Neuropharmacology

Roberto Canaparo

Department of Drug Science and Technology

Via Pietro Giuria 13, Torino, Italy

roberto.canaparo@unito.it

Tel 0116706237

Neuropharmacology Student Activities

Anorexia Nervosa

Hyperactivity Disorder

Obesity

Insomnia

Huntington's Disease

Amyotrophic Lateral Sclerosis

Multiple Sclerosis

Stroke

Autism Spectrum Disorders

Post-Traumatic Stress Disorder

Substance Use Disorders

Migraine

Neuropharmacology Student Activities

Topics structure

Introduction

Mechanism/Pathophysiology

Diagnosis, screening and prevention

Pharmacotherapy

Pharmacology treatment in development/new strategies

Conclusion/outlook

Neuropharmacology Audience Activity

The students from the audience must prepare at least two questions to submit to the speaker

Neuropharmacology Homework

Two multiple choice questions: only one answer is correct

One open question

In one week time

Exam

The exam consists of a written test (30 minutes) with 2 open questions

27/01/2020

21/02/2020

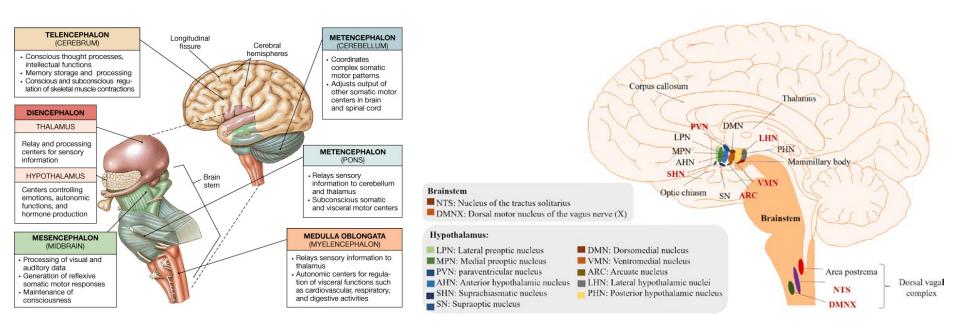
30/06/2020

23/07/2020

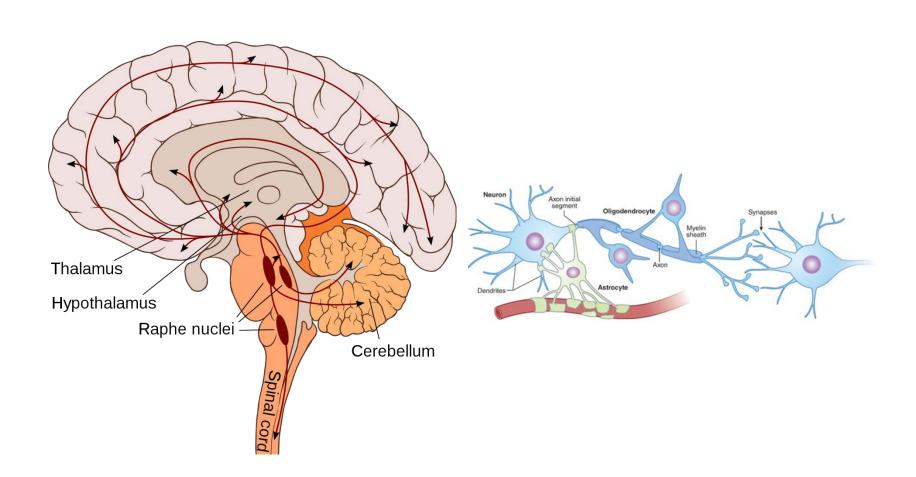
08/09/2020

PHARMACOLOGICAL REGULATION OF SYNAPTIC FUNCTION

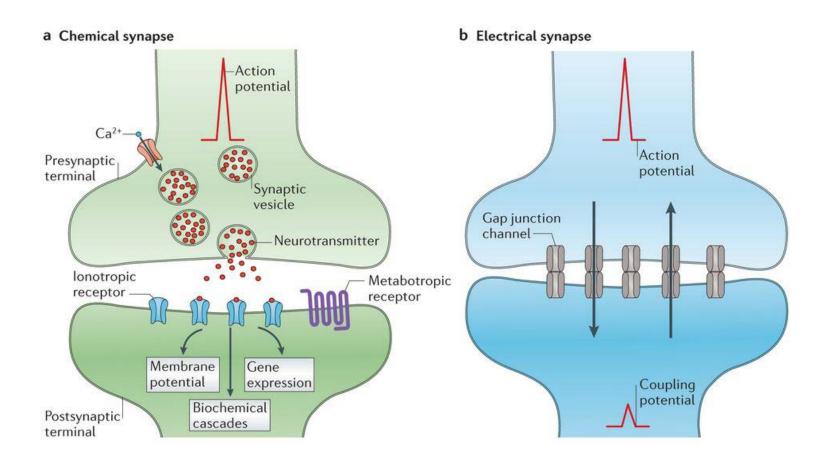
Organization of the CNS



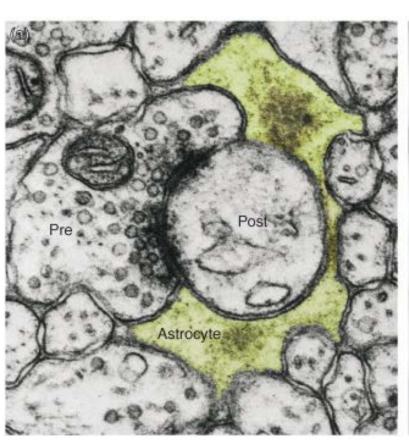
Organization of the CNS

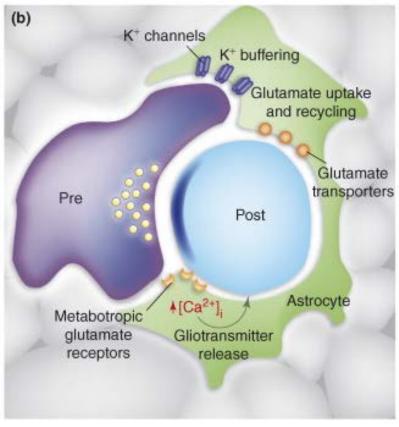


The Synapse

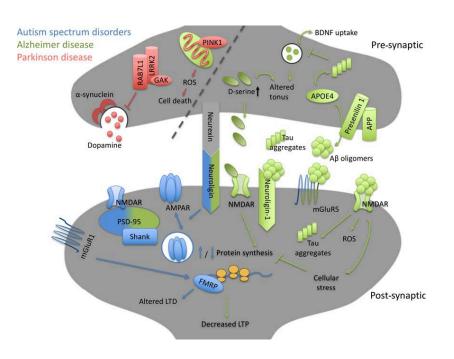


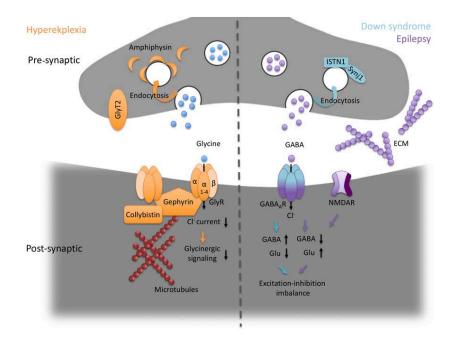
The Tripartite Synapse



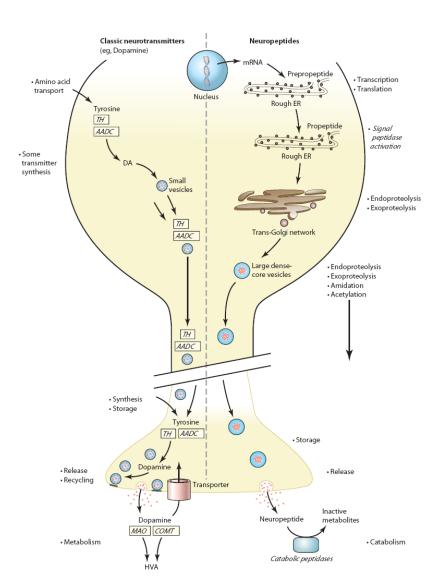


Synaptopathies

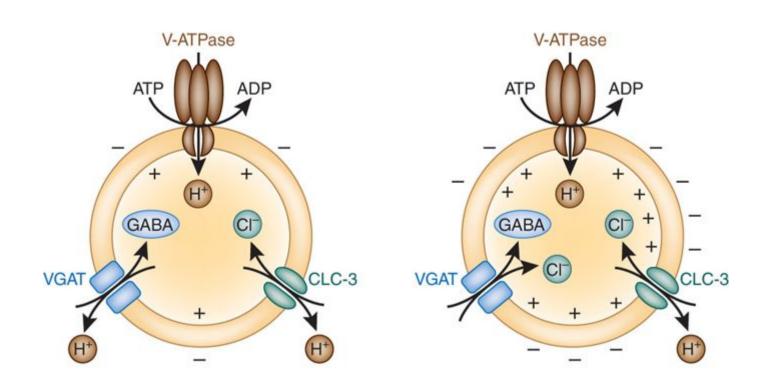




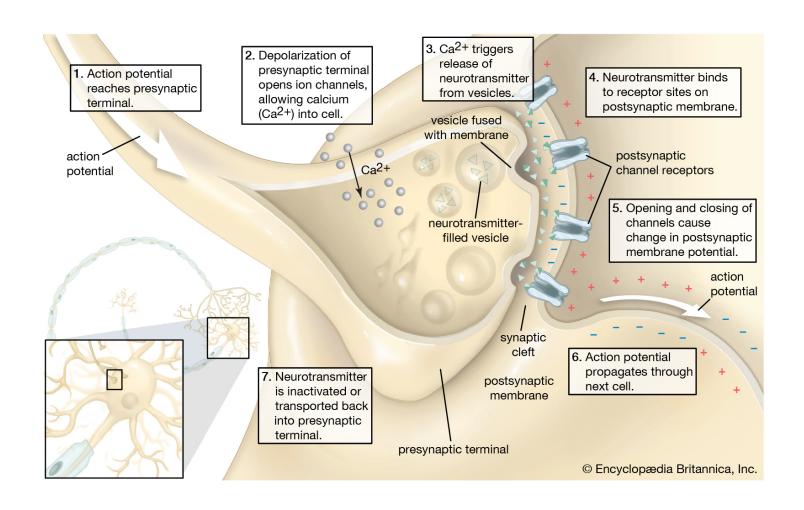
Chemical Messengers



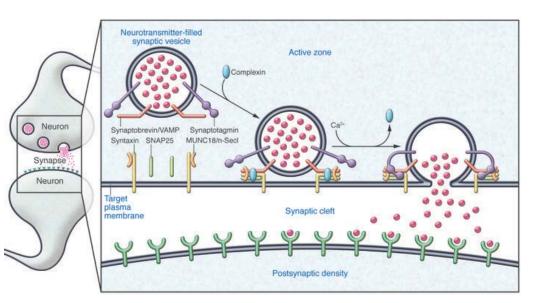
Neurotransmitter Storage

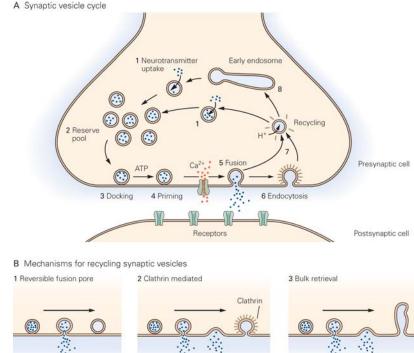


Neurotransmitter Release

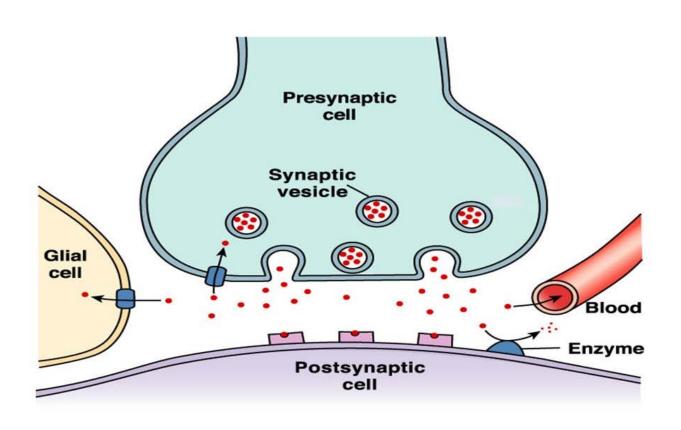


Neurotransmitter exocytotic and endocytotic process

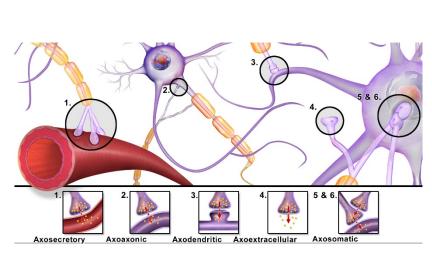


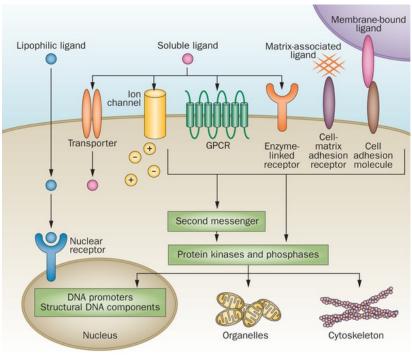


Neurotrasmitter Fate

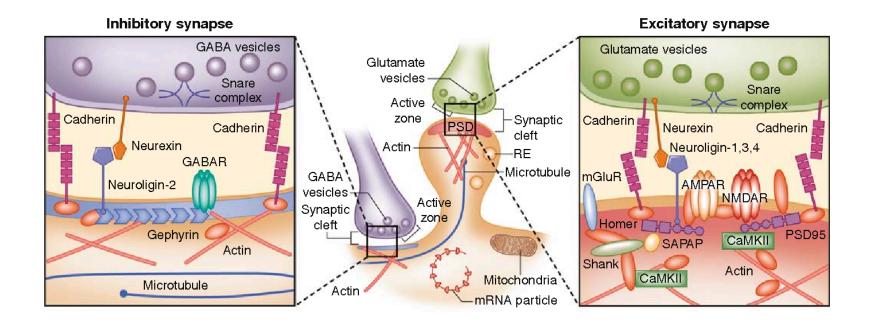


Postsynaptic Signal Reception

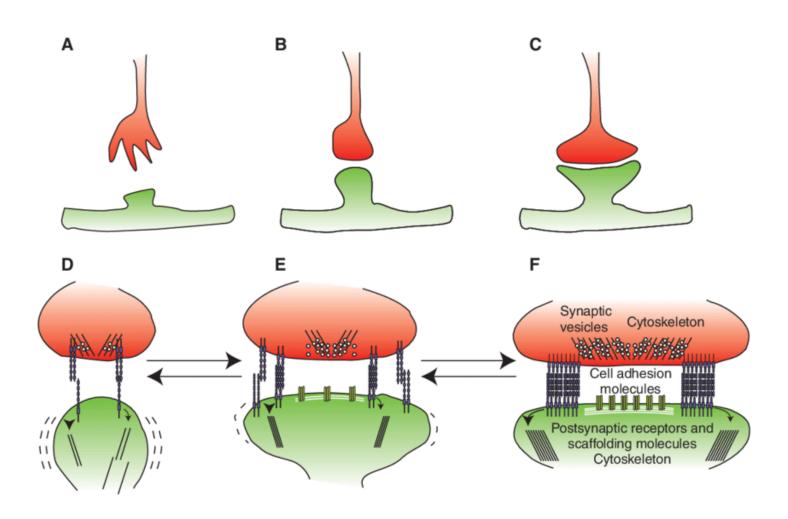




Inhibitory and Excitatory Synapses



Synaptogenesis



Mechanism of Drug Action at Synaptic Level

- A Effects on Transmitter Production
 - 1 Inhibition of transmitter synthesis

 Para-chlorophenylalanine inhibits tryptophan
 hydroxylase, preventing synthesis of serotonin
 from its metabolic precursor.
 - 2 Blockade of axonal transport Colchicine impairs maintenance of microtubules and blocks axonal transport.
 - Interference with the storage of transmitters
 Reserpine blocks the packaging of transmitter
 molecules within vesicles, thereby allowing the
 transmitter to be broken down by enzymes.
- B Effects on Transmitter Release
 - 4 Prevention of synaptic transmission Tetrodotoxin, found in puffer fish, blocks voltage-gated Na⁺ channels and prevents nerve conduction.
 - 5 Alteration of synaptic transmitter release Calcium channel blockers (e.g., verapamil) inhibit release of transmitters. Amphetamine stimulates release of catecholamine transmitters. Black widow spider venom causes overrelease, and thus depletion, of ACh.
 - 6 Alteration of transmitter release through modulation of presynaptic activity Caffeine competes with adenosine for presynaptic receptors, thus preventing its inhibitory effects.
- Effects on Transmitter Clearance
 - 7 Inactivation of transmitter reuptake Cocaine and amphetamine inhibit reuptake mechanisms, thus prolonging synaptic activity. Certain antidepressants inhibit serotonin reuptake.
 - 8 Blockade of transmitter degradation
 Some drugs (e.g., monoamine oxidase inhibitors) inhibit enzymes that normally break down neurotransmitter molecules in the axon terminal or in the synaptic cleft. As a result, transmitter remains active longer and to greater effect.

