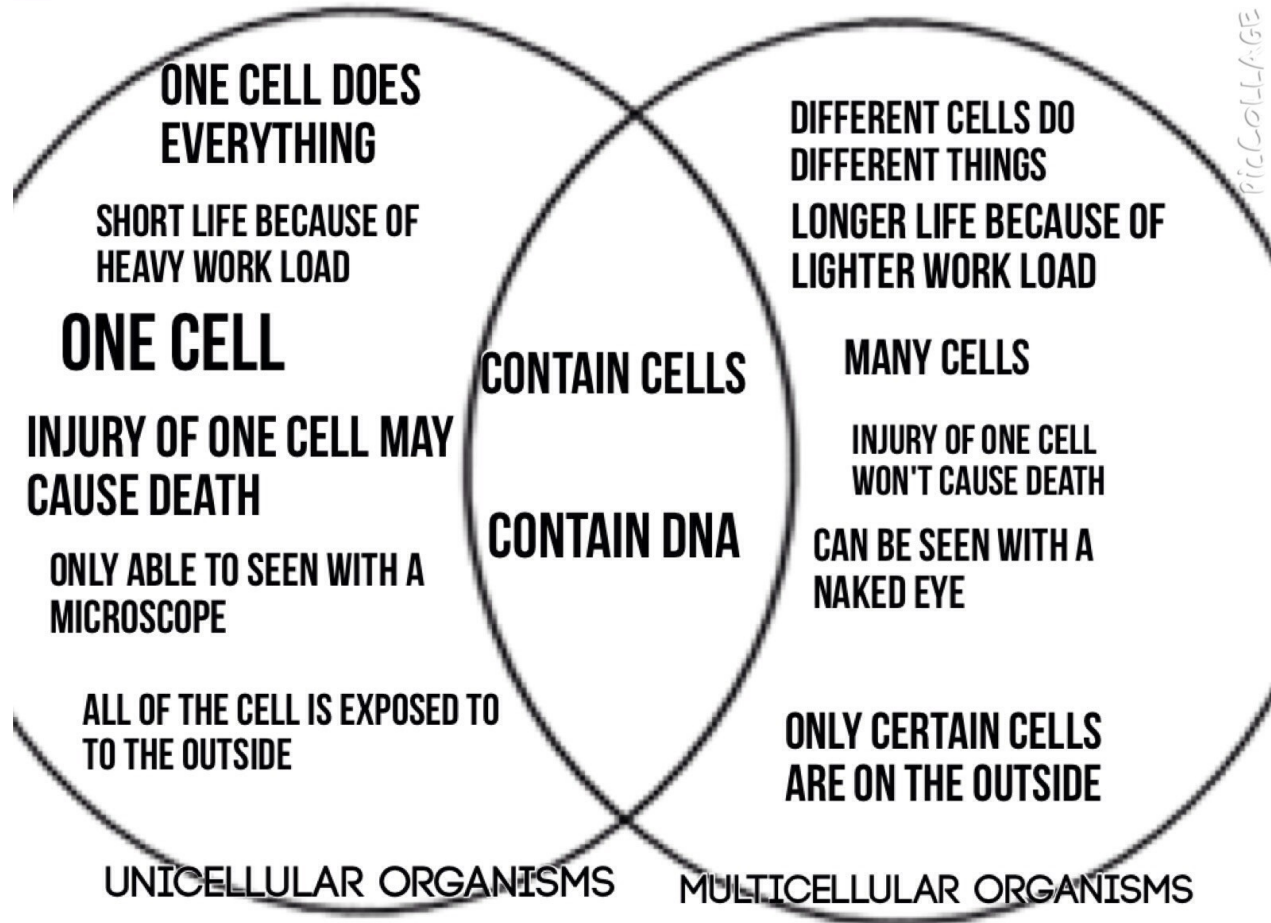
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- Evolutionary younger structures were associated with new functions or with the improvement in existing functions

Evolutionary approach

- 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

What is nervous system good for?

The role of nervous system



Main points

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

The role of nervous system

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

The role of nervous system

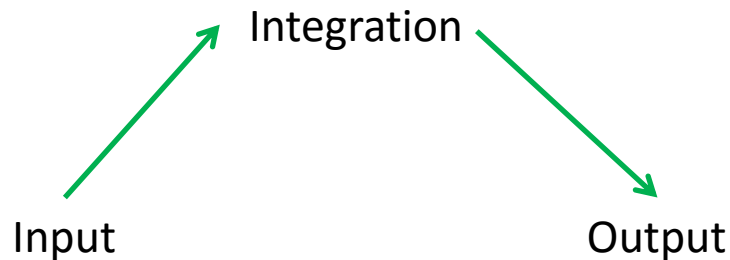
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- Maintaining homeostasis
 - The composition of inner environment
 - The integrity of organ/ bodily barriers

The role of nervous system

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- Essentials for survival of multicellular organism
 - To receive signals from outer and inner environment
 - To process this information
 - To respond in a coordinate manner to these stimuli

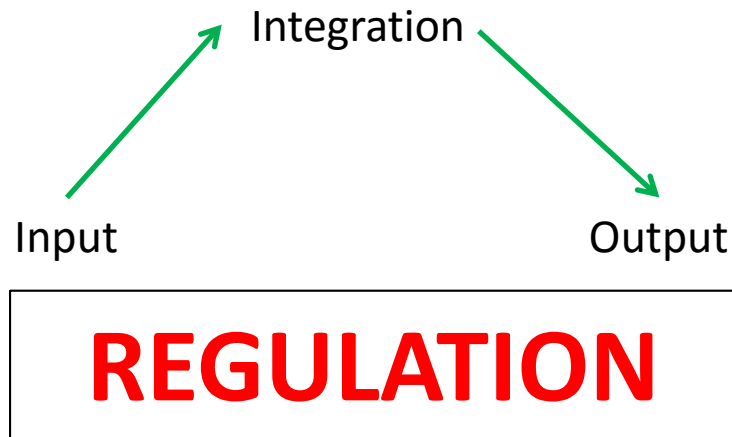
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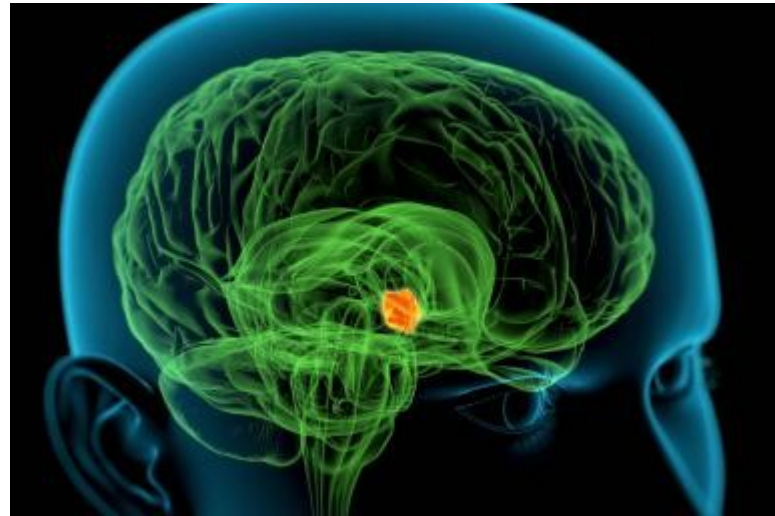


The role of nervous system

- Regulation
 - Nervous
 - Humoral

The role of nervous system

- Regulation
 - Nervous
 - Humoral



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

Central nervous system control/influence all the types of regulations

The role of nervous system

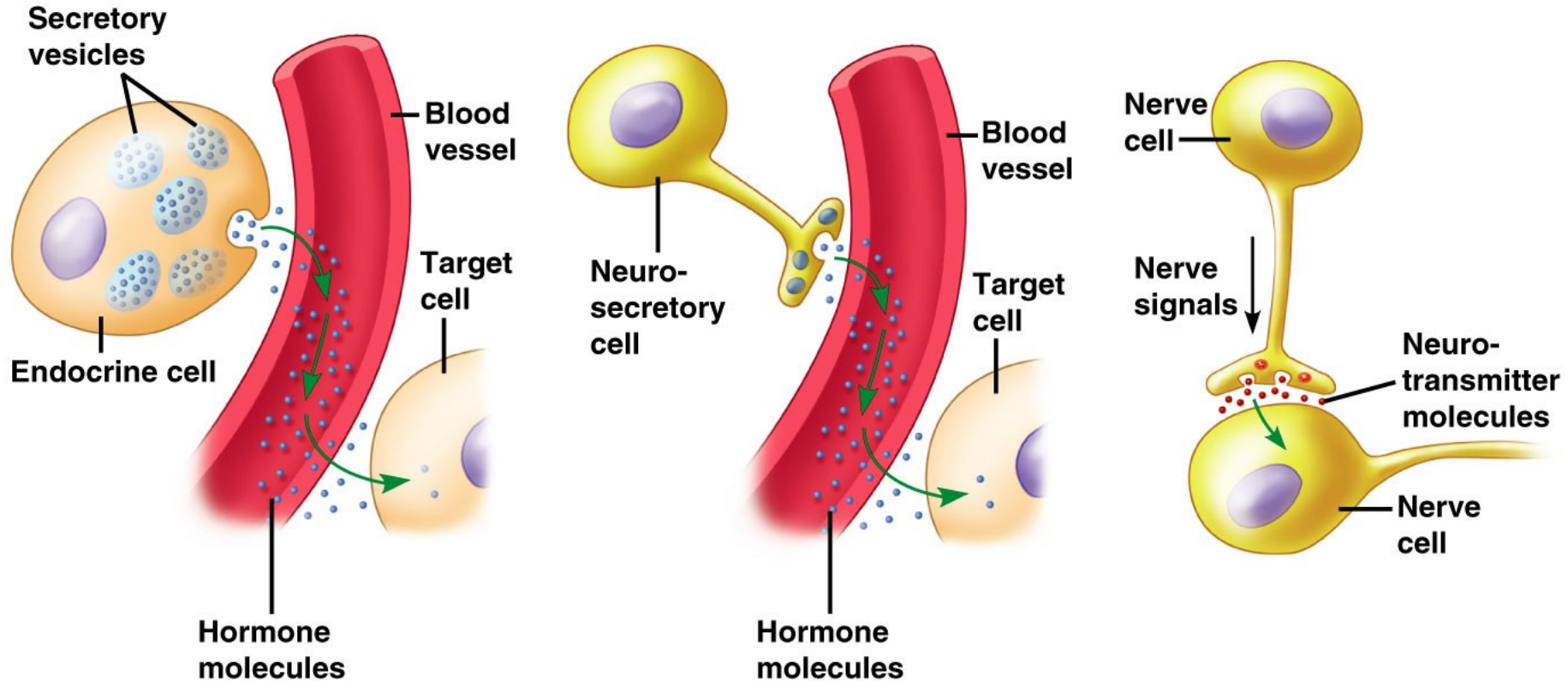
Humoral regulations

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

Nervous regulations

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

Hormonal and nervous regulations

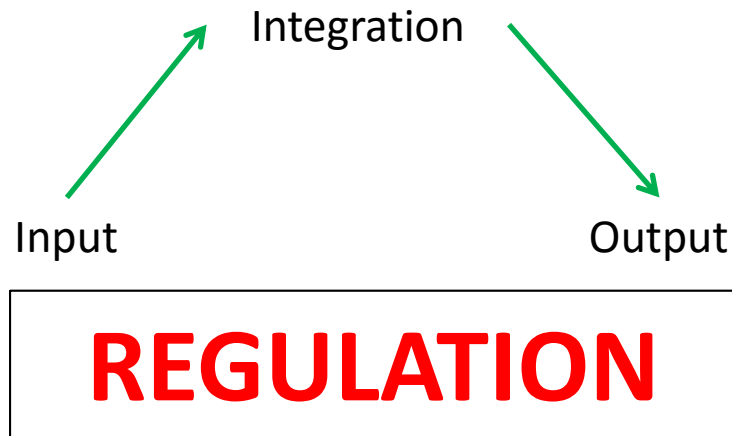


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<http://www.austincc.edu/>

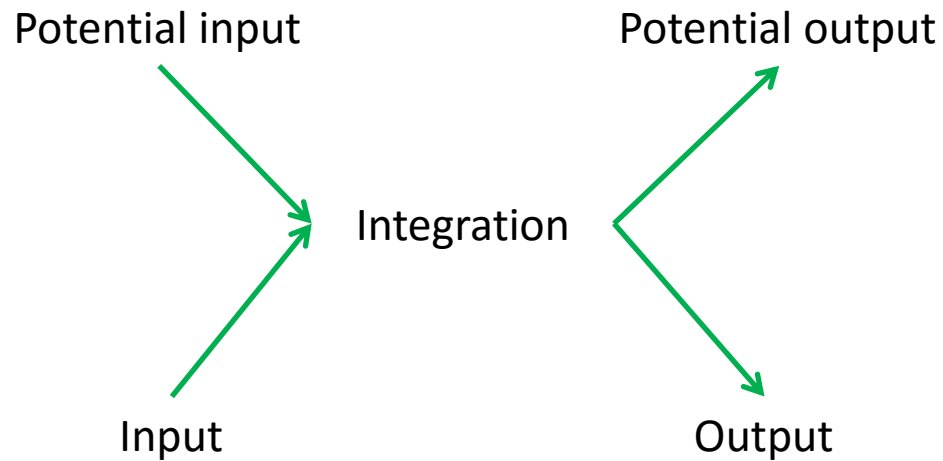
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The role of nervous system

ANTICIPATION



REGULATION