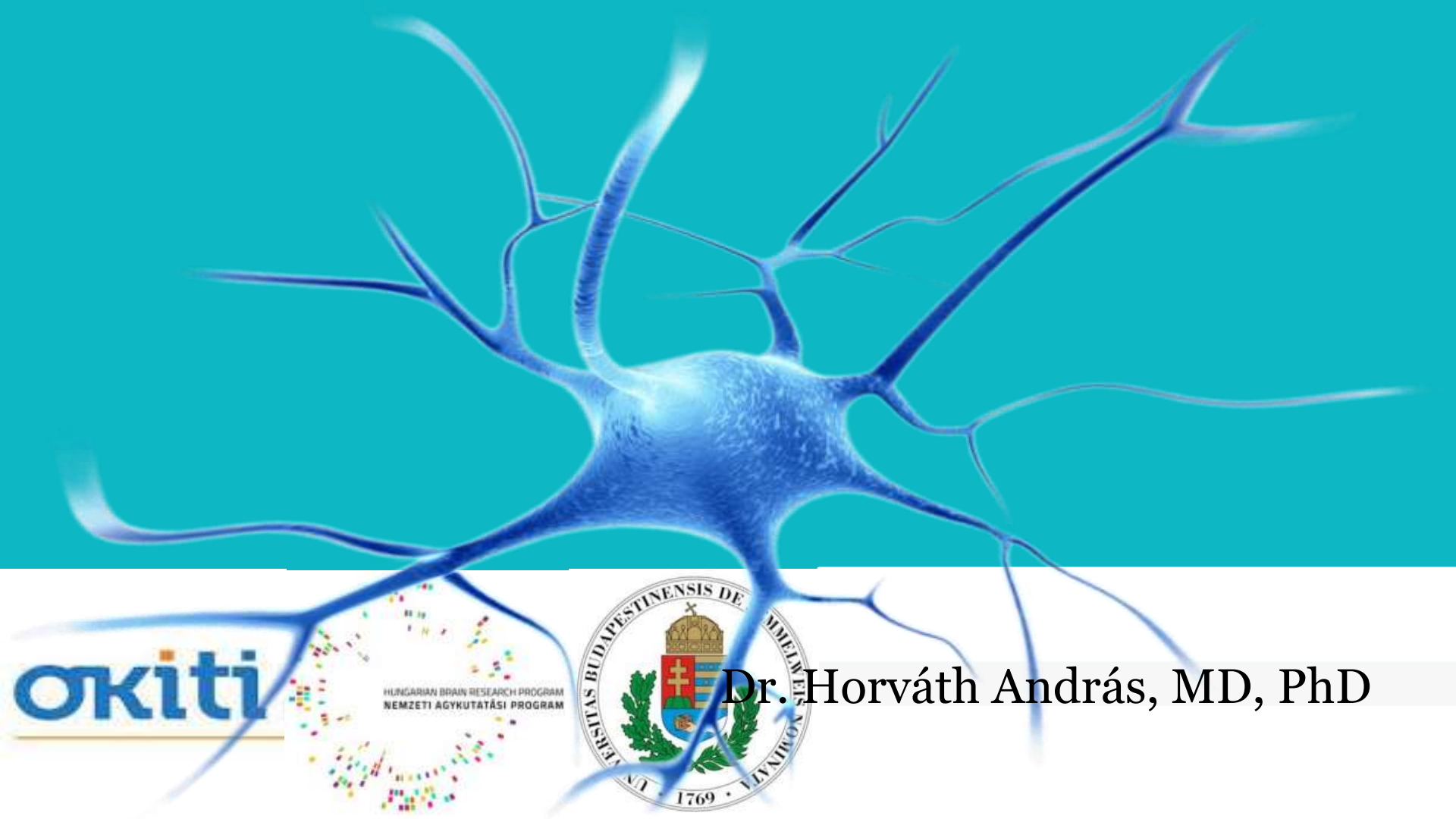


Dr. Horváth András, MD, PhD

Idegrendszer – általános szerveződés

"It is difficult to believe that until approximately year 1900 it was not known that neurons are the basic units of the brain (Santiago Ramón y Cajal). Equally surprising is the fact that the concept of chemical transmission in the brain was not known until around 1930 (Henry Hallett Dale) and (Otto Loewi). We began to understand the basic electrical phenomenon that neurons use in order to communicate among themselves, the action potential, in the 1950s (Alan Lloyd Hodgkin, Andrew Huxley and John Eccles). It was in the 1960s that we became aware of how basic neuronal networks code stimuli and thus basic concepts are possible (David H. Hubel and Torsten Wiesel). The molecular revolution swept across US universities in the 1980s. It was in the 1990s that molecular mechanisms of behavioral phenomena became widely known (Eric Richard Kandel)."

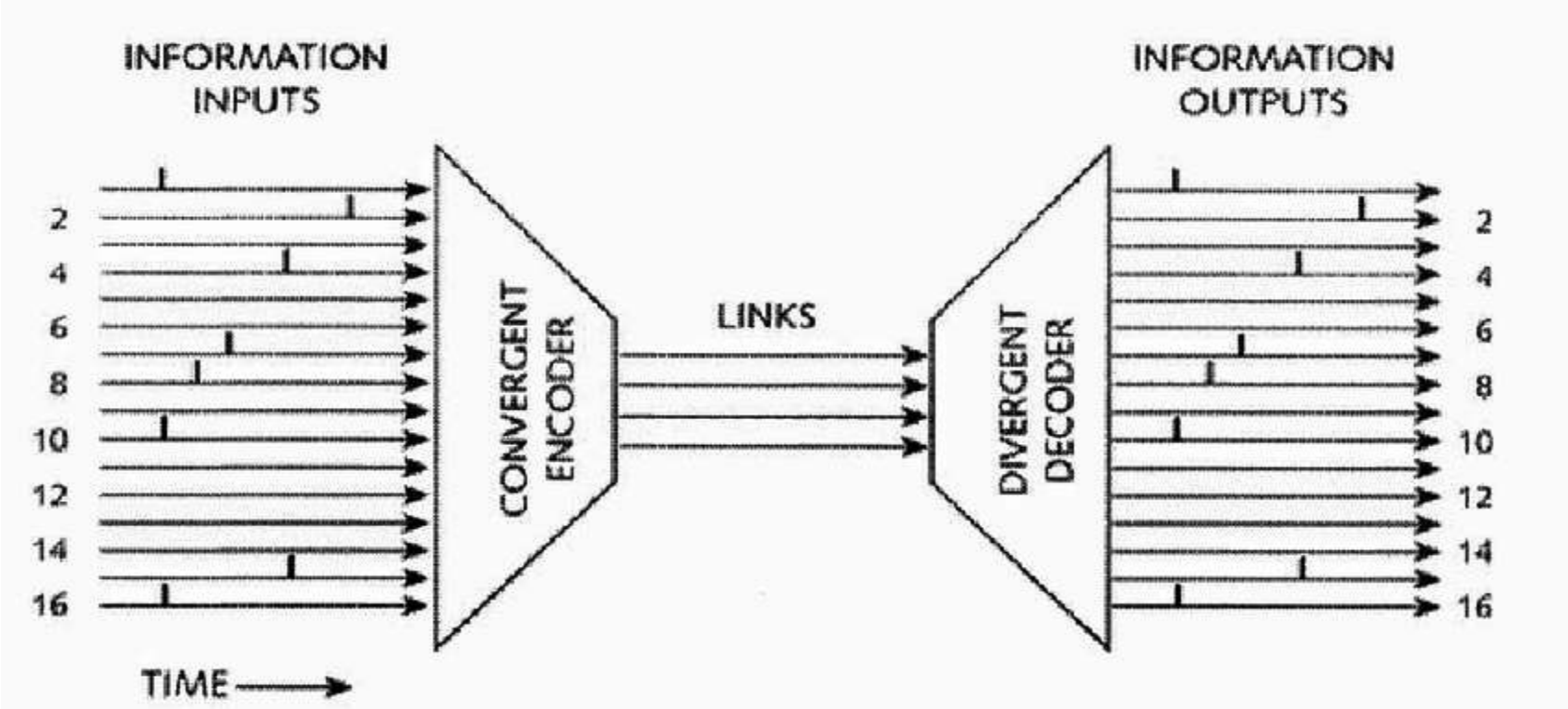
”

Az idegrendszer felosztása

- Központi idegrendszer
- Agy (cerebrum)
- Gerincvelő (medulla spinalis)
- Környéki idegrendszer
- Idegek
  - Agyidegek (nervi craniales)
  - Gerincvelői idegek (nervi spinales)
- Ganglionok
  - érző dúcok (ganglia sensoria)
  - vegetatív dúcok (ganglia autonomica)
  - Brain- gut axis

„Microbes have the last word.” Pasteur

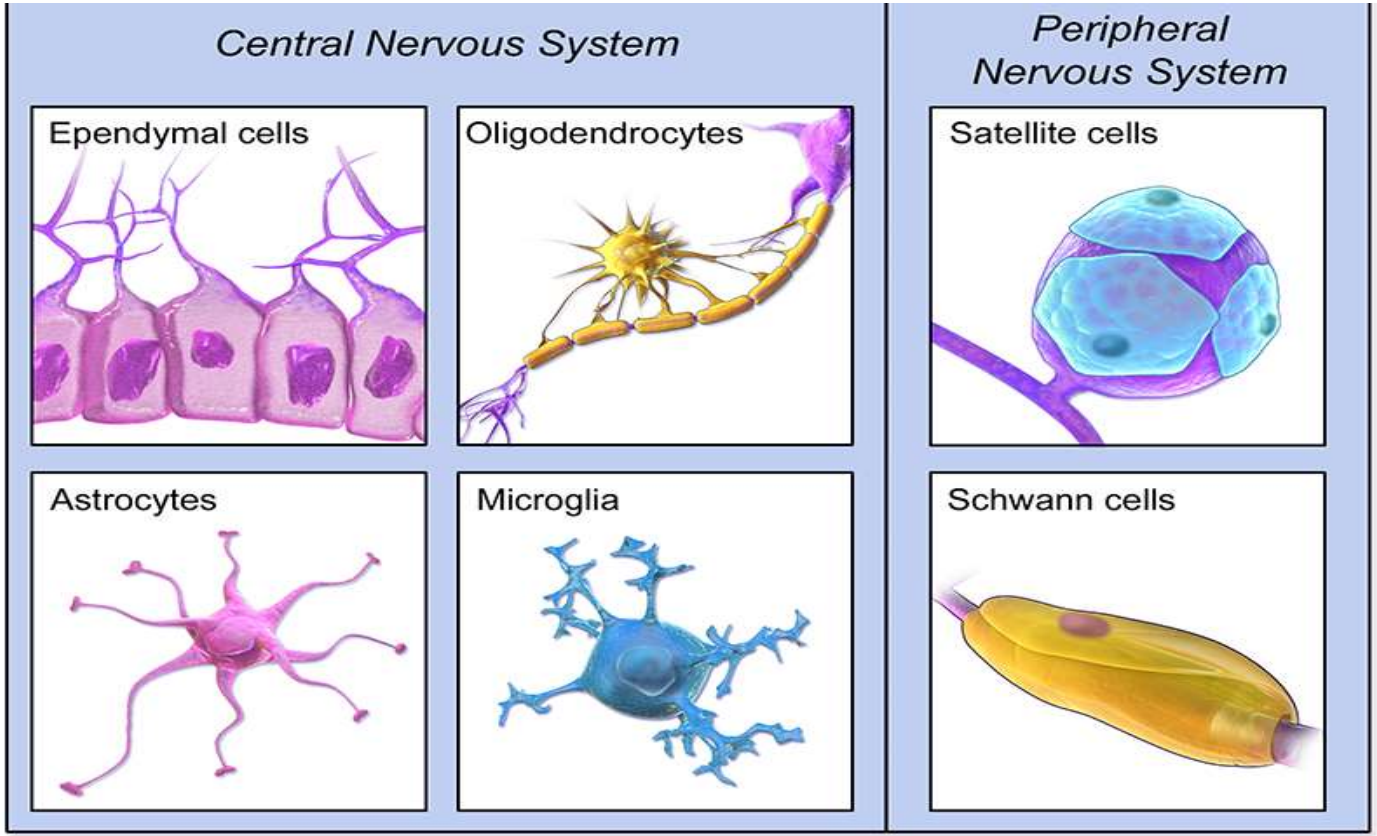
Funkció


INFORMATION
INPUTS
INFORMATION
OUTPUTS
2
4
6
8
10
12
14
16
CONVERGENT
ENCODER
LINKS
DIVERGENT
DECODER
2
4
6
8
10
12
14
16
TIME

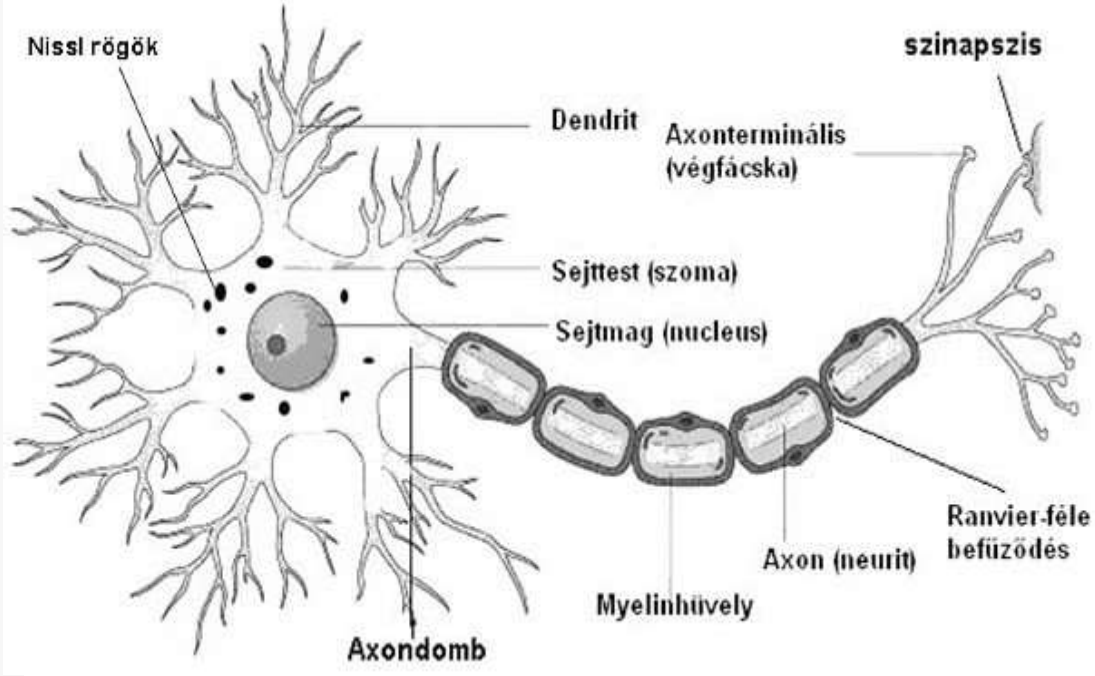
Fő sejttípusok

Neuronok
ingerelhetőek
morfológiailag polarizált sejtek
Gliasejtek
neuronok „kiszolgálása”
elektromos szigetelés
stb.

Glia


Central Nervous System
Peripheral Nervous System
Ependymal cells
Oligodendrocytes
Satellite cells
Astrocytes
Microglia
Schwann cells

Neuron szerkezete



Neuronok polarizáltsága

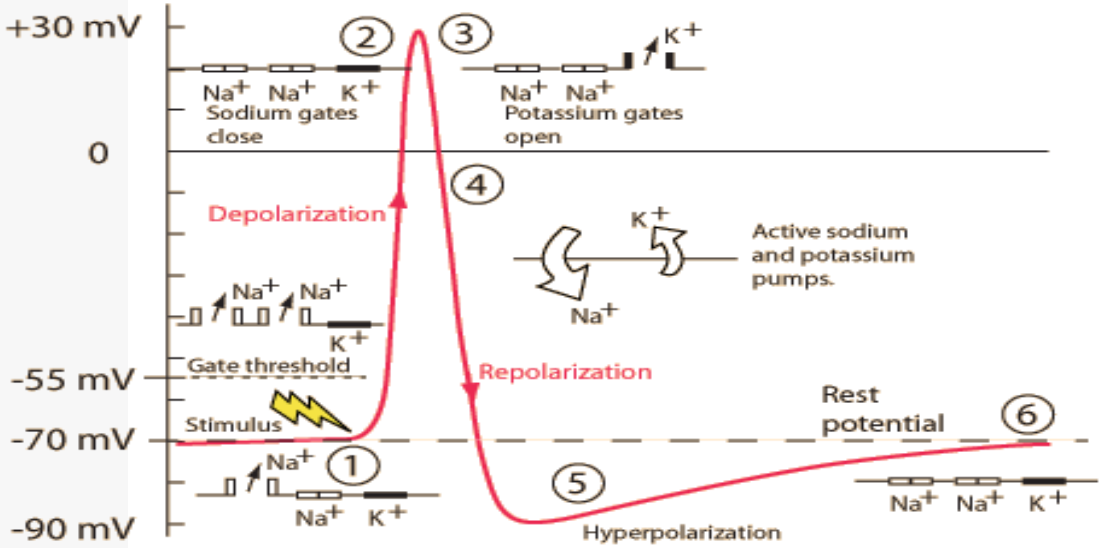
motoneuronok, pyramissejtek, stb.

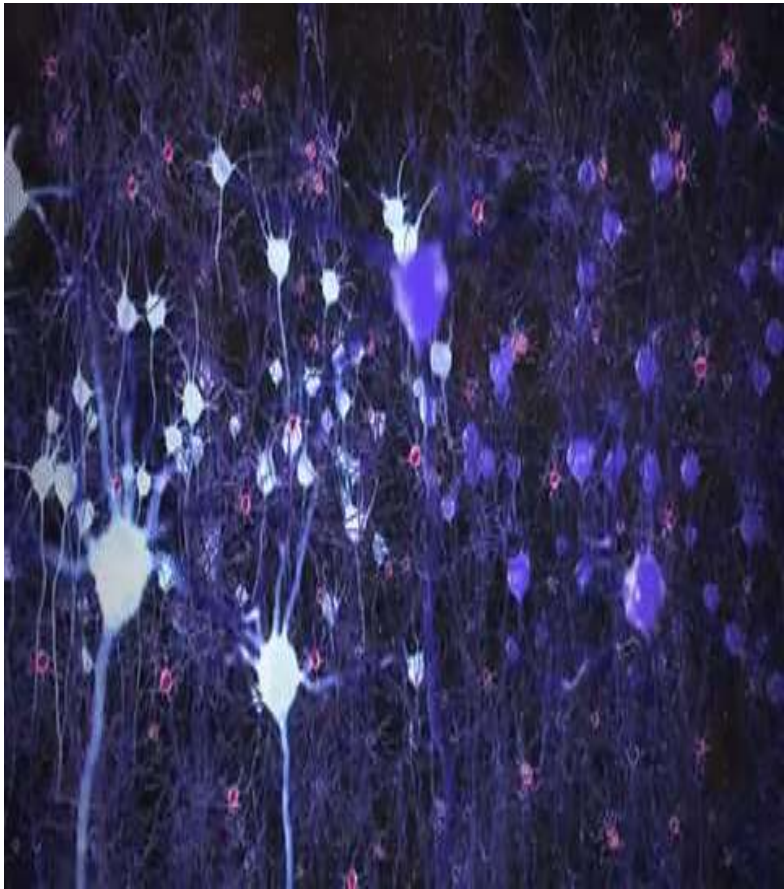
a legtöbb érző ganglionsejt

elsősorban gerinctelenekben

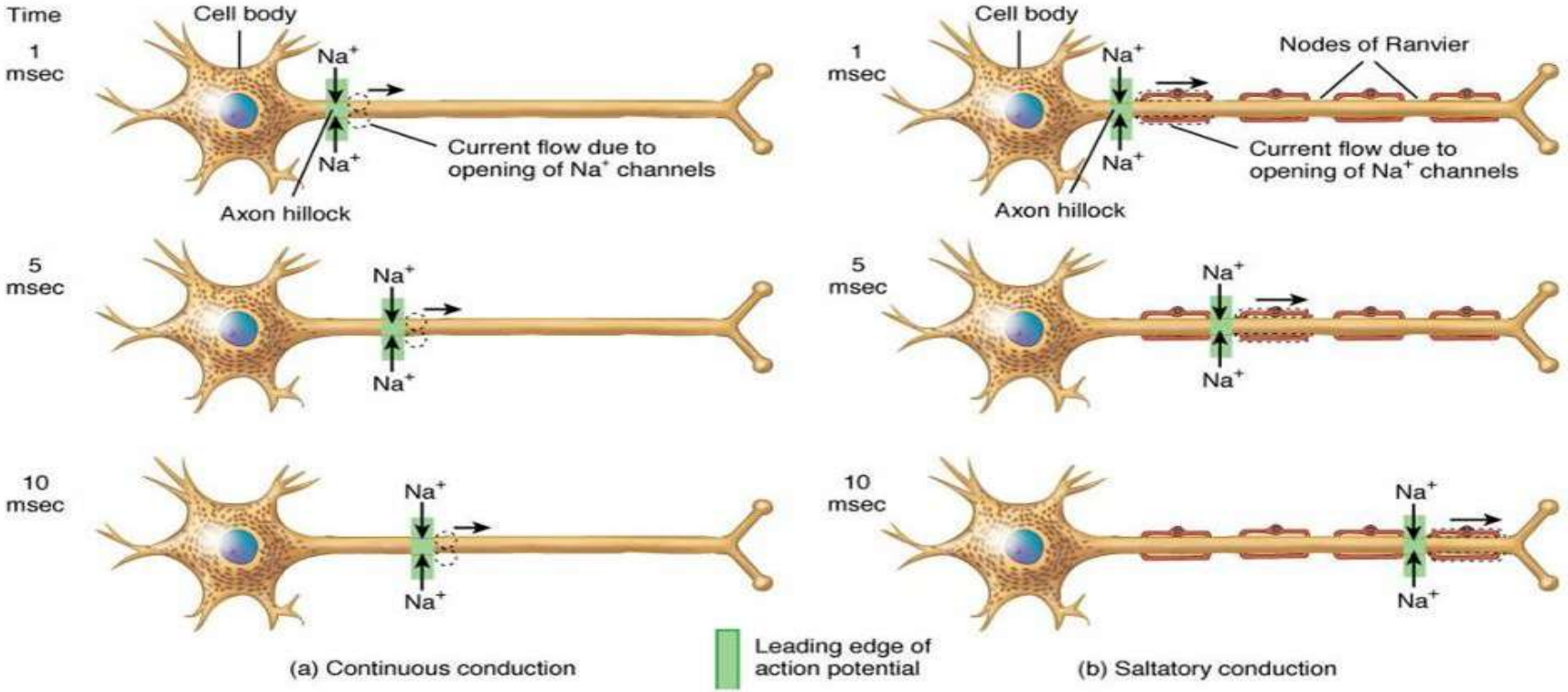
retina, belsőfül egyes neuronjai

Inger-ingerület

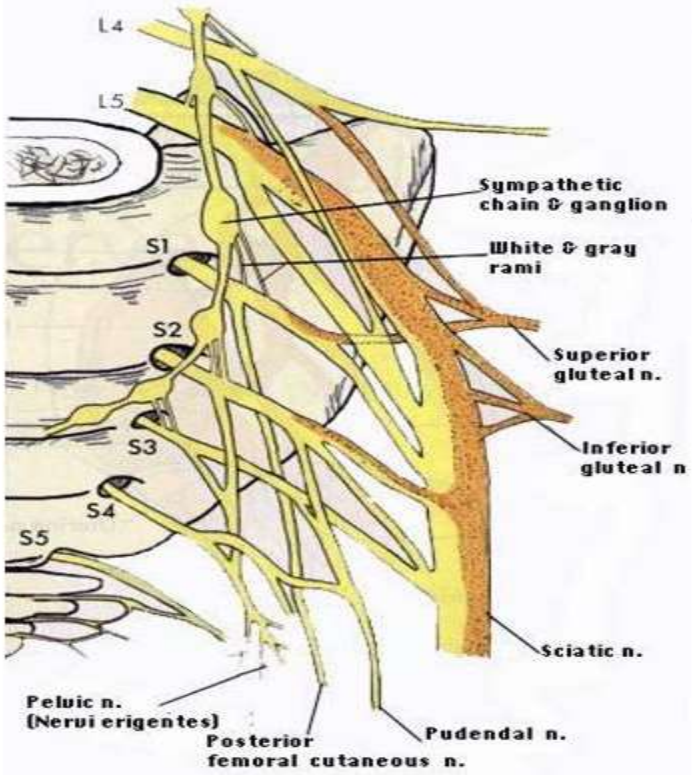


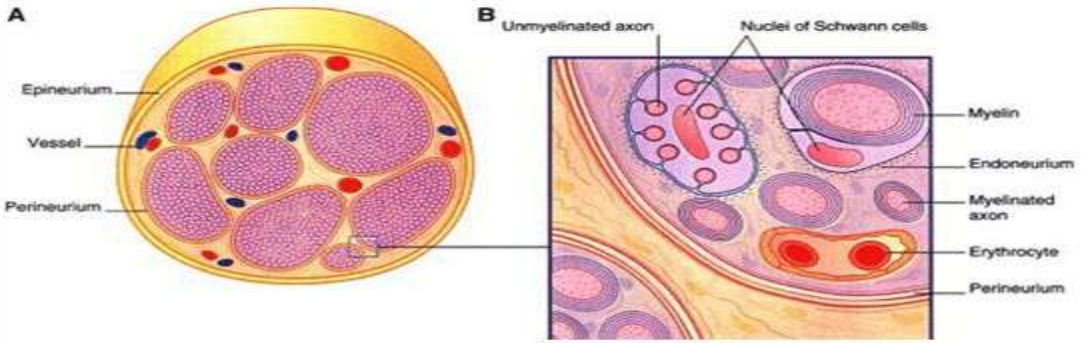


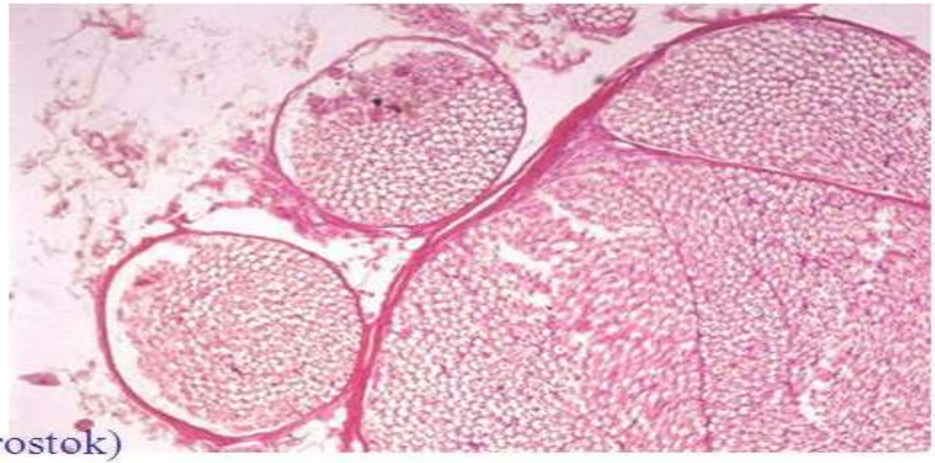
Myelin-hüvely



Perifériás idegek

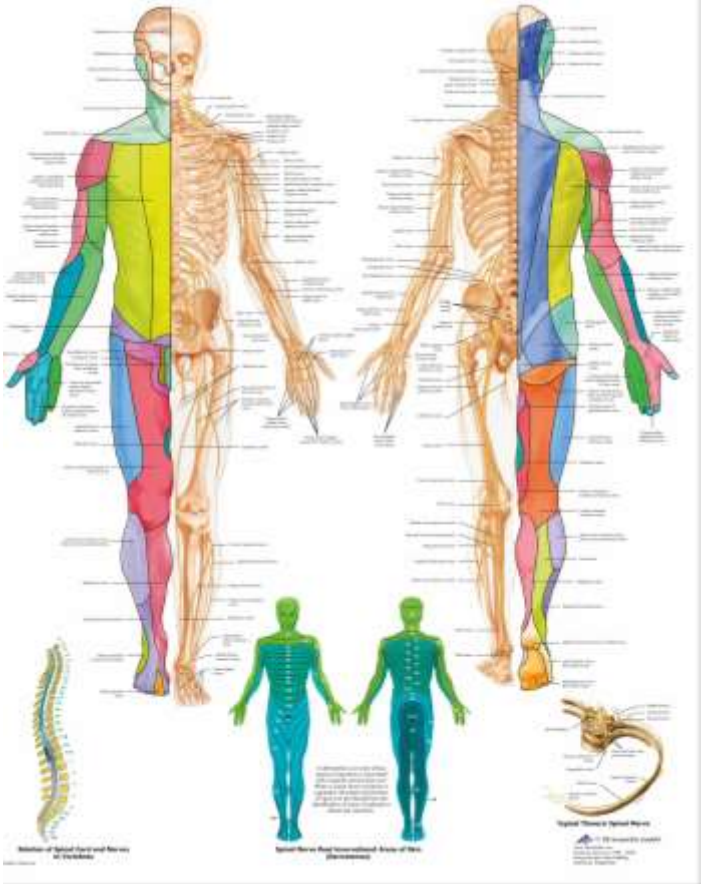


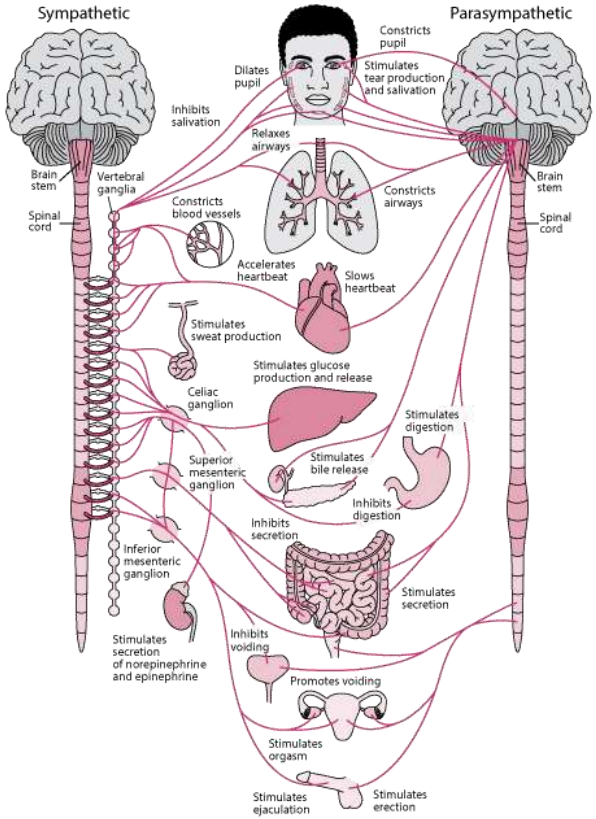




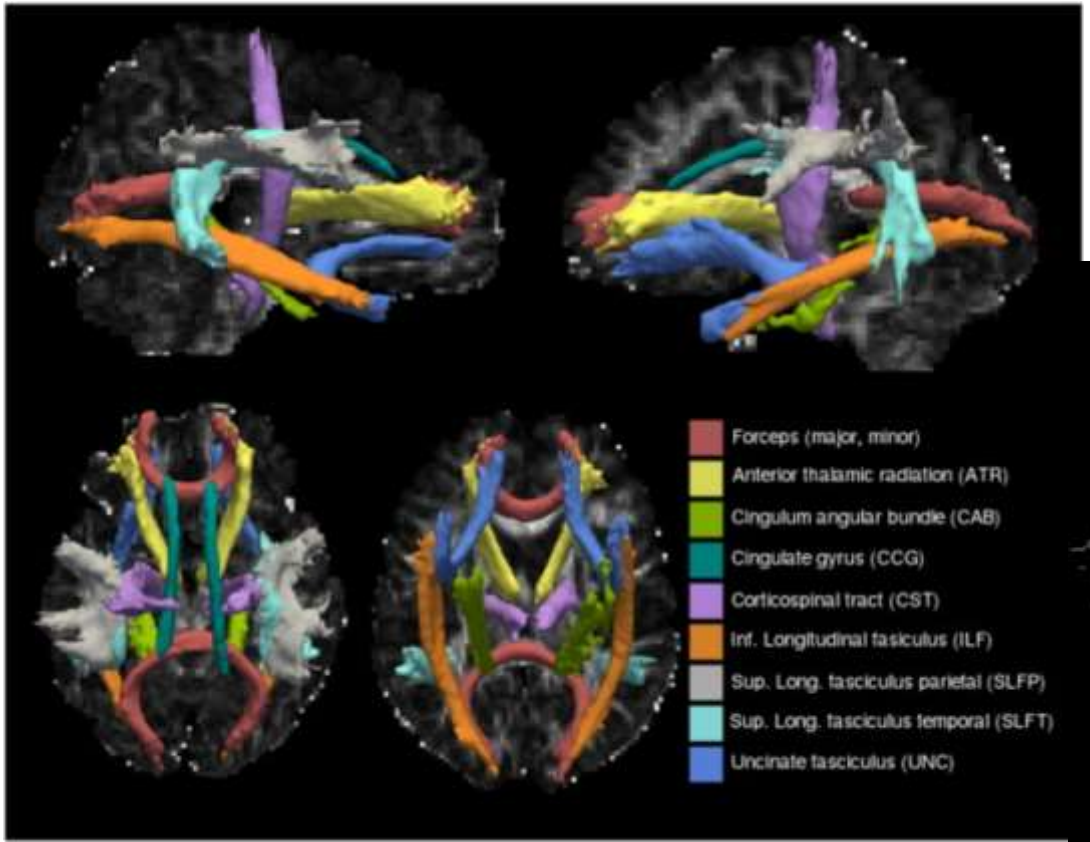
Legtöbbször kevert ideg (szenzoros és motoros rostok)

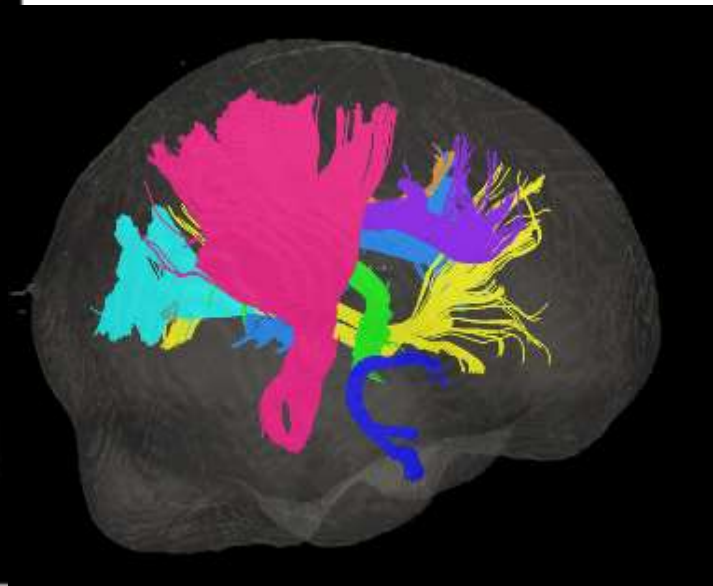
Perifériás idegek- típusai



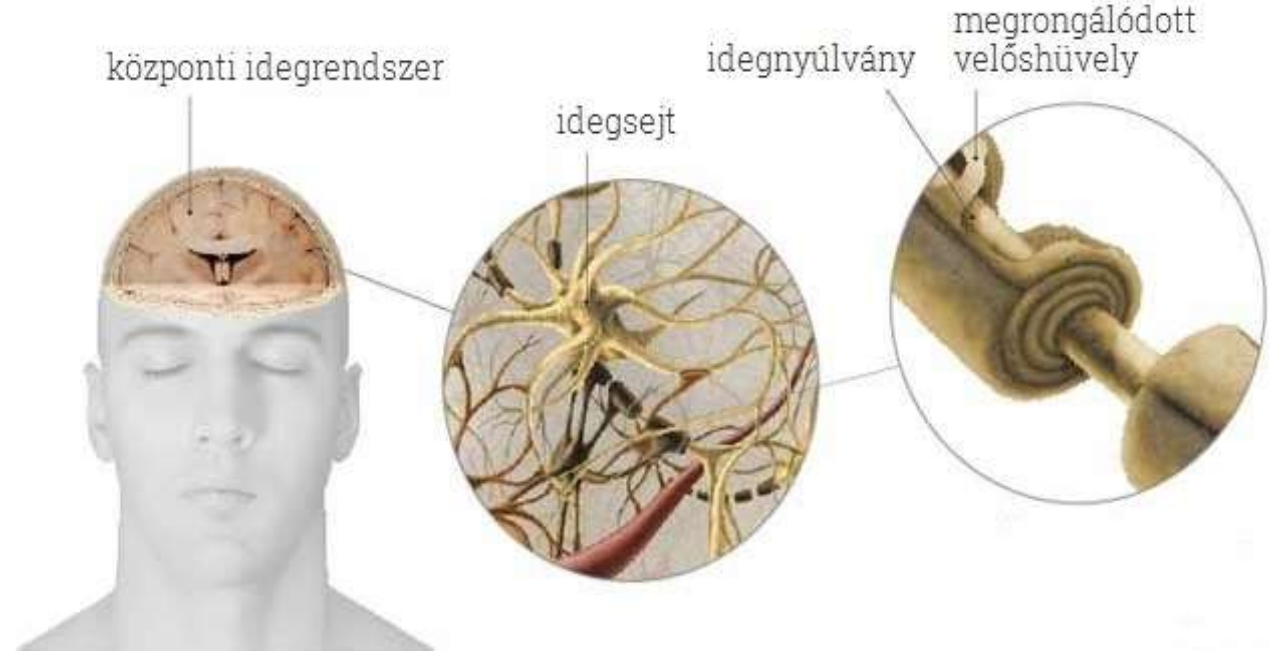


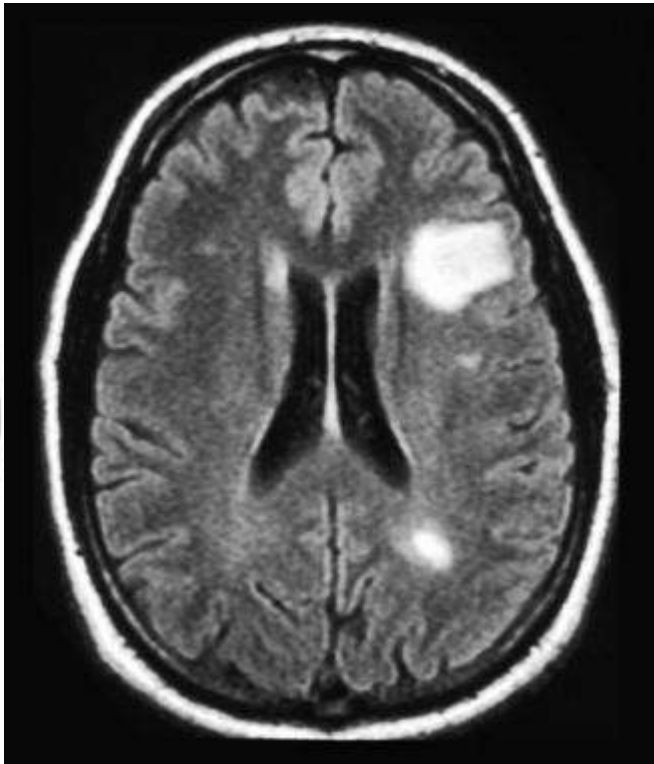
Pályák


Forceps (major, minor)
Anterior thalamic radiation (ATR)
Cingulum angular bundle (CAB)
Cingulate gyrus (CCG)
Corticospinal tract (CST)
Inf. Longitudinal fasciculus (ILF)
Sup. Long. fasciculus parietal (SLFP)
Sup. Long. fasciculus temporal (SLFT)
Uncinate fasciculus (UNC)

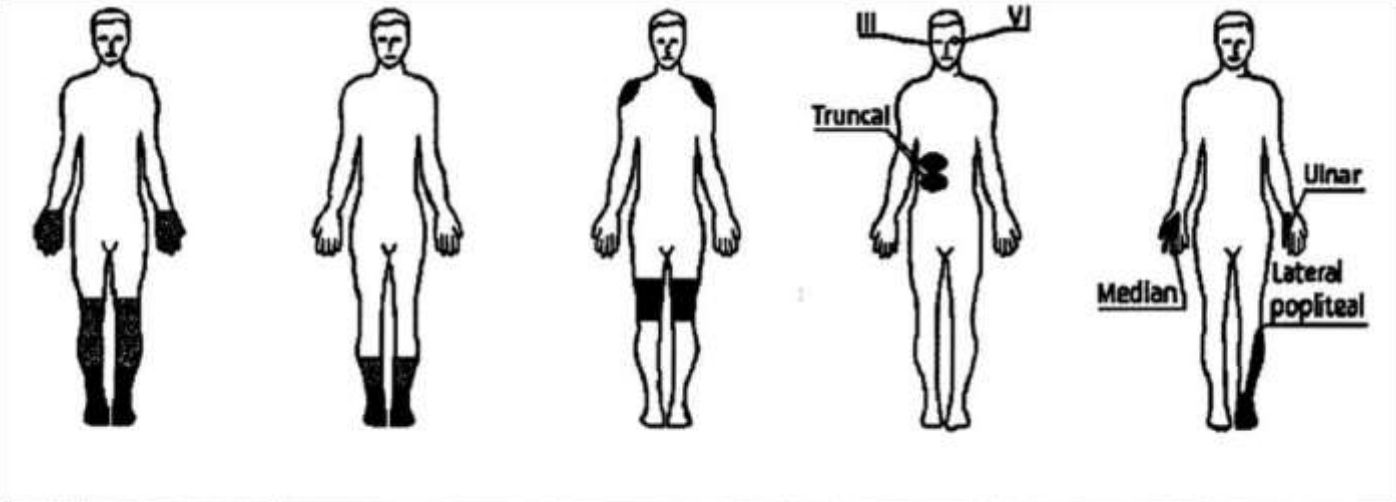


Demyelinizáció- sclerosis multiplex





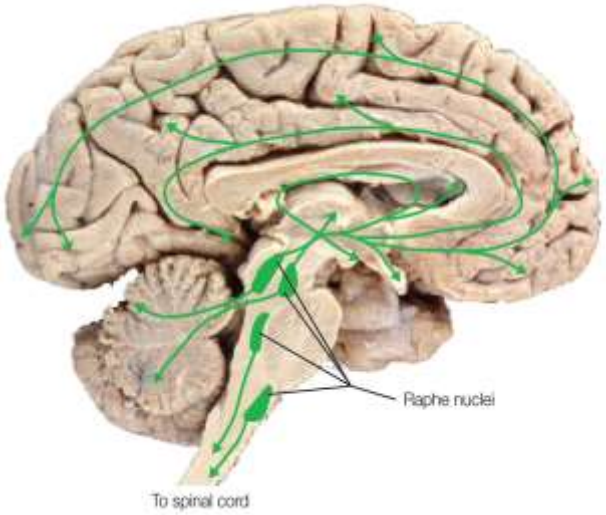
Demyelinizáció- polineuropátia

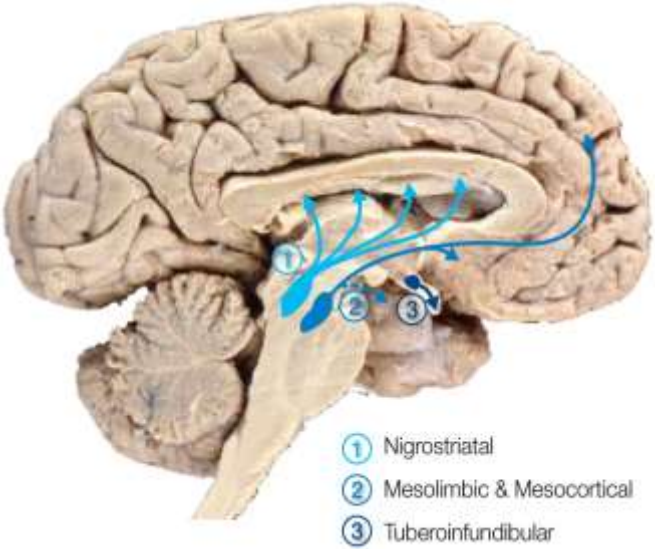


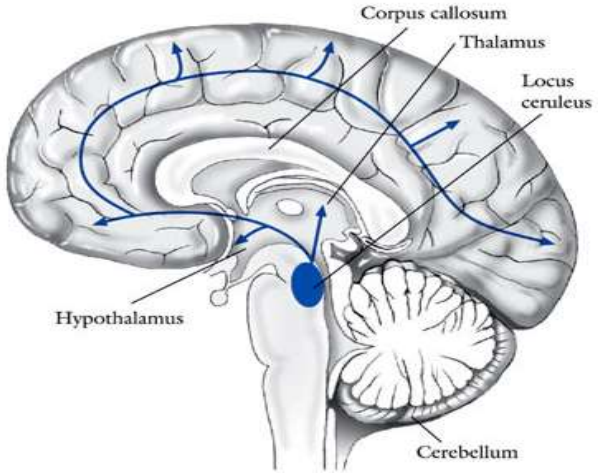
Large fiber Neuropathy	Small fiber Neuropathy	Proximal motor Neuropathy	Acute mono Neuropathies	Pressure Palsies
Sensory loss: 0→ +++ (Touch, vibration) Pain: + → +++ Tendon reflex: N → ↓↓↓ Motor deficit 0 → +++	Sensory loss: 0 → + (thermal , allodynia) Pain: + → +++ Tendon reflex: N → ↓ Motor deficit: 0	Sensory loss: 0 → + Pain: + → +++ Tendon reflex: ↓↓ Proximal Motor deficit: + → +++.	Sensory loss: 0 → + Pain: + → +++ Tendon reflex: N Motor deficit: + → +++	Sensory loss in Nerve distribution: + → +++ Pain: + → ++ Tendon reflex: N Motor deficit: + → +++

Vezetésgátlás: anesztézia

Neurotranszmitterek





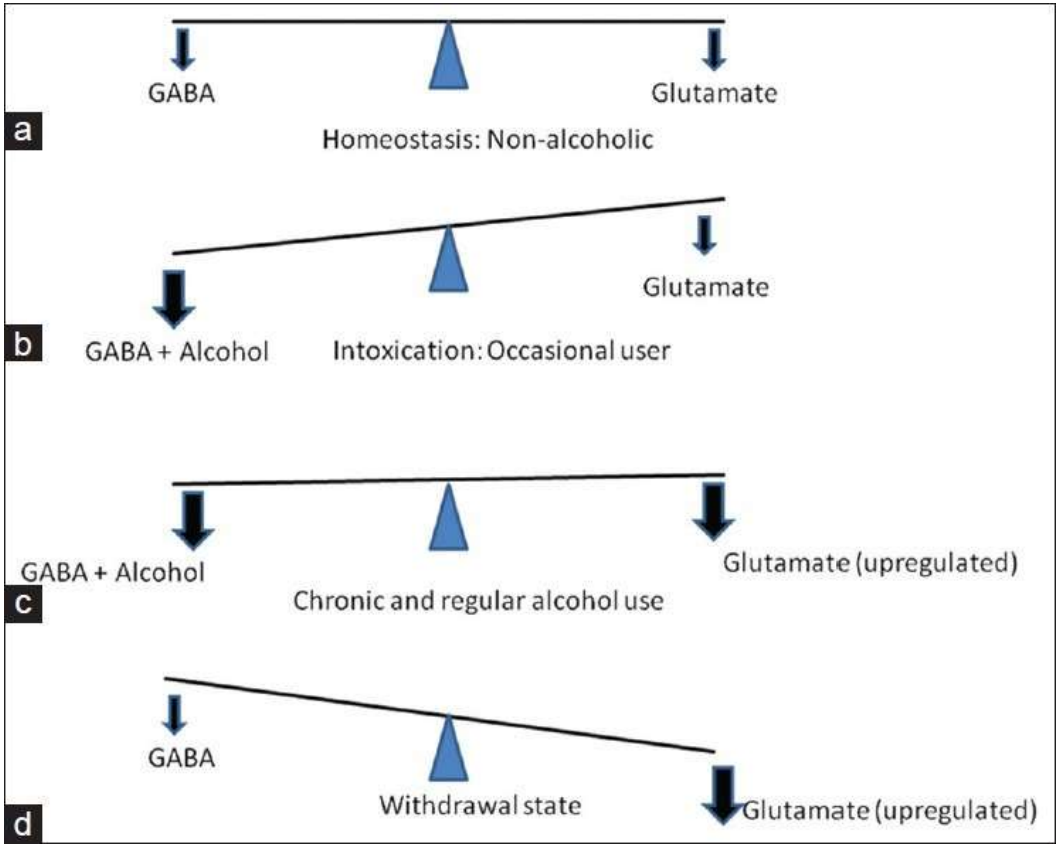


<u>Szerotonin</u>
- Depresszió, szedáció
+ Mánia, szorongás

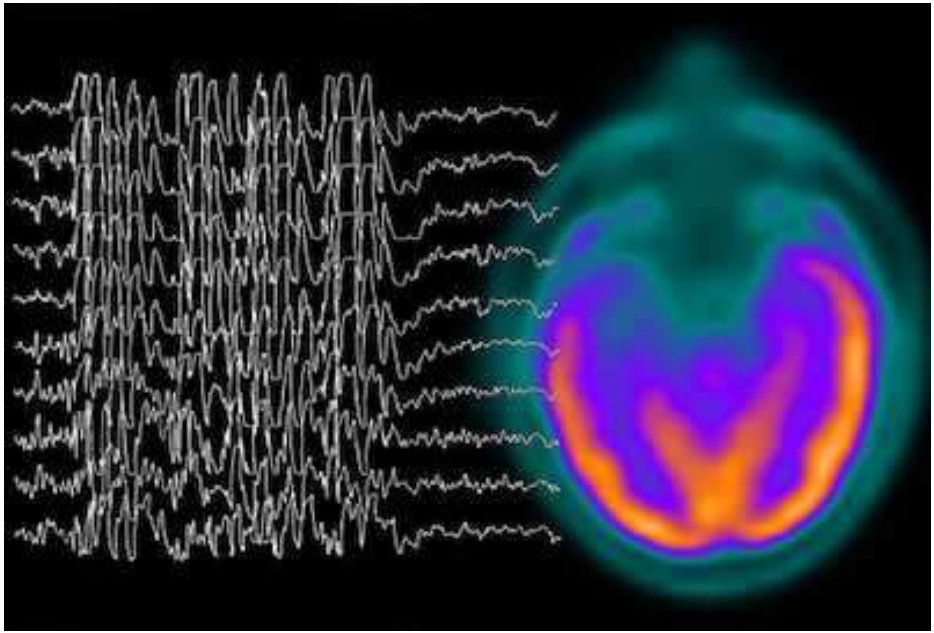
<u>Dopamin</u>
- Parkinson-kór
+ Schizophrenia, hallucinációk

<u>Noradrenalin</u>
- Depresszió, motiválatlanság
+ Szorongás, félelem, izgatottság, stressz

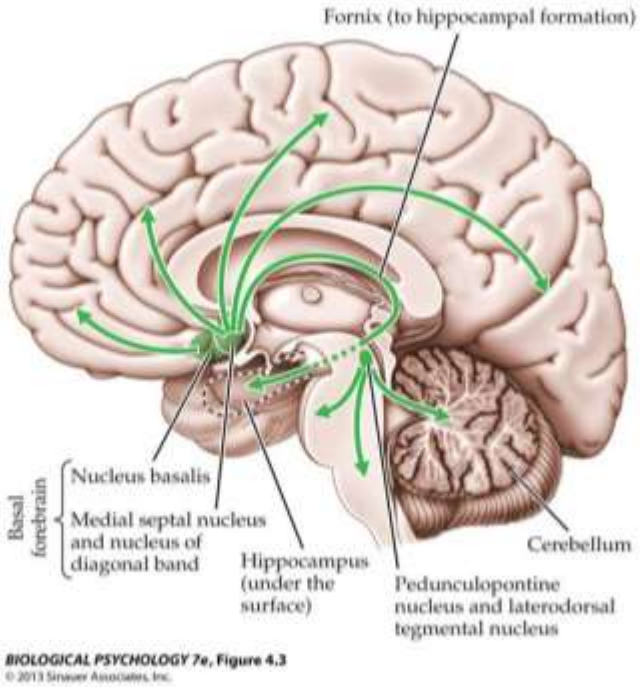
GABA/ glutamát transzmisszió



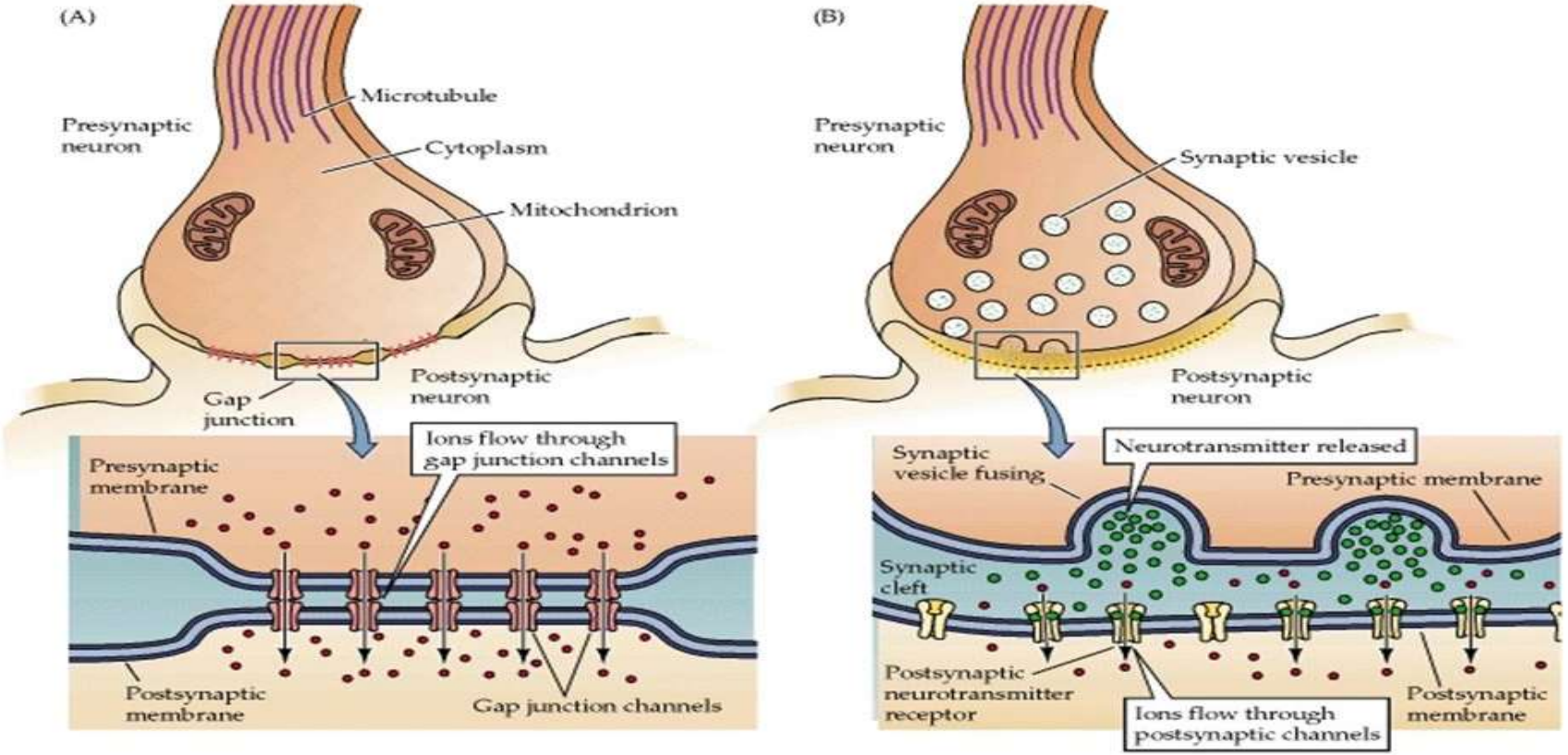
Epilepsziás vastaps



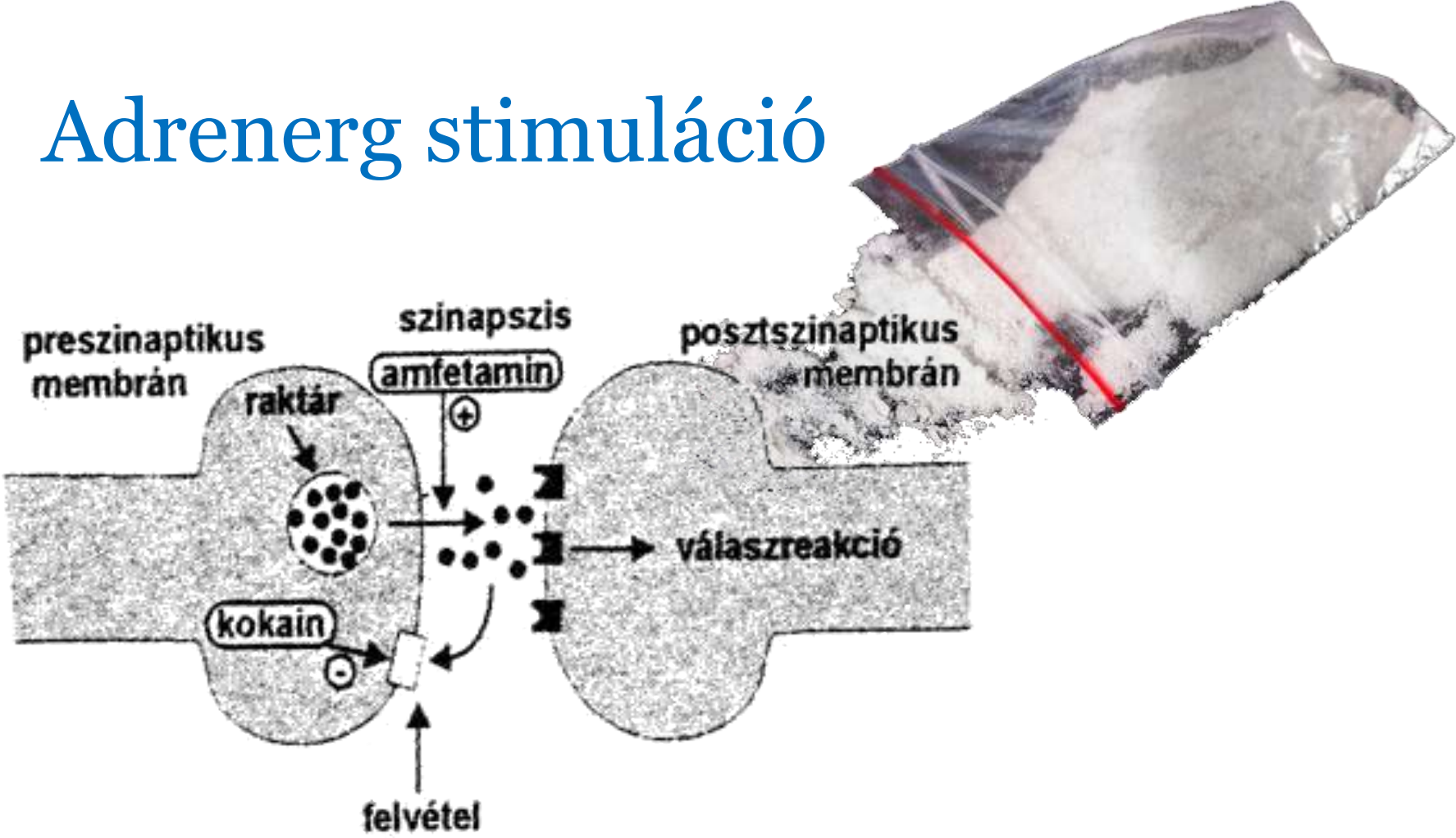
Kolinerg transzmisszió



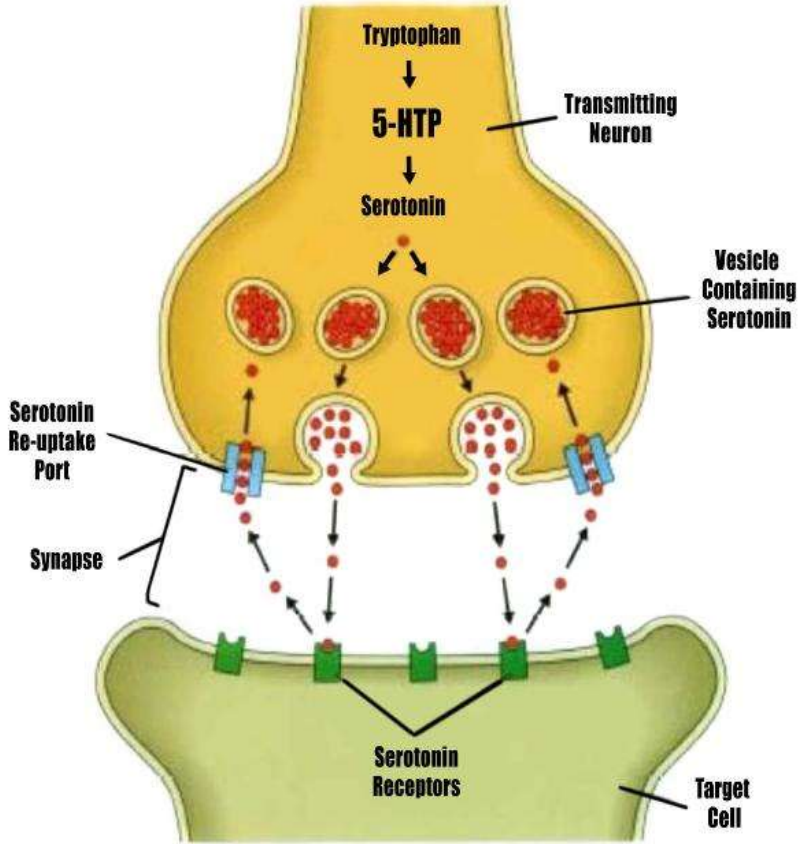
Szinapszis


(A)
Presynaptic neuron
Microtubule
Cytoplasm
Mitochondrion
Gap junction
Postsynaptic neuron
Ions flow through gap junction channels
Presynaptic membrane
Postsynaptic membrane
Gap junction channels
(B)
Presynaptic neuron
Synaptic vesicle
Postsynaptic neuron
Synaptic vesicle fusing
Neurotransmitter released
Presynaptic membrane
Synaptic cleft
Postsynaptic neurotransmitter receptor
Ions flow through postsynaptic channels
Postsynaptic membrane

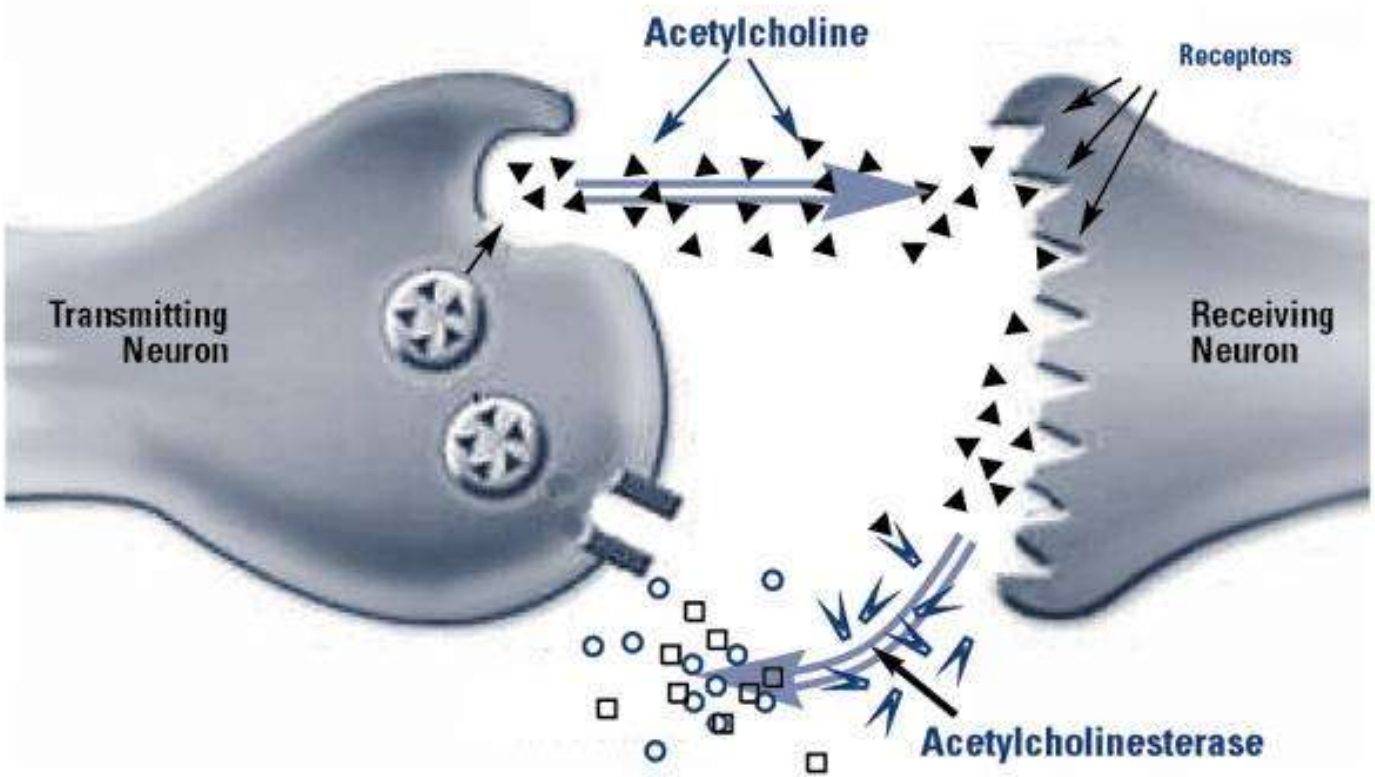
Adrenerg stimuláció



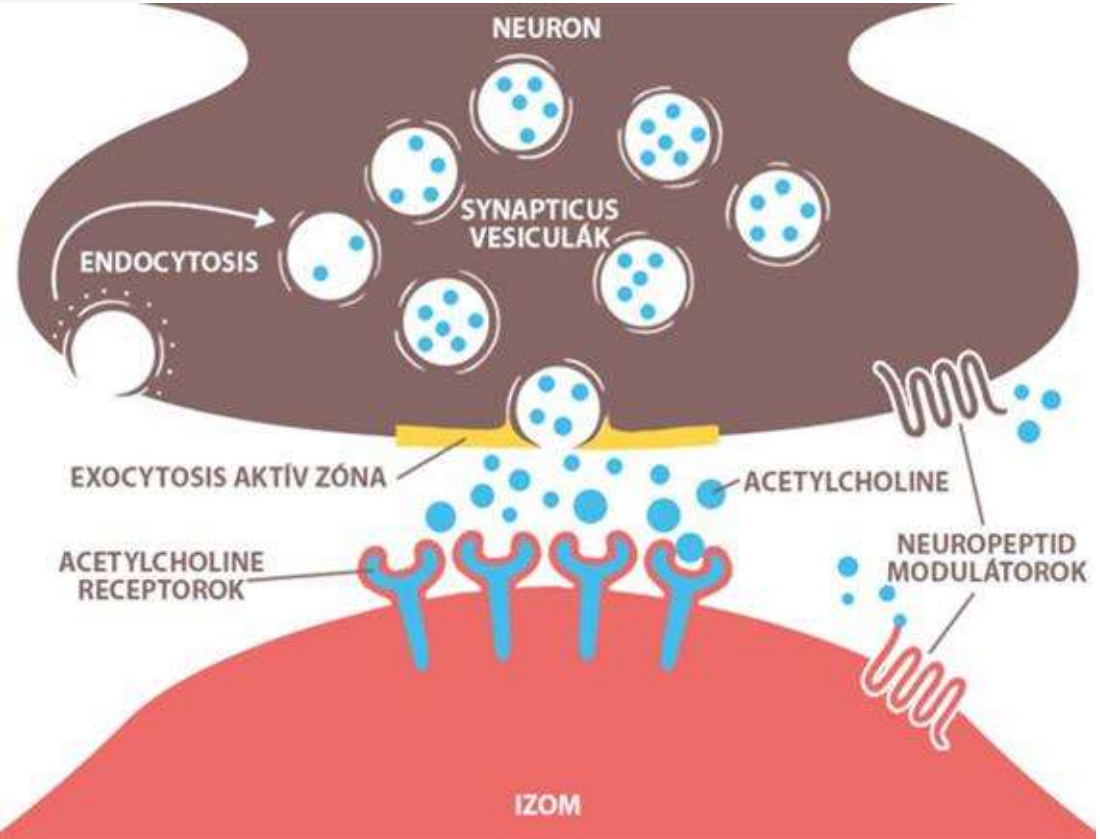
Szerotoninerg stimuláció

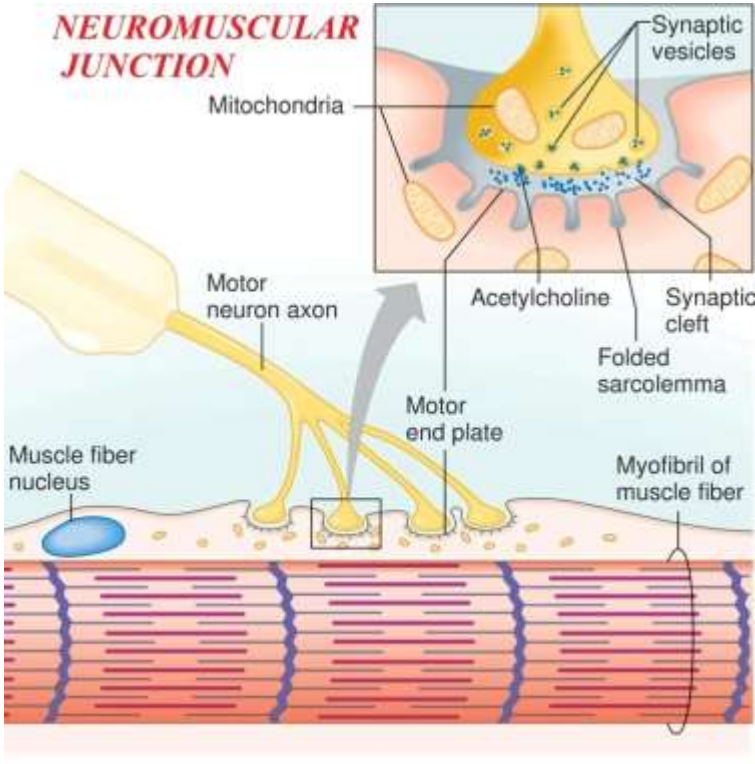


Kolinerg támadáspont

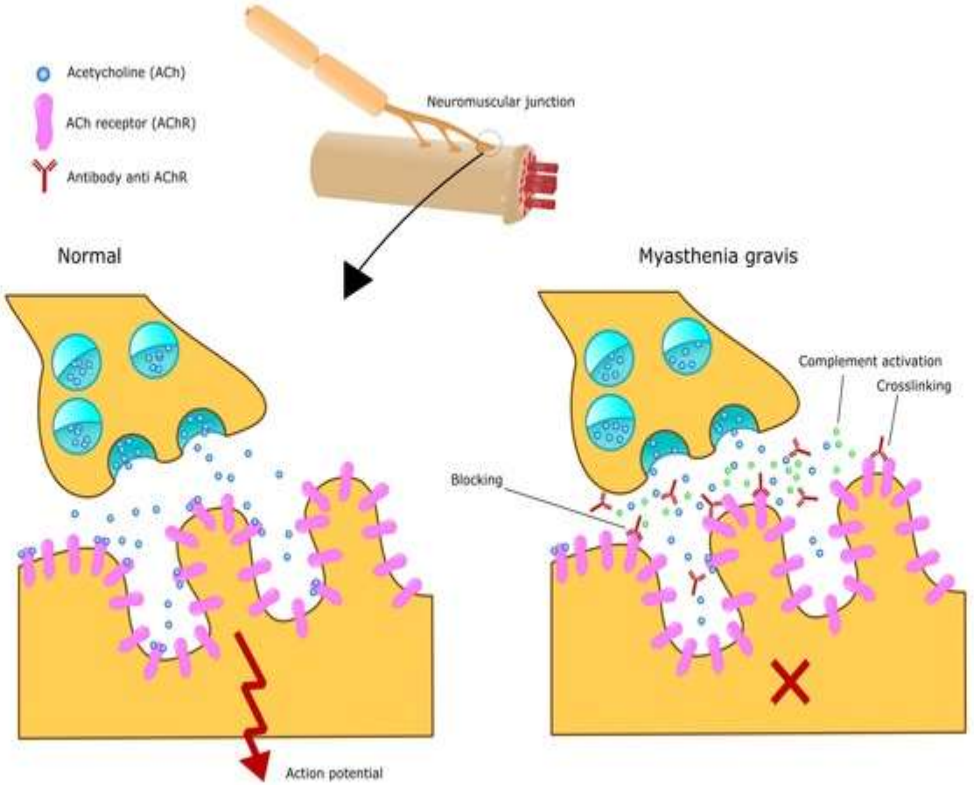


Neuromuszkuláris junkció

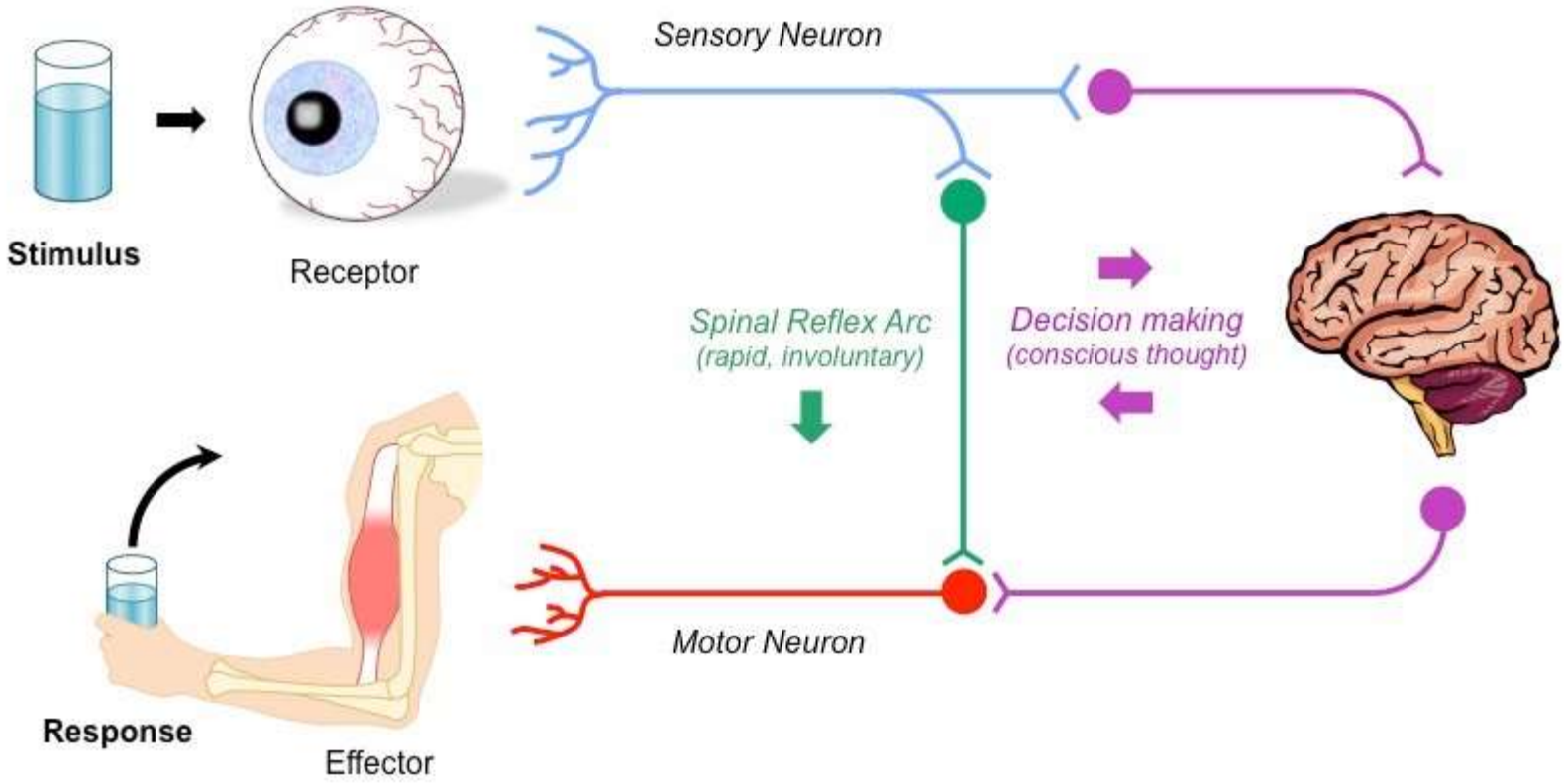




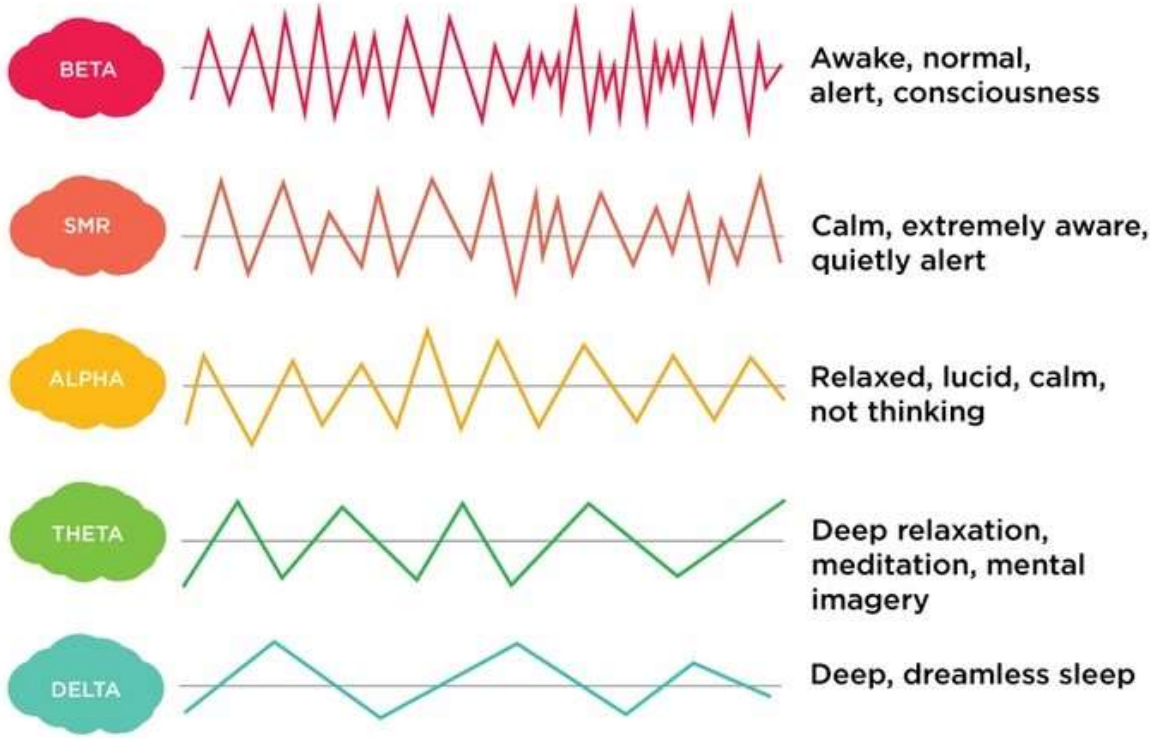
Izomrelaxánsok- myasthenia gravis



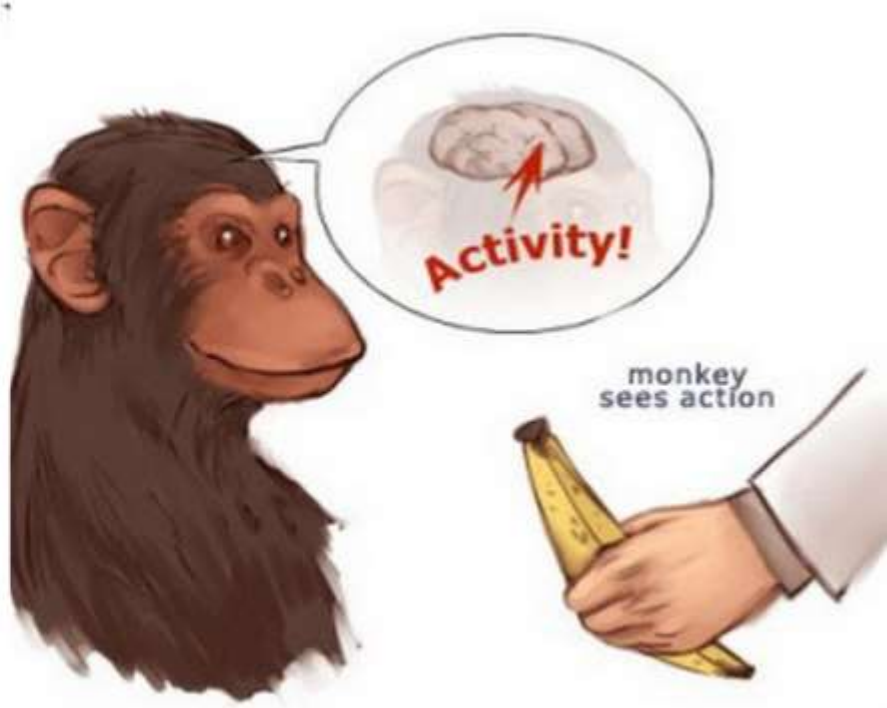
Stimulus-válasz reakció



Oszcilláció, ritmicitás

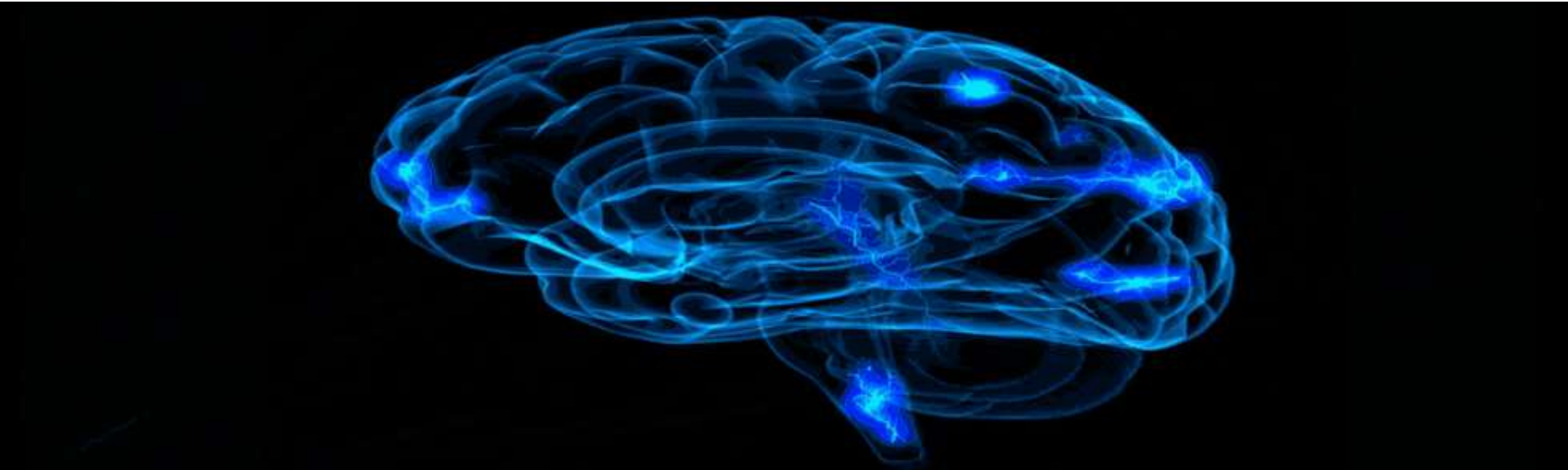


Tükörneuronok



Dinamikus rendszer

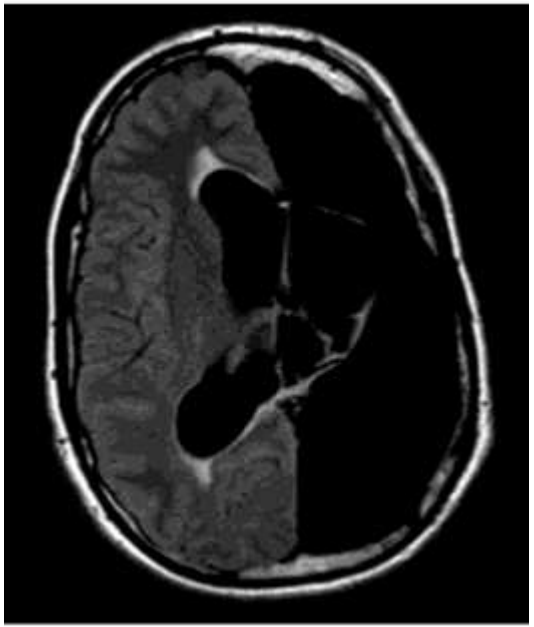
Párhuzamos neuroncsoportok, nagy dinamikus rendszerbe integrálva, relatíve kevés koordinátor alegységgel (hub), funkcionális adaptációs készséggel



Jennifer Aniston neuronok

Quiroga, 2005

„Brain is a river, not a rock”



- 70%/nap; 95%/serdülőkor szinapszis

Kellemes és sikeres vizsgákat!