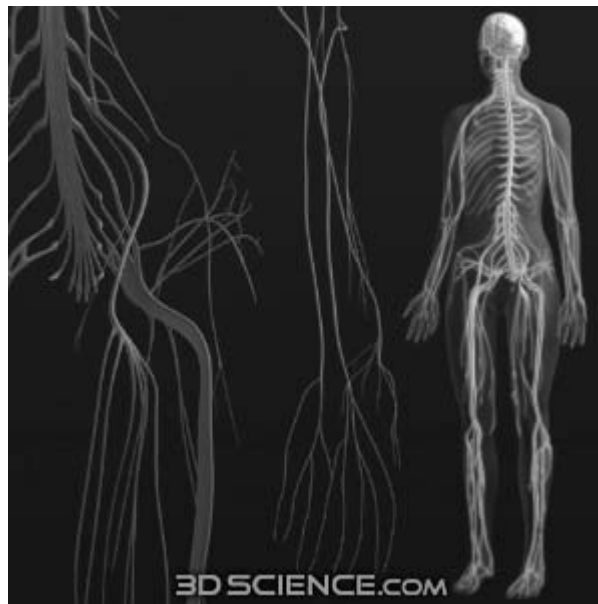
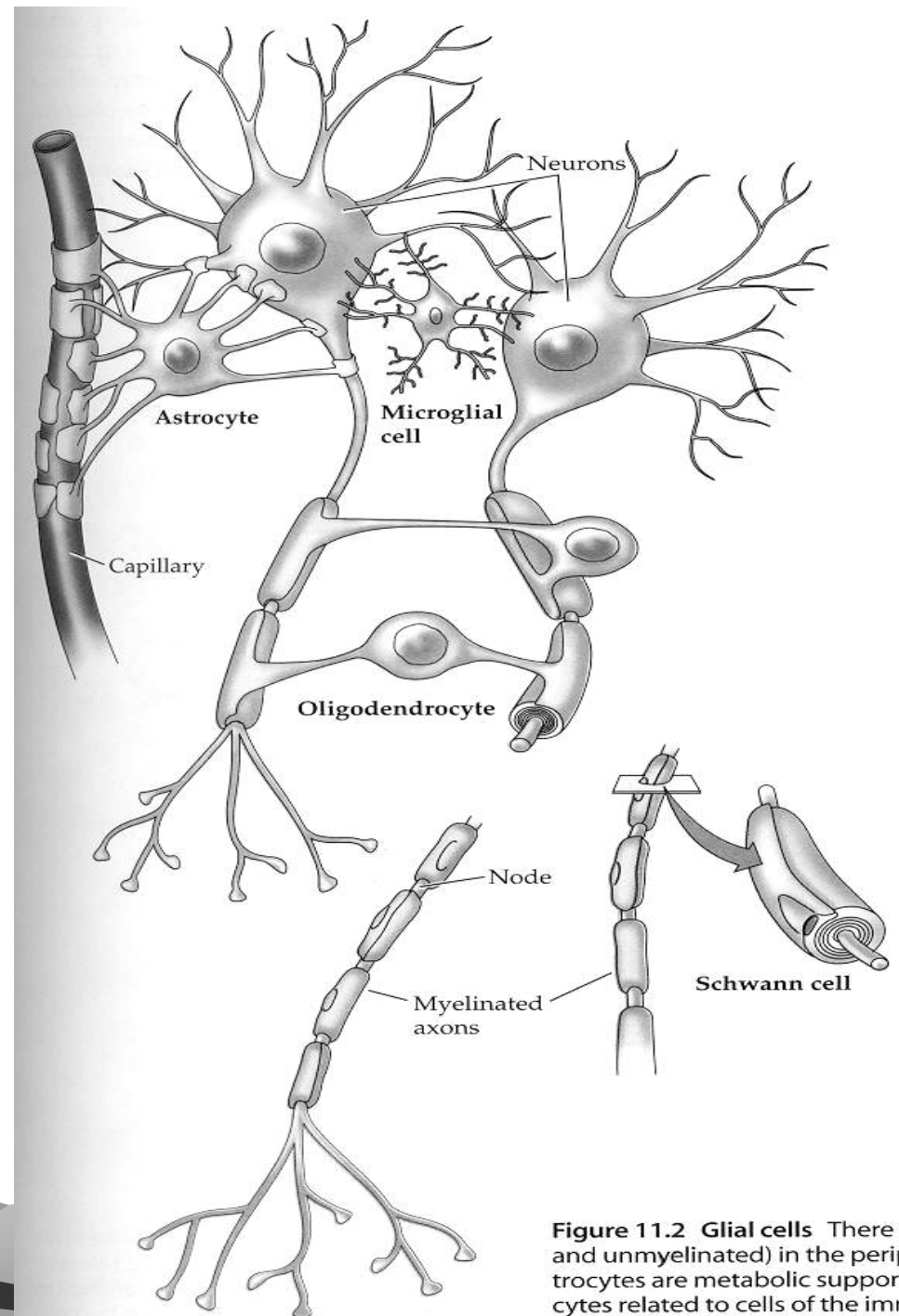


# Nervová soustava

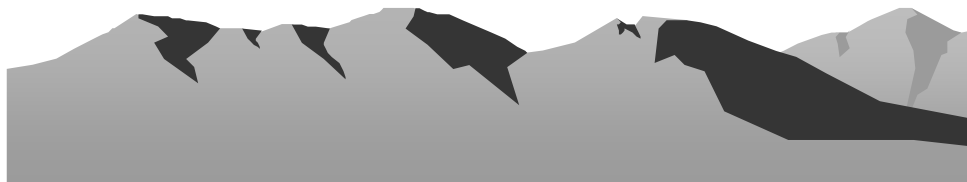


Uzpůsobena na rychlé předávání informací  
Rostoucí význam  
Vybavena schopností zpracovávat, učit se  
Základem pro chování, až po řeč, paměť,  
vědomí

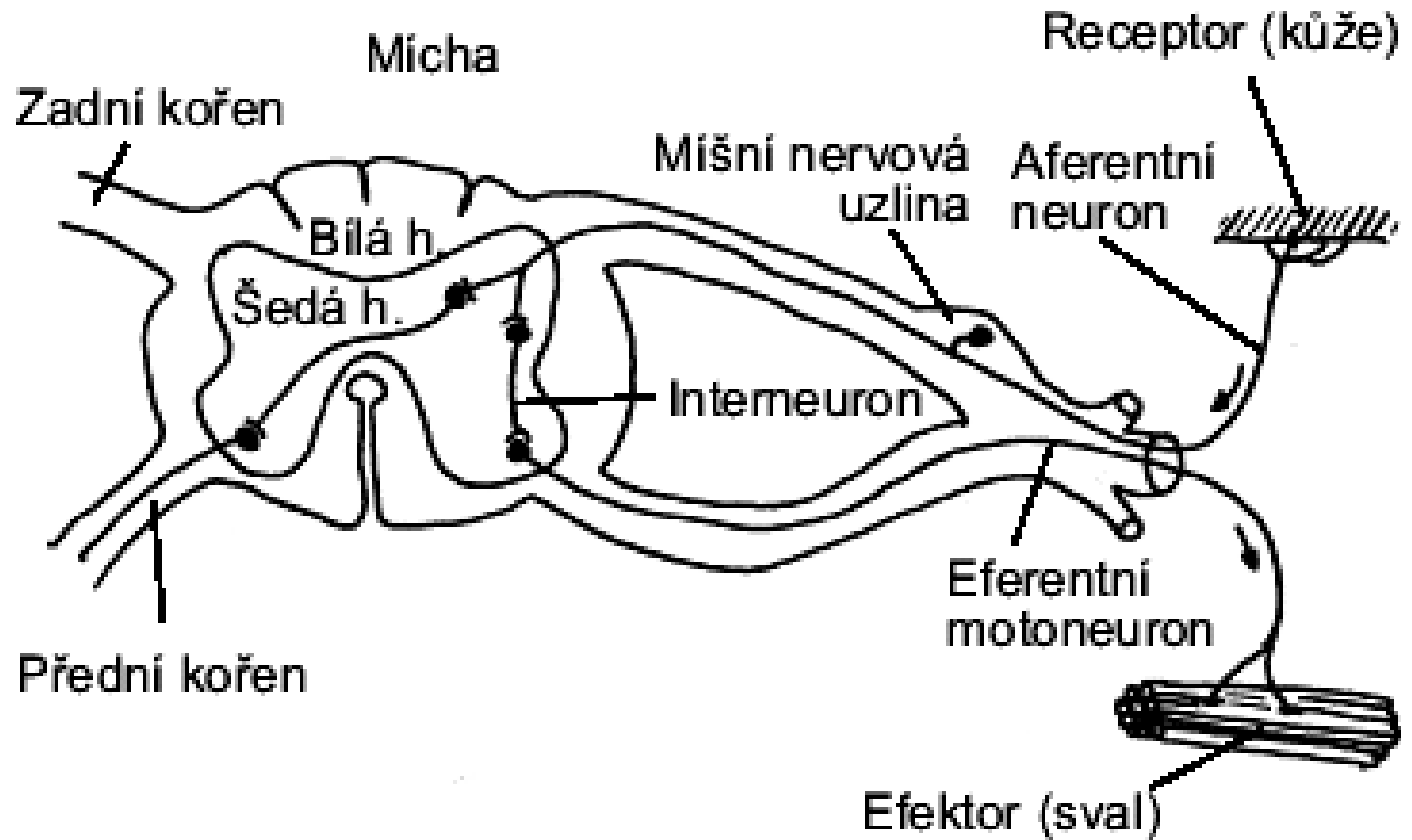
Neuron - stavební jednotka



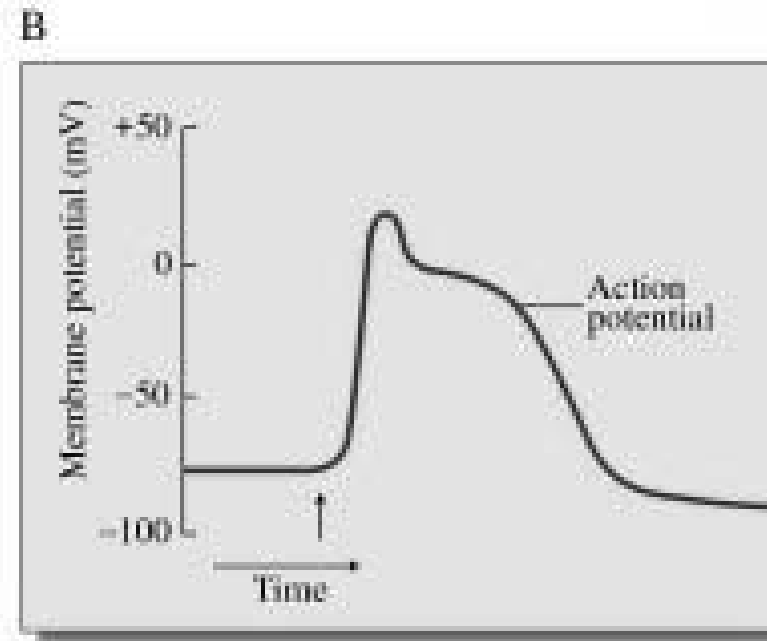
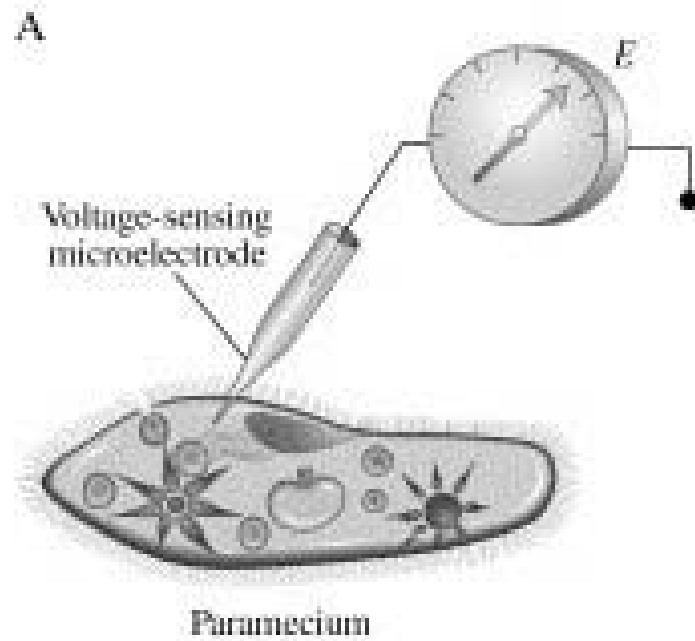
**Figure 11.2 Glial cells** There are (myelinated and unmyelinated) in the pericytes are metabolic support cytes related to cells of the imm



Reflexní oblouk – primární funkční jednotka.

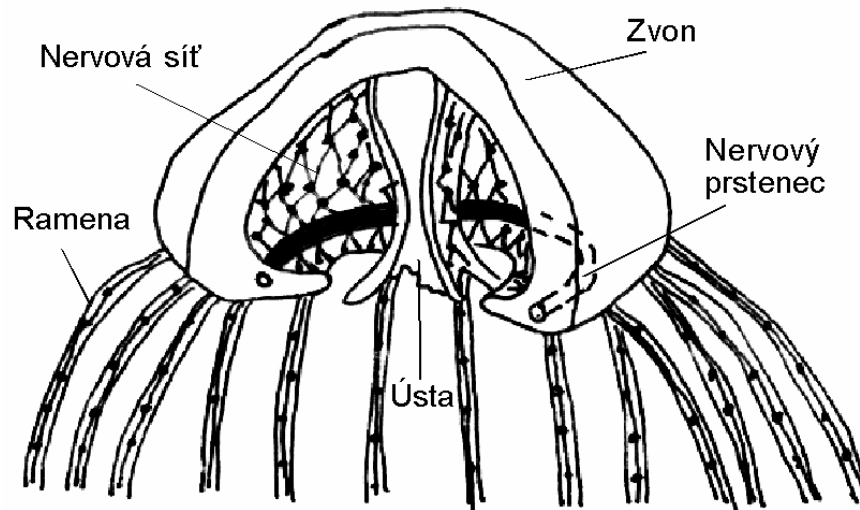


Využití elektrických impulzů pro koordinaci pohybu.

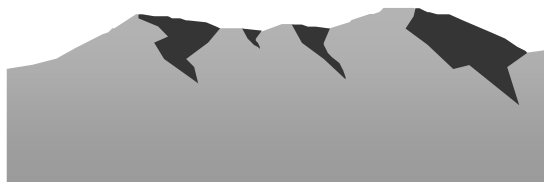
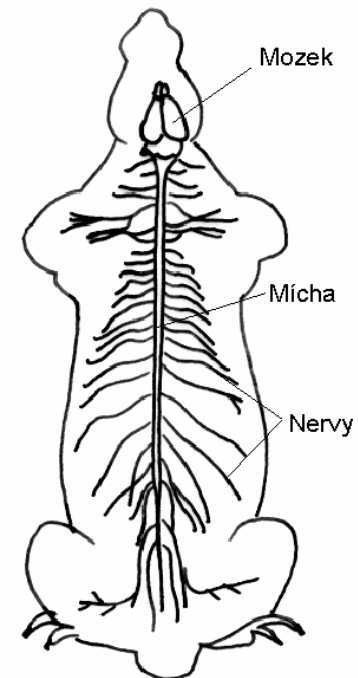
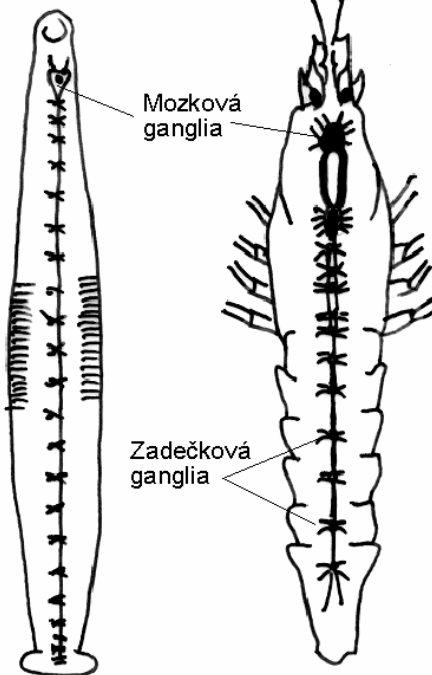
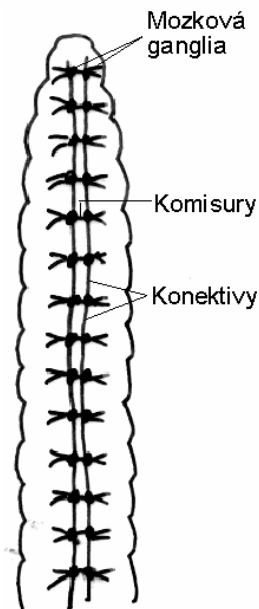


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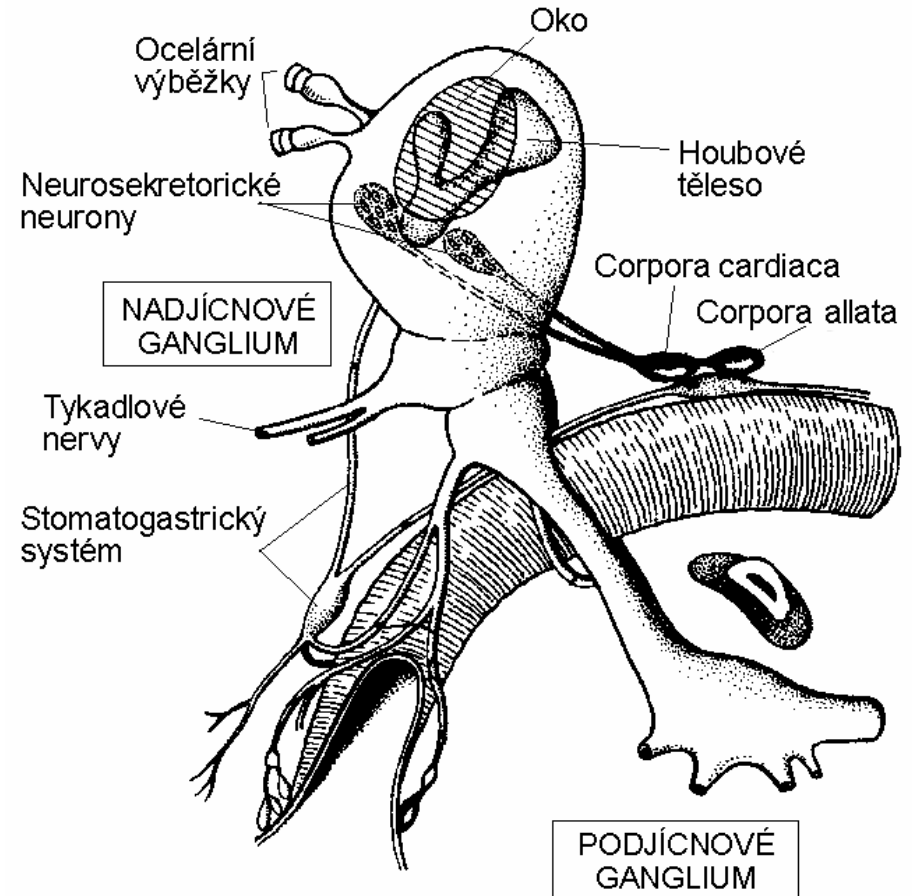
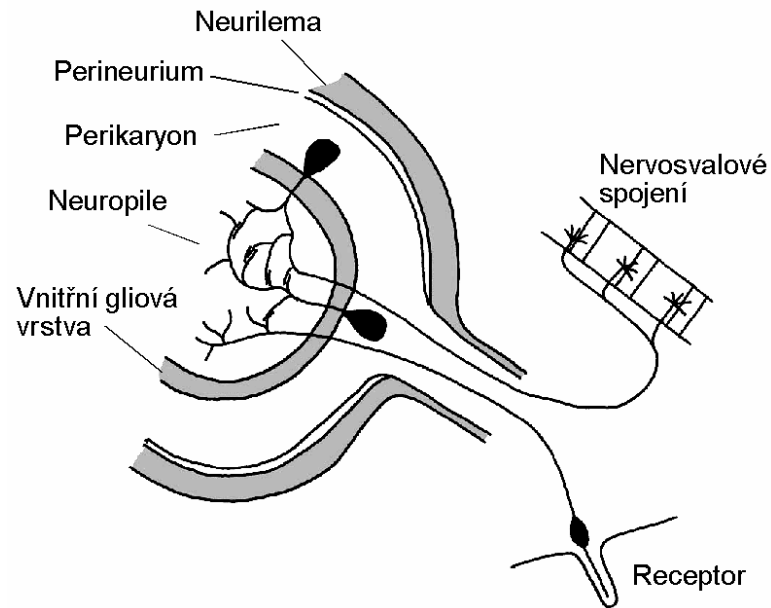




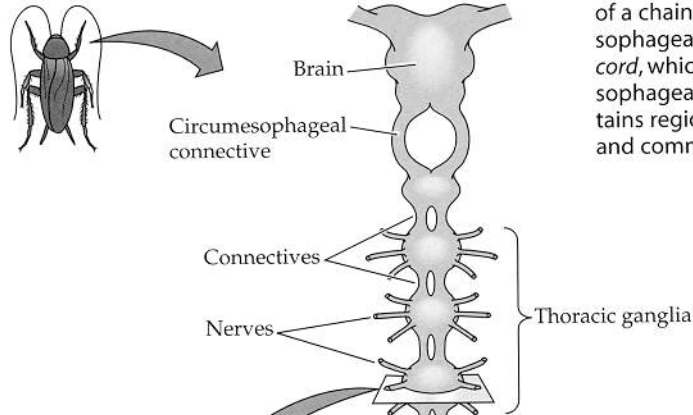
Agregace  
Centralizace  
Cefalizace



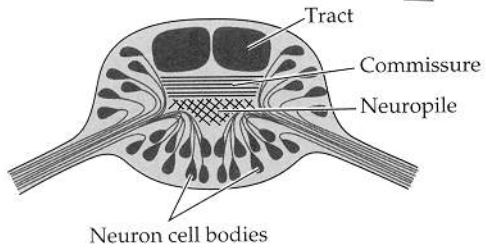
# Hmyz



(a) Dorsal view of the central nervous system



(b) Cross section of a ganglion

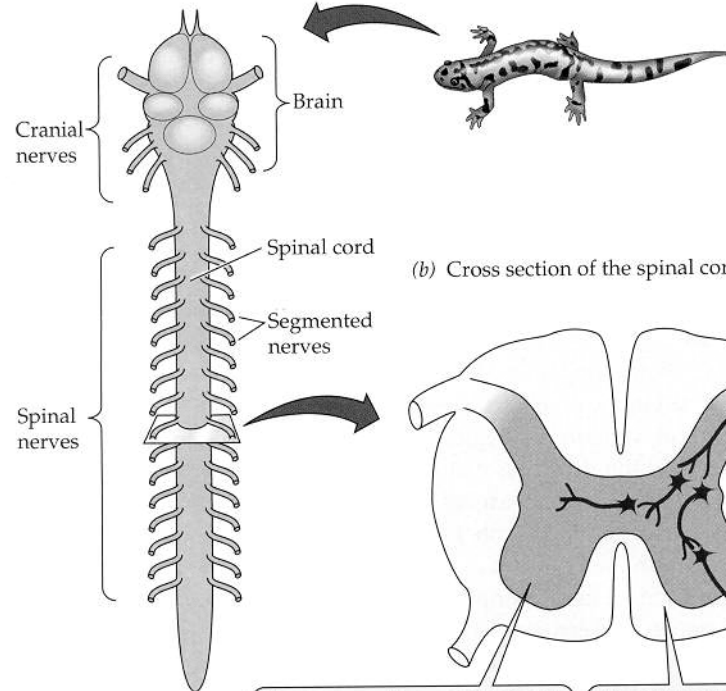


**Figure 10.5 The organization of an arthropod central nervous system** (a) The CNS, which is shown here in a dorsal view, consists of a chain of segmental ganglia linked by connectives. (b) A ganglion, shown in cross section, contains regions of cell bodies, of synaptic neuropile, and commissures.

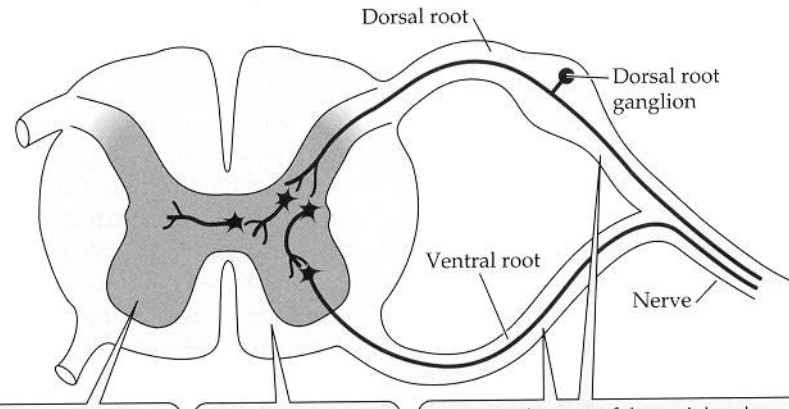
**THE VERTEBRATE CENTRAL NERVOUS COLUMN** Vertebrate central nervous system in contrast to those of arthropods consists of a continuous column of neural tissue and synaptic areas intermingled in a continuous system of vertebrates consisting of the spinal cord (Figure 10.6). It differs from the arthropod system in that it is a single continuous column of neural tissue.

# Obratlovci

(a) Dorsal view of the central nervous system



(b) Cross section of the spinal cord



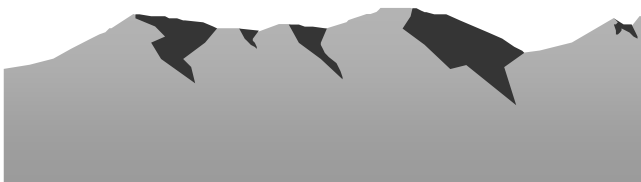
The **gray matter** consists of cell bodies, synapses, and unmyelinated neural processes.

The **white matter** consists of tracts of myelinated axons.

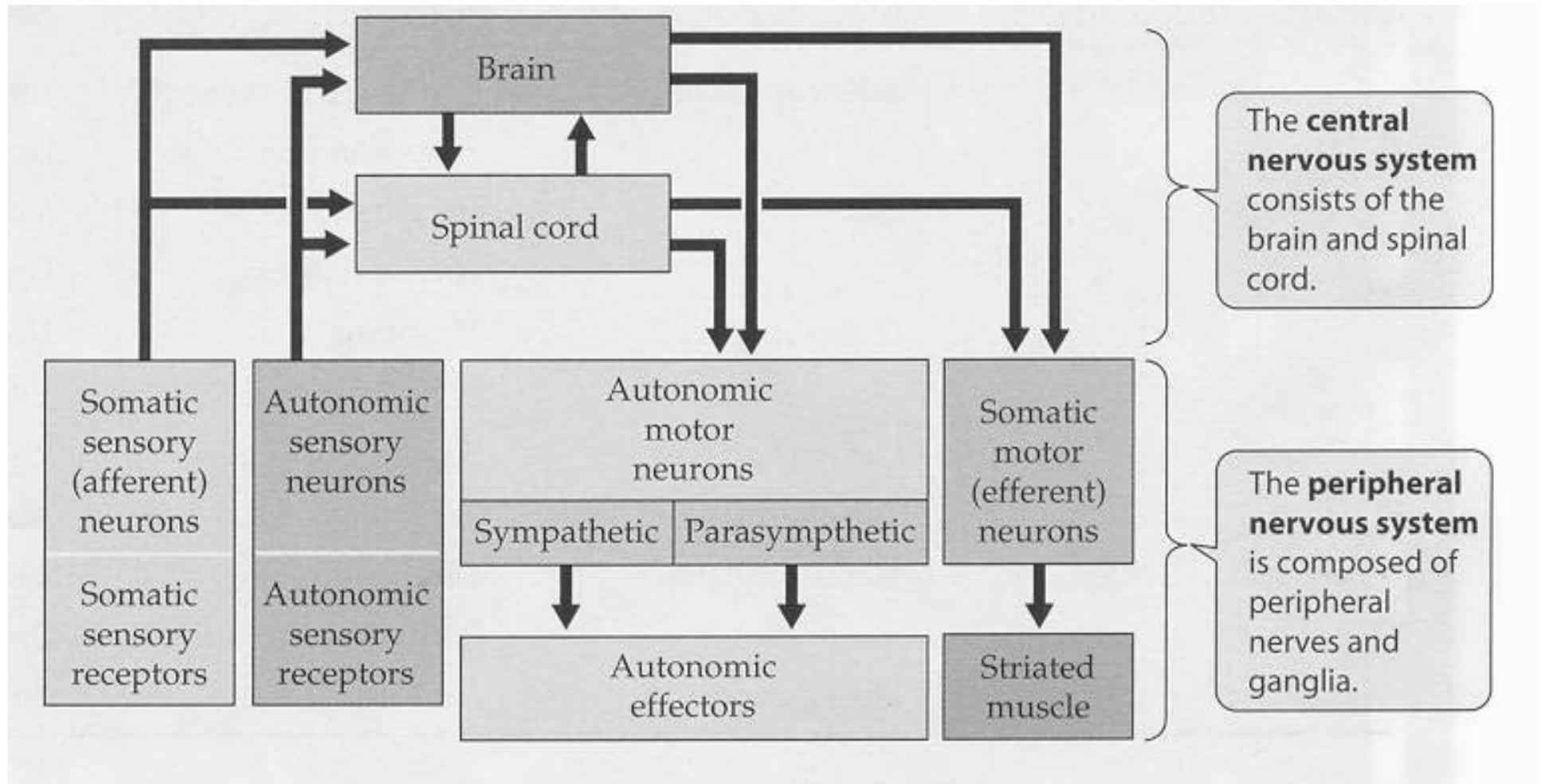
Segmental nerves of the peripheral nervous system connect to the spinal cord via sensory dorsal roots and motor ventral roots.

**Figure 10.6 The organization of a vertebrate central nervous system** (a) A schematic vertebrate central nervous system shown in dorsal view, consists of a single continuous column of neural tissue and synaptic areas intermingled in a continuous system of vertebrates consisting of the spinal cord (Figure 10.6). It differs from the arthropod system in that it is a single continuous column of neural tissue.

# Hmyz

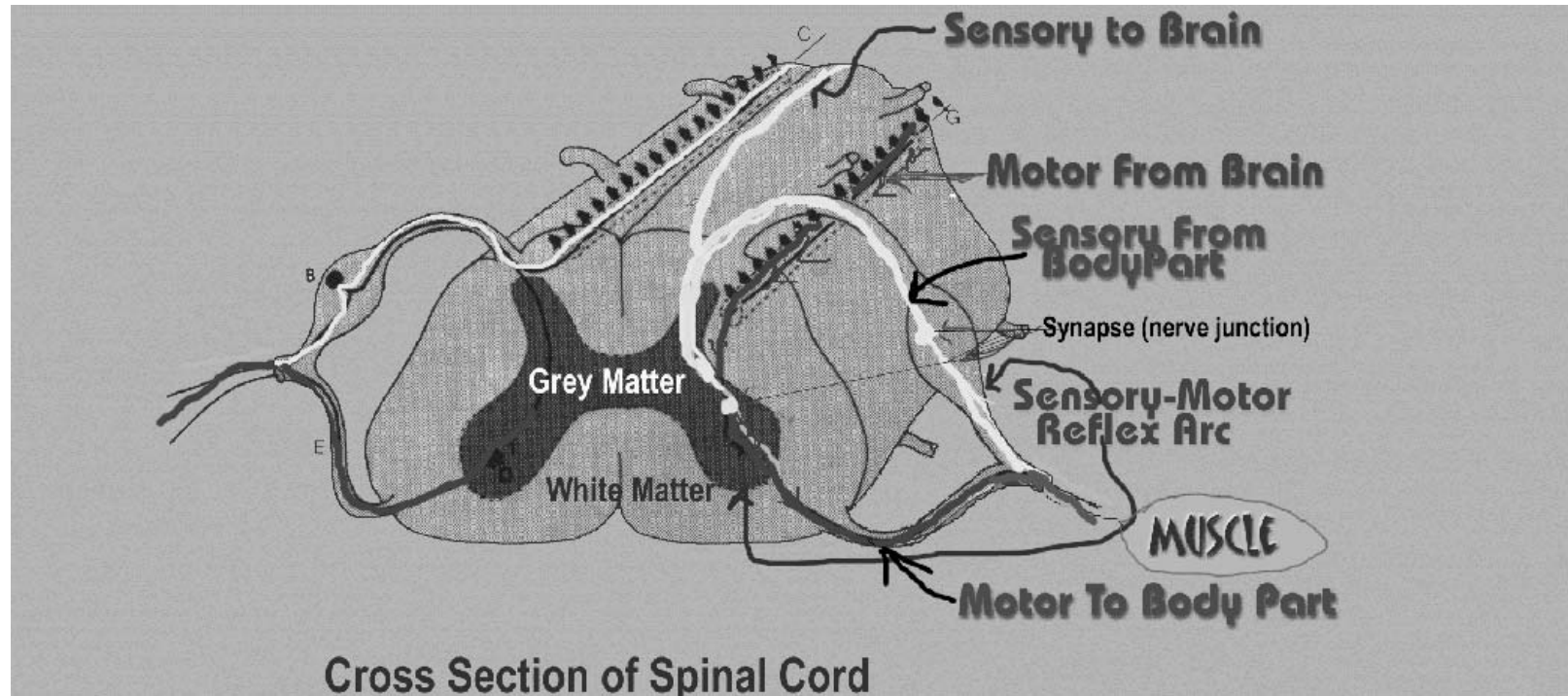


# Členění nervového systému

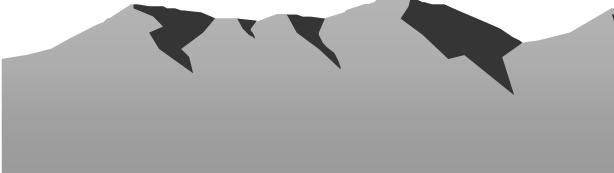
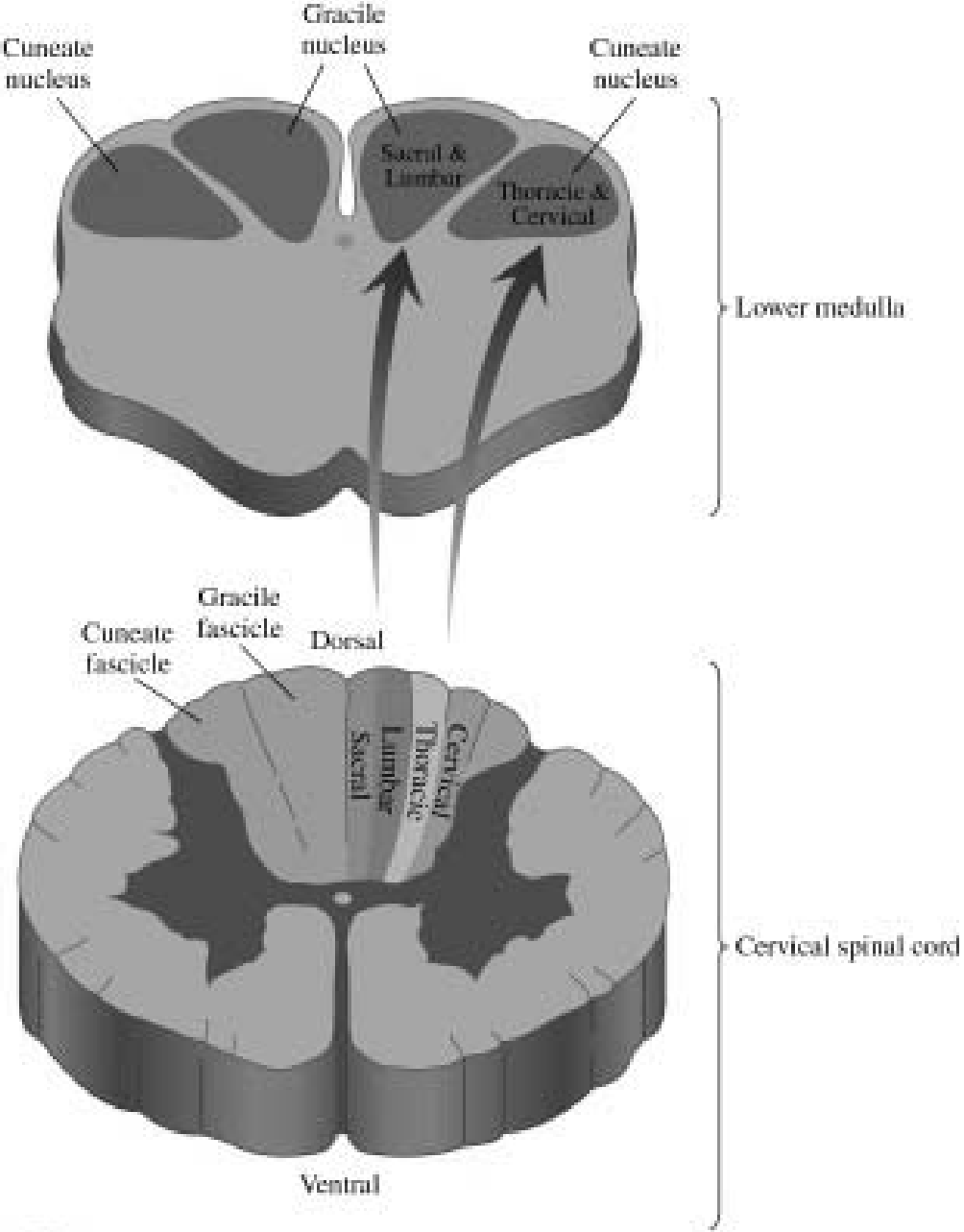


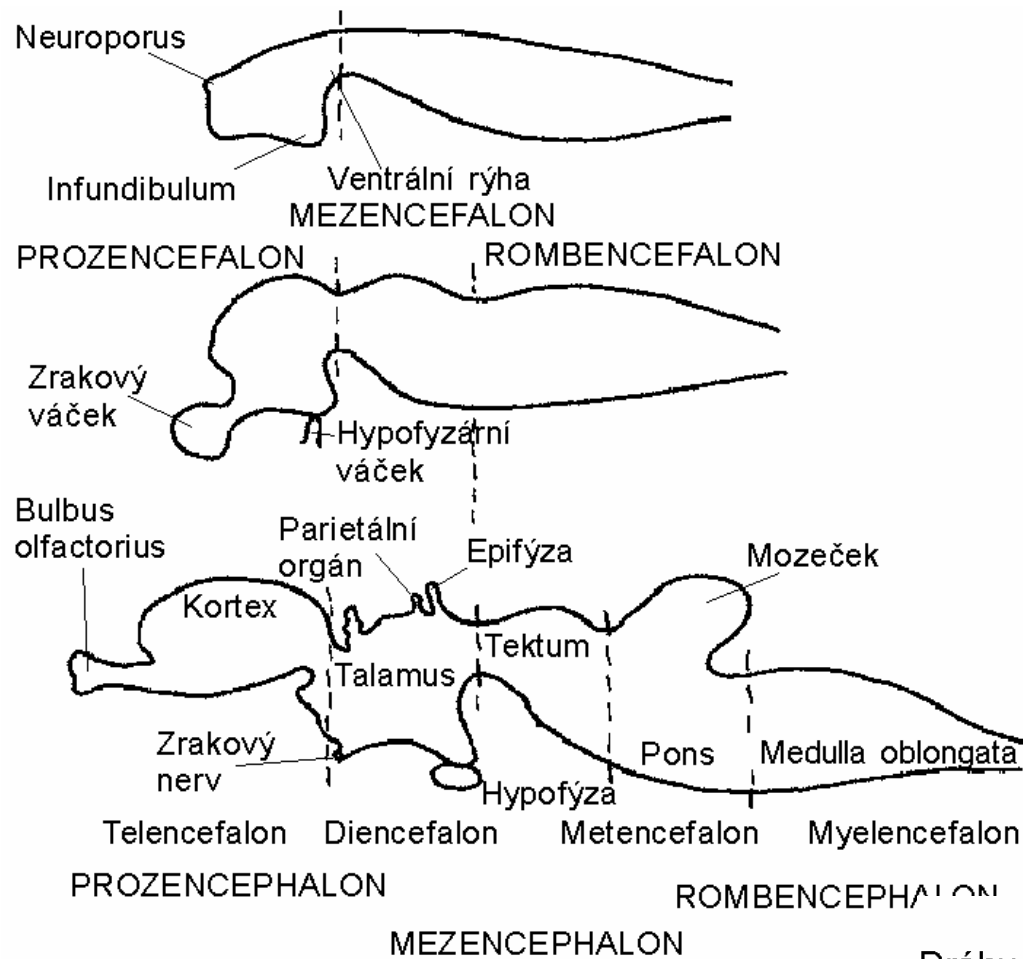


Mícha

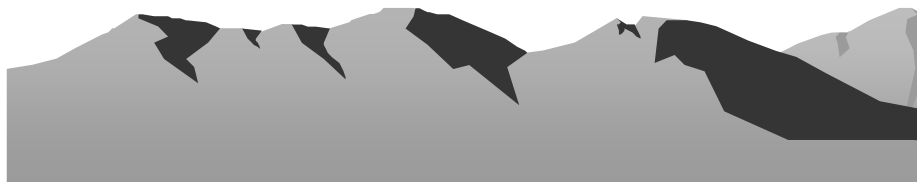
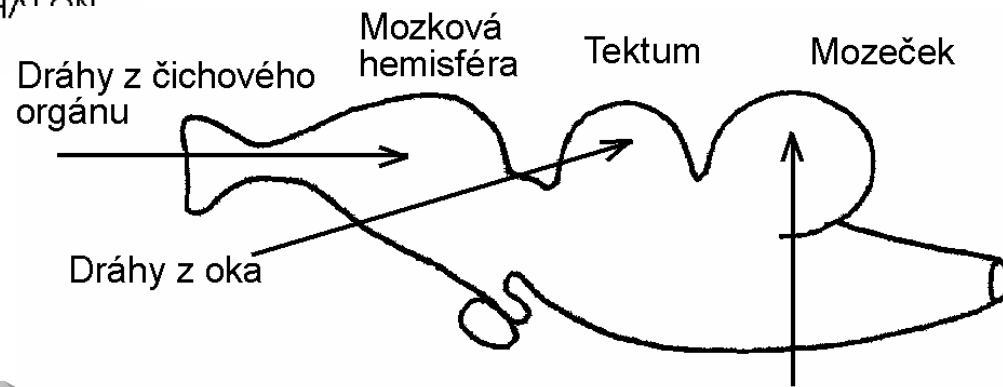


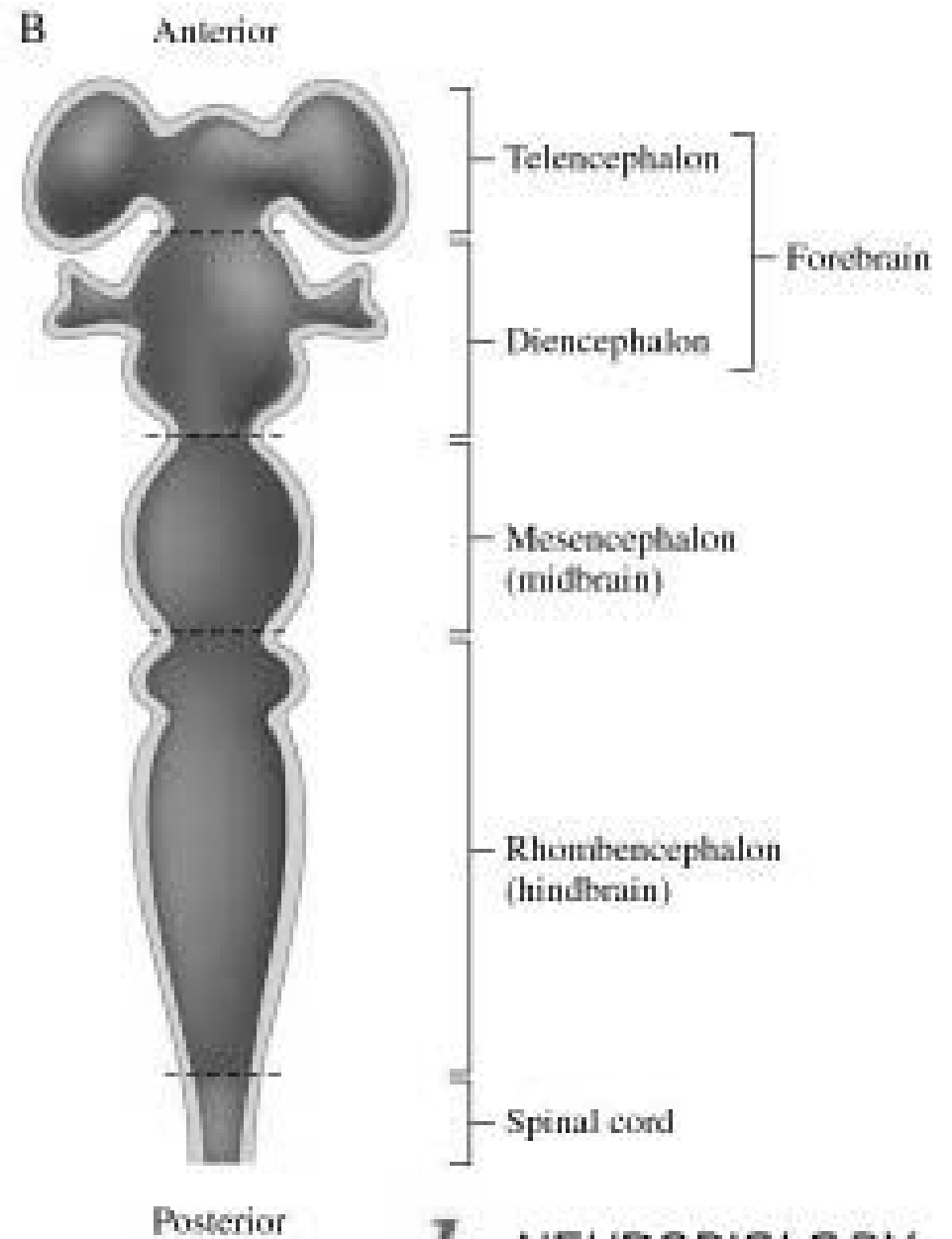
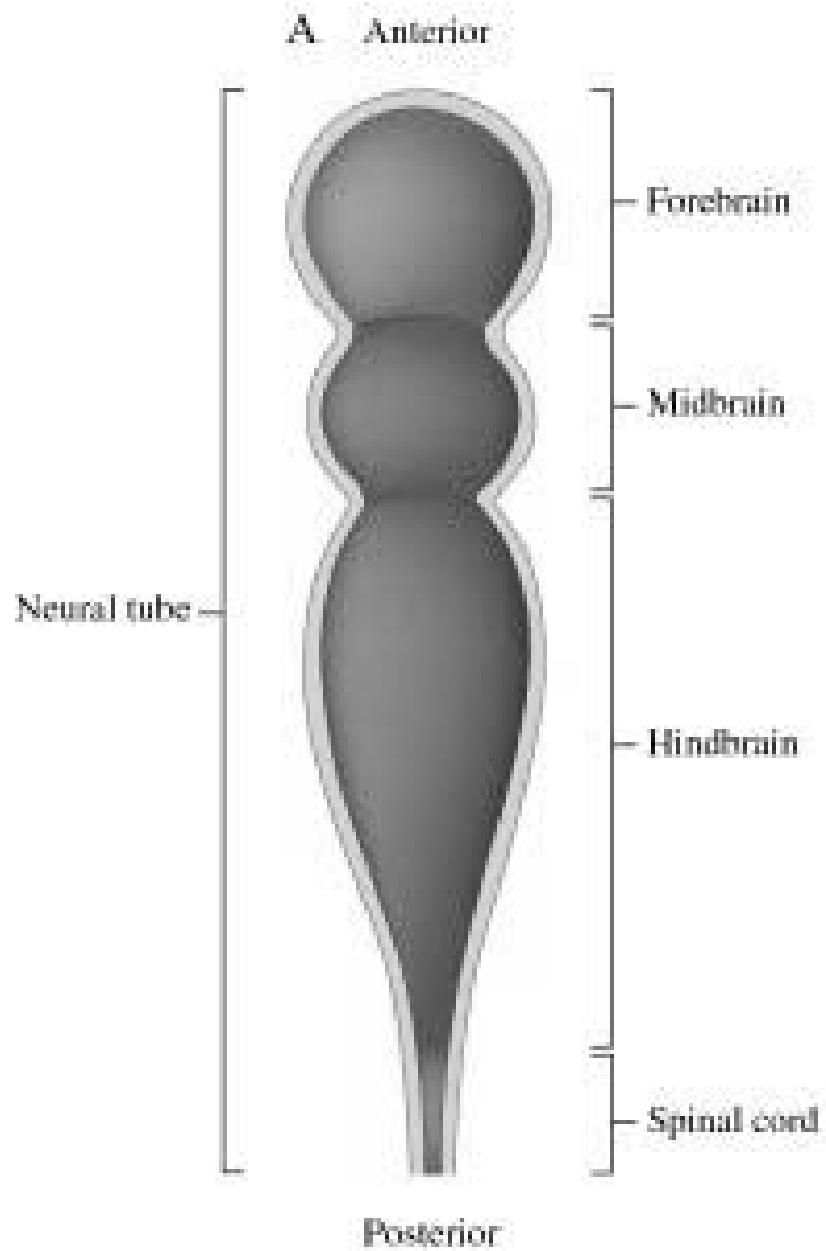
# Somatotopie

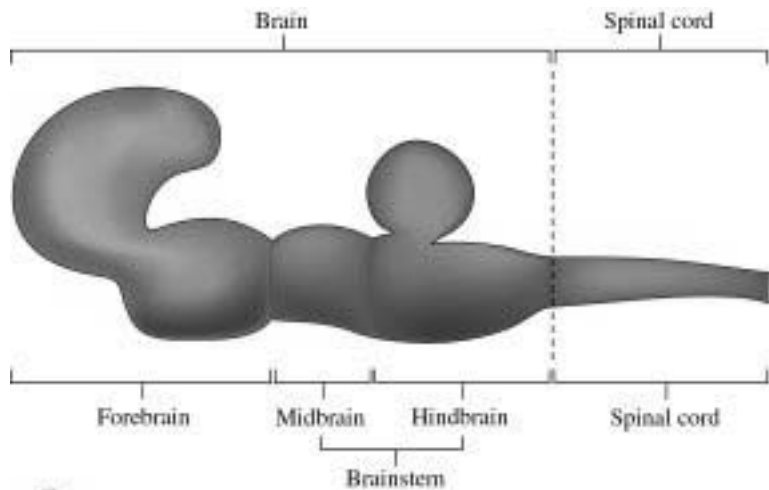




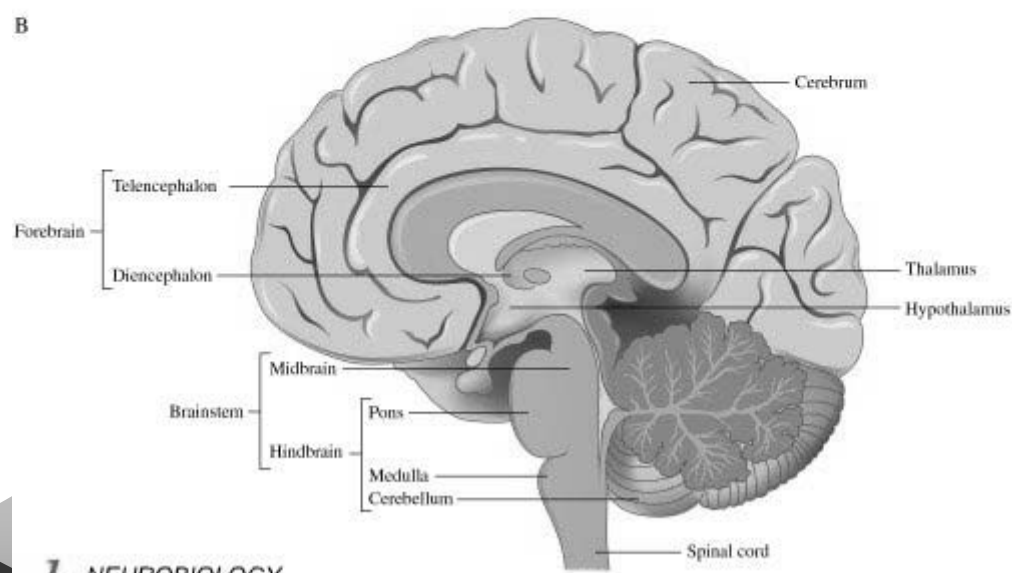
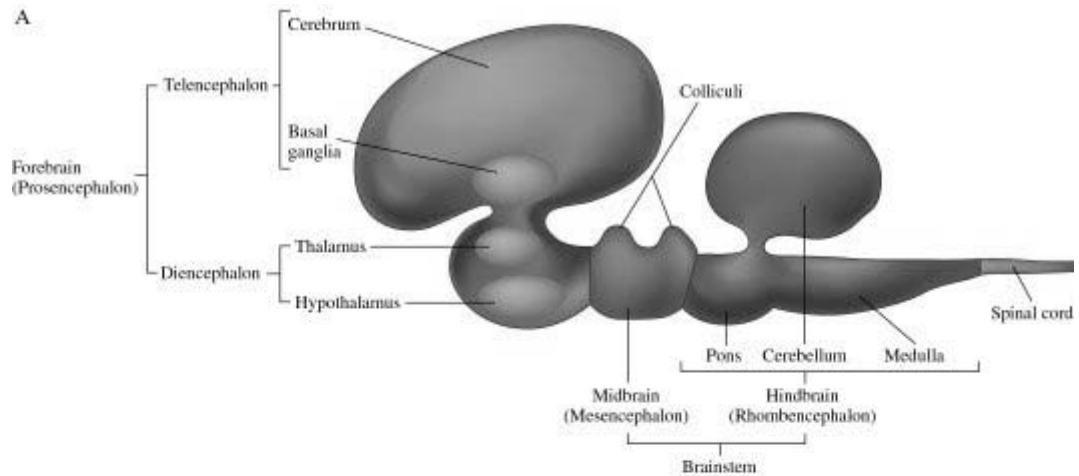
## Vývoj mozku a zpracování vstupů





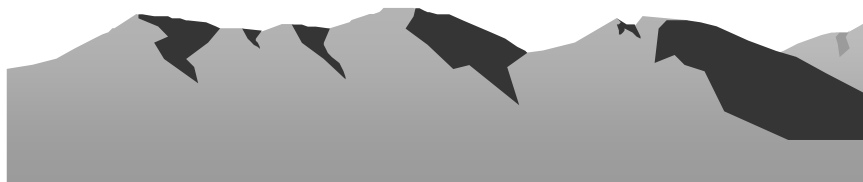


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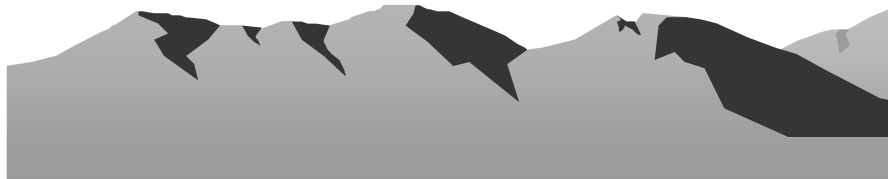
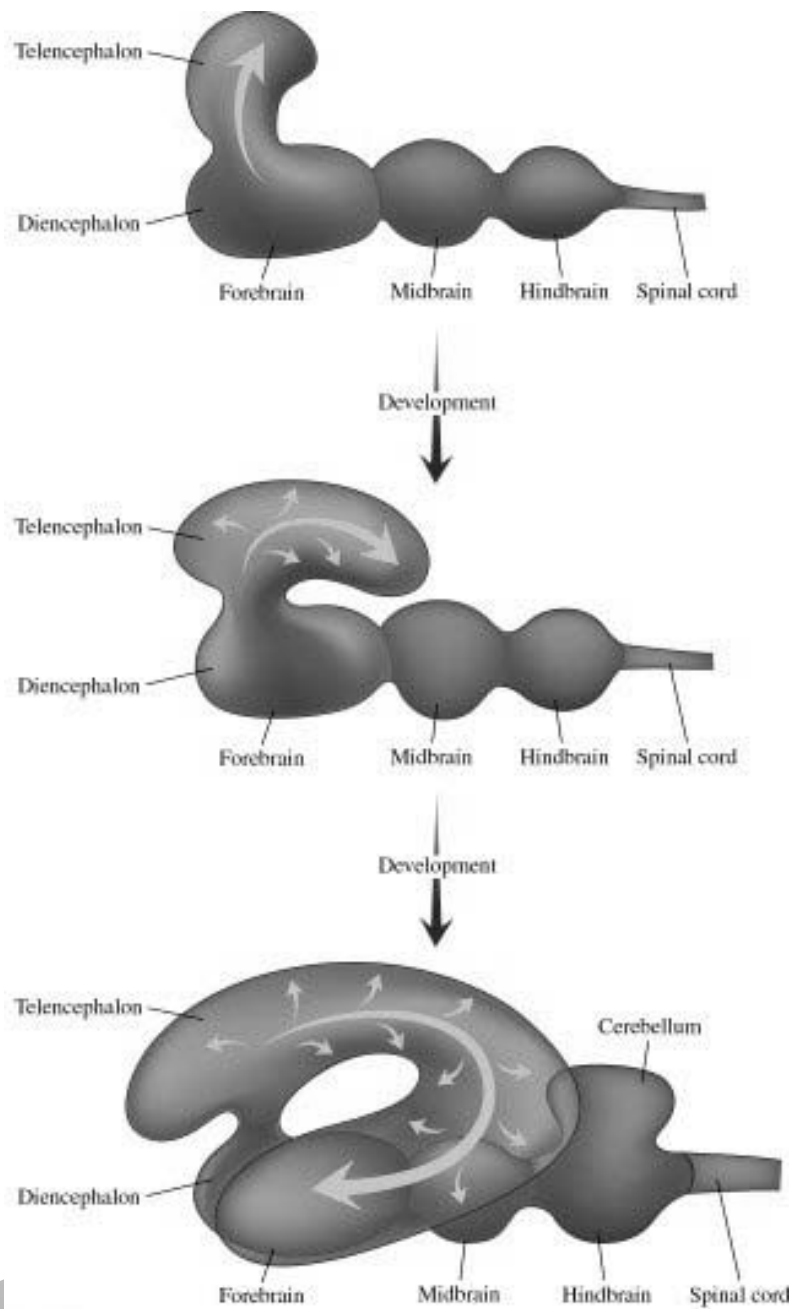


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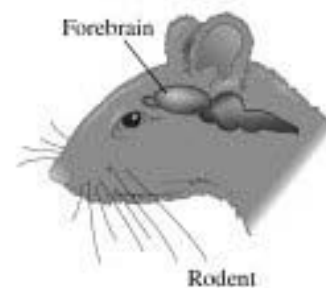
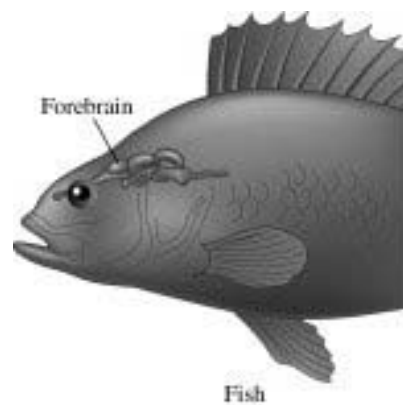
Vývoj zejména v kraniální a dorzální oblasti



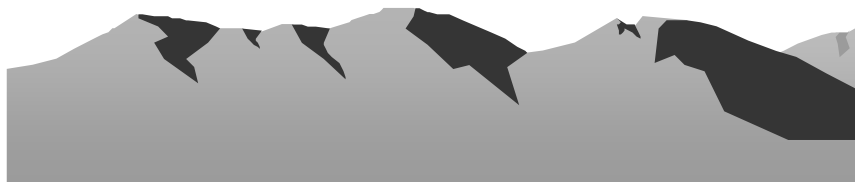
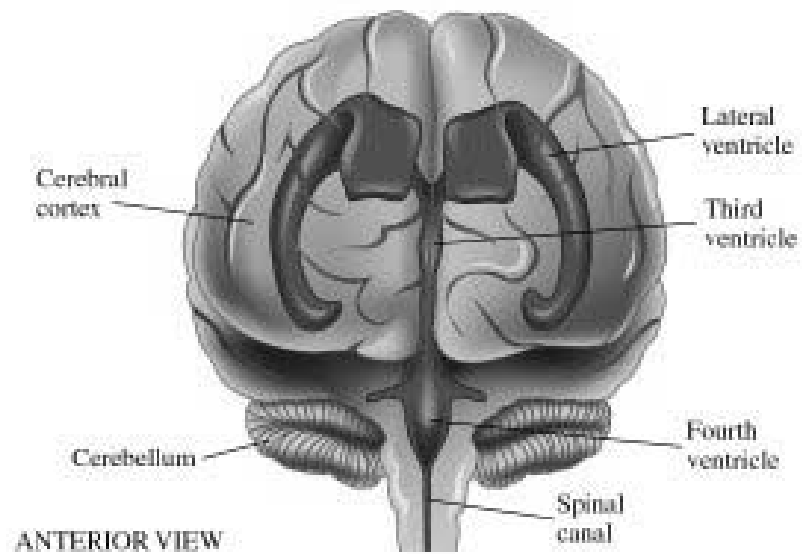
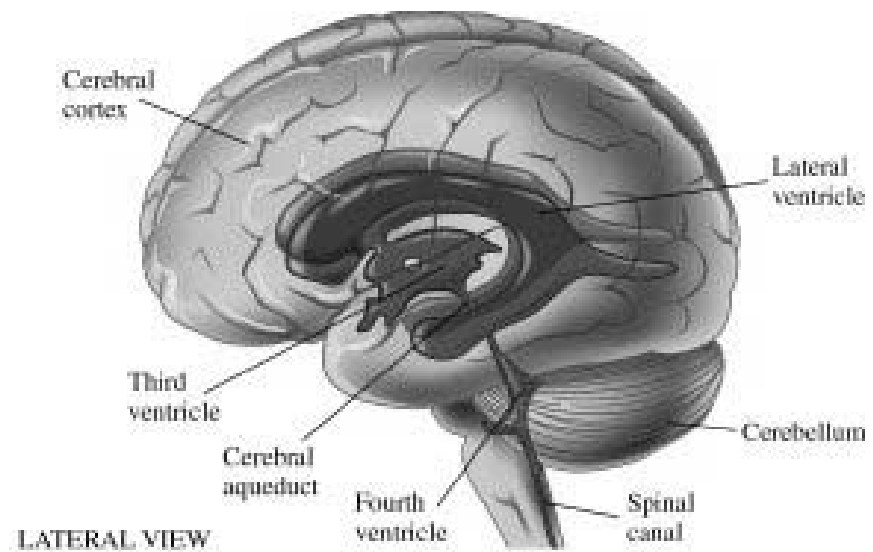
# Dominance telencefala zejména neokortexu



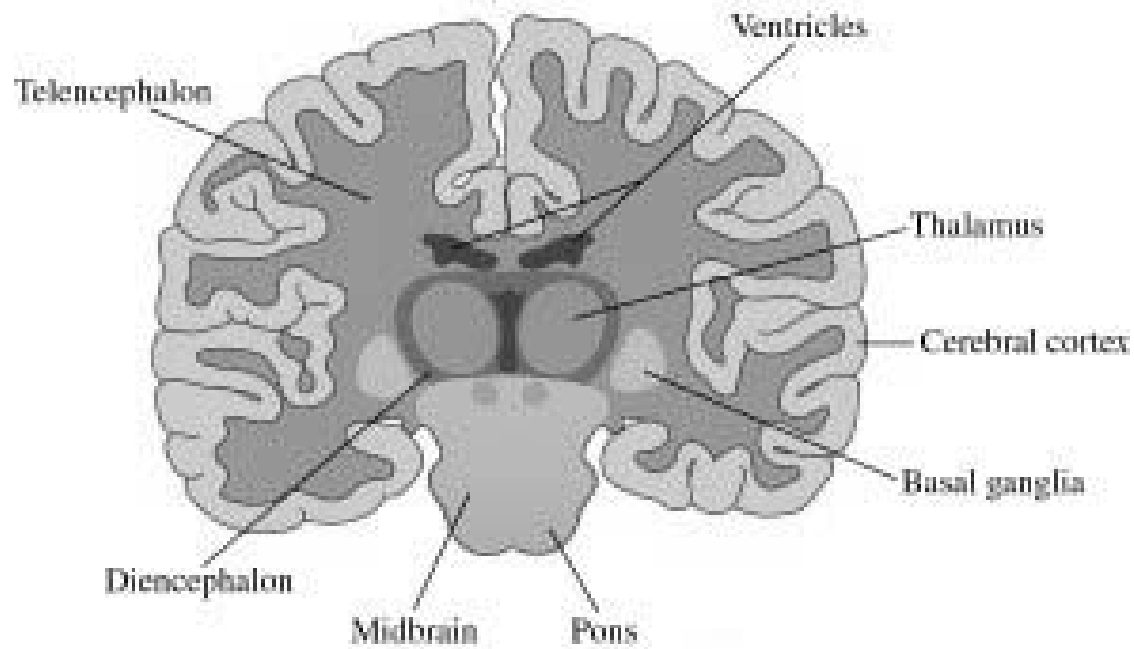
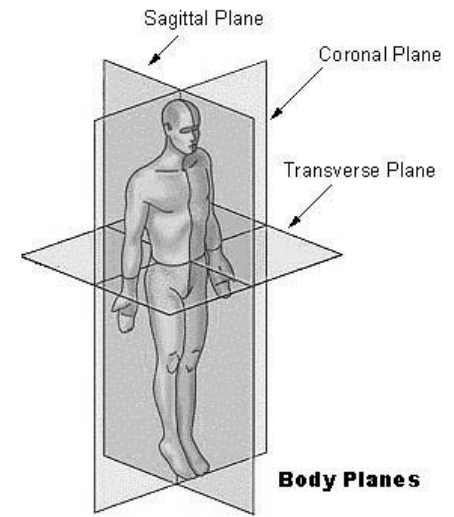
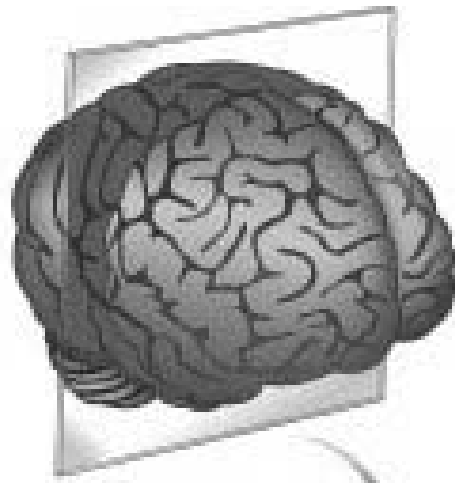
# Dominance telencefala zejména neokortexu



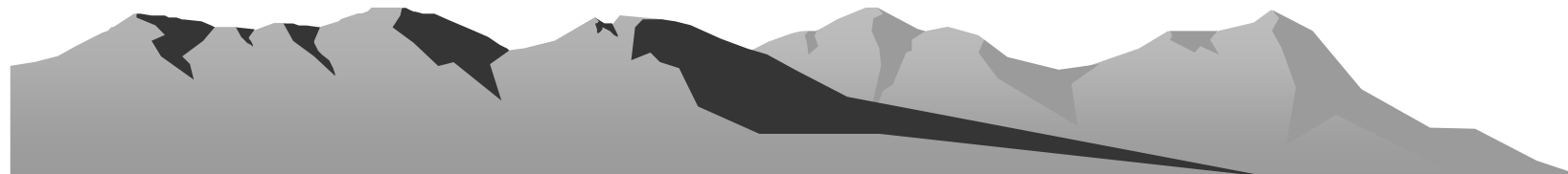
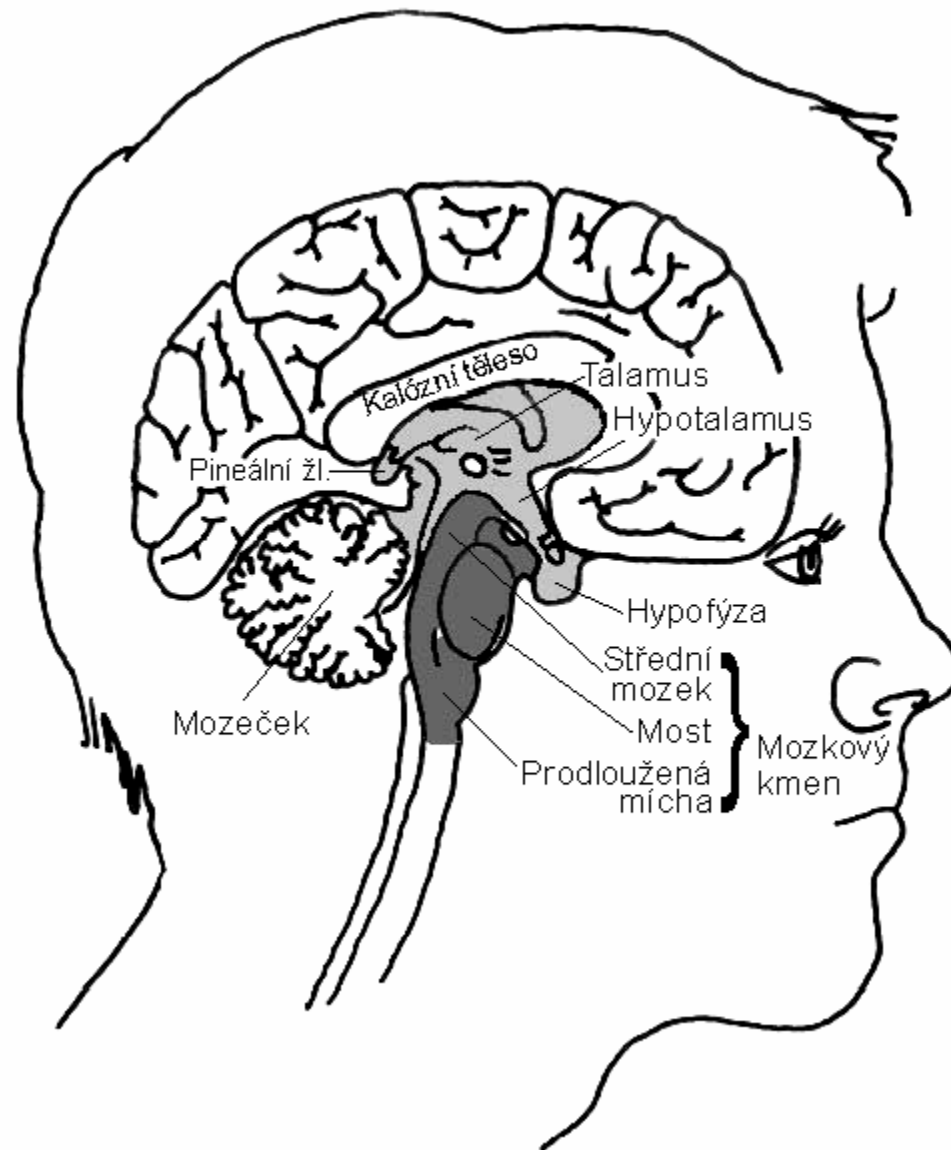
# Mozkové komory





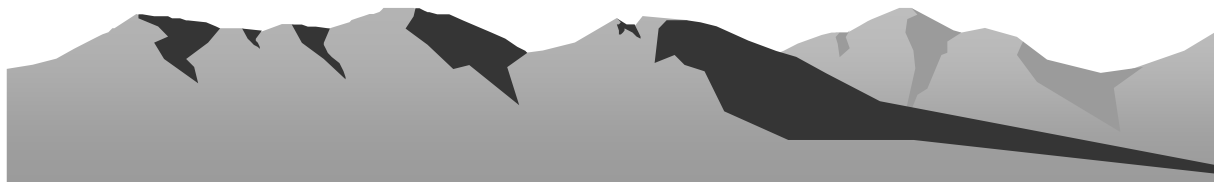
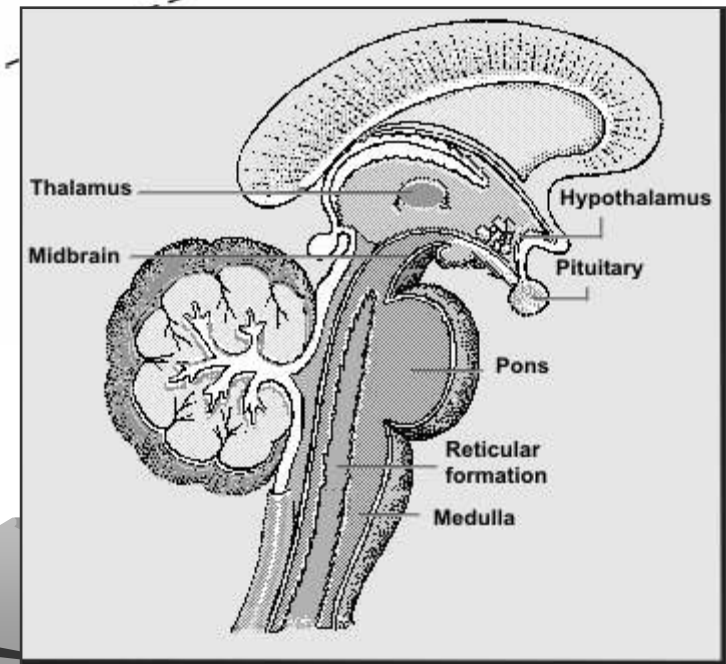
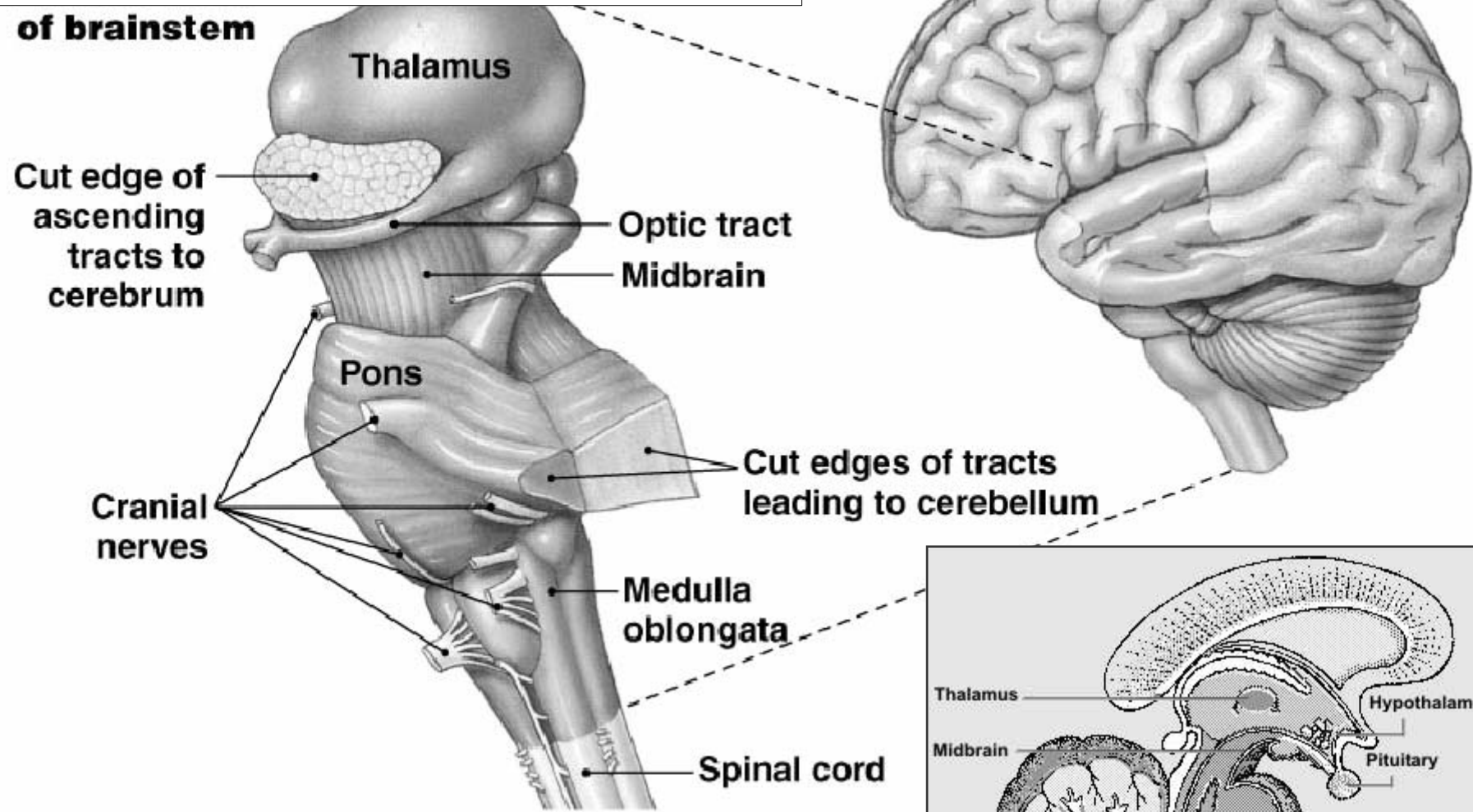


# Mozkový kmen



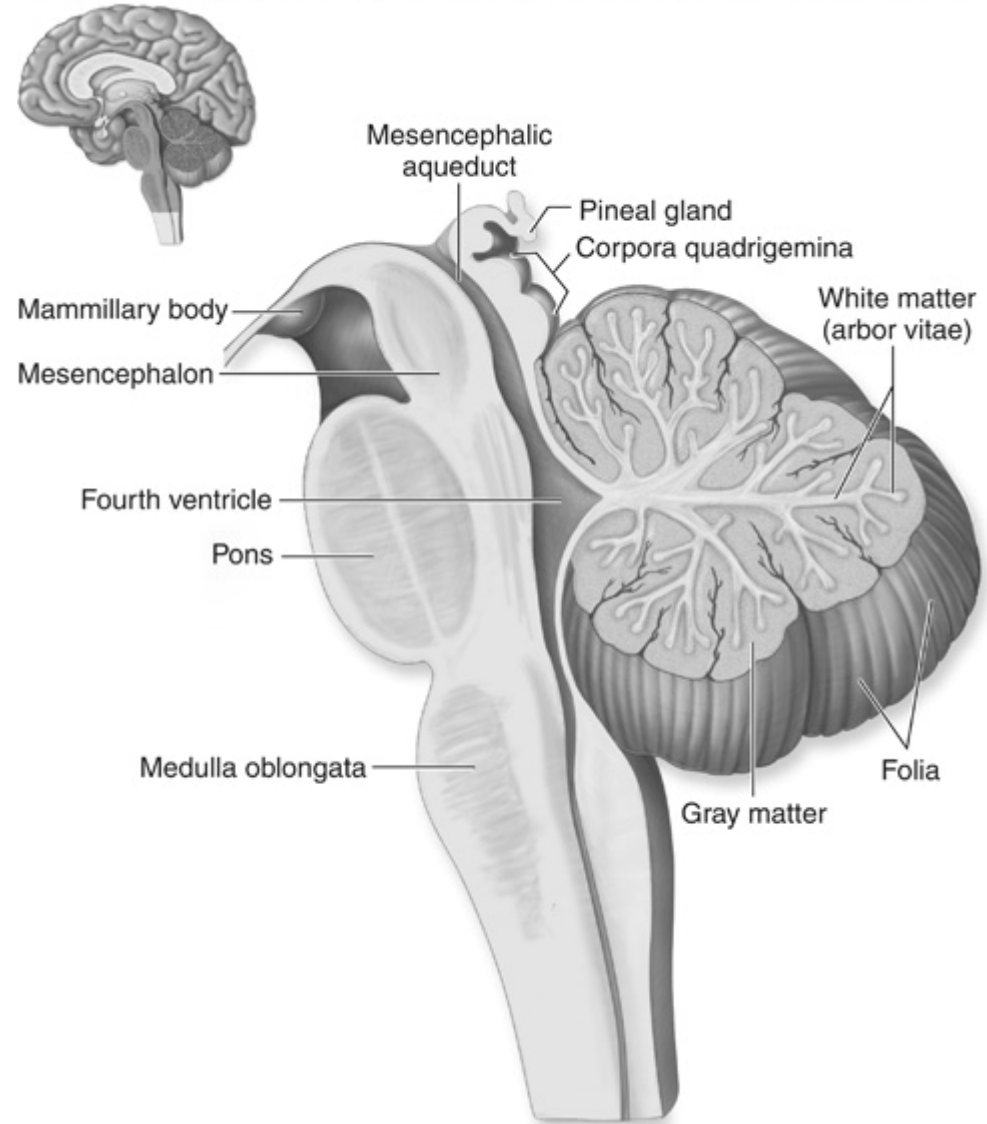
# Mozkový kmen – prodloužená mícha

of brainstem



# Mozeček a střední mozek

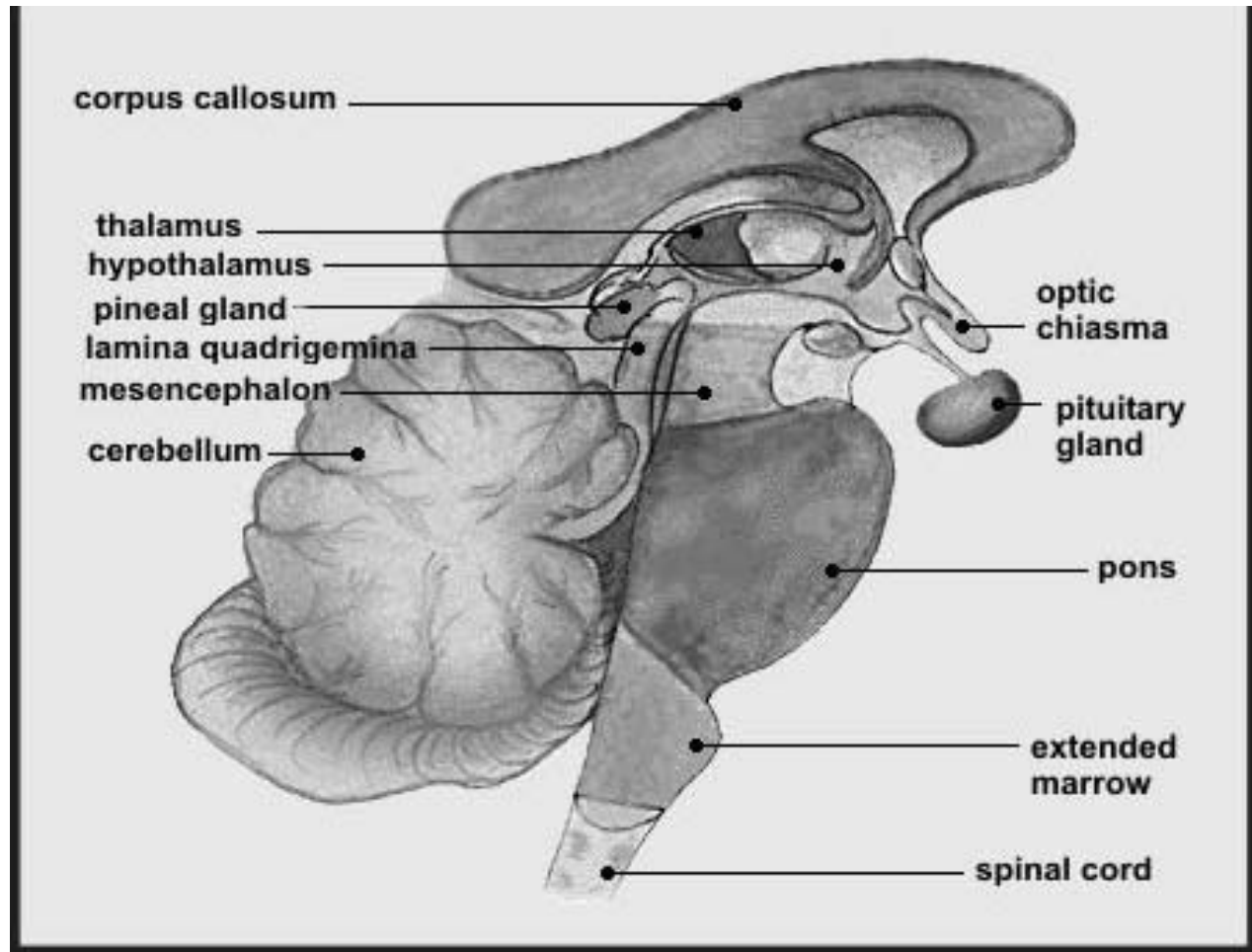
Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.



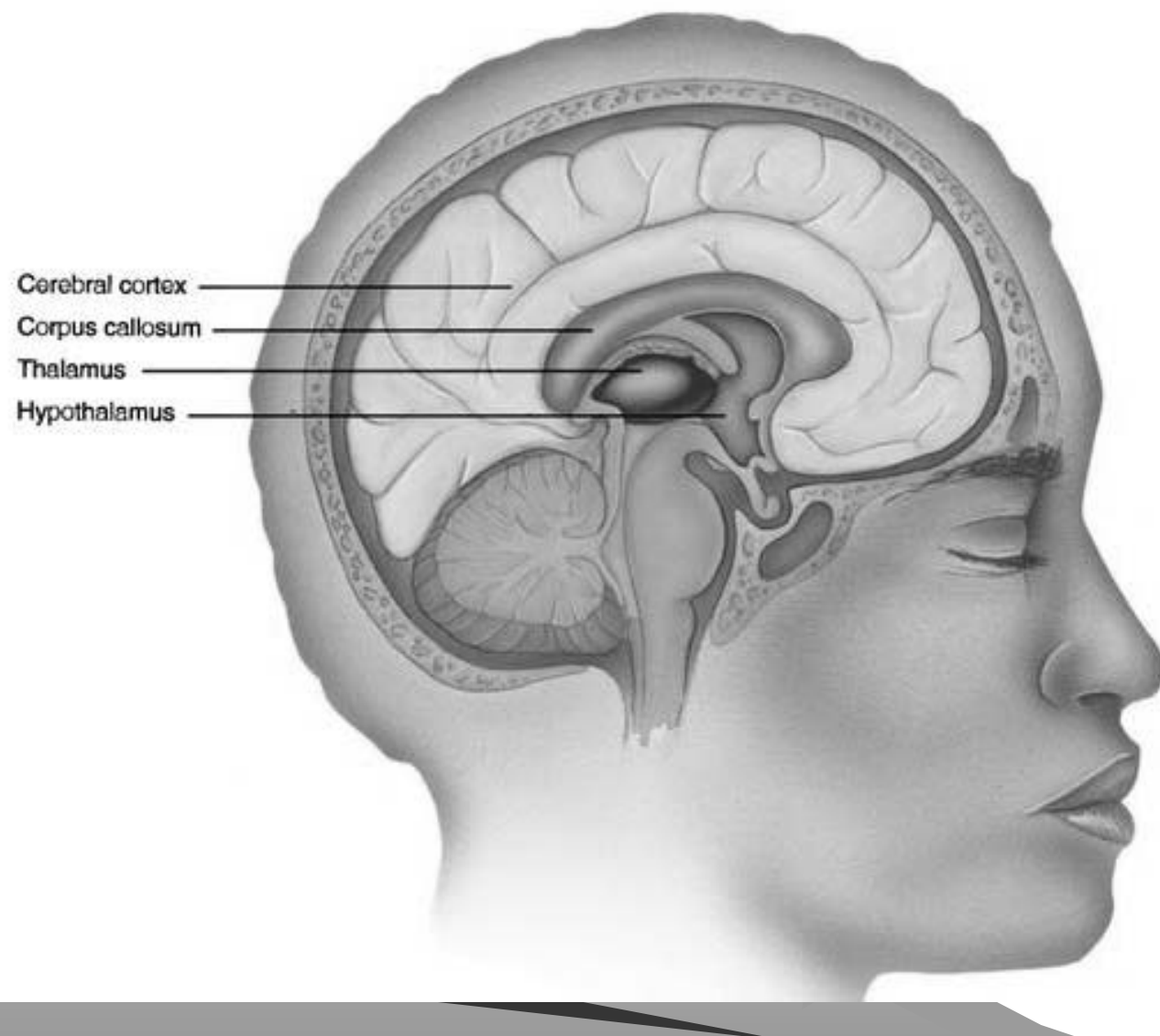
(a) Midsagittal section

# Střední mozek

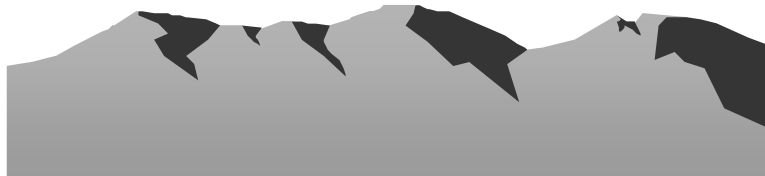
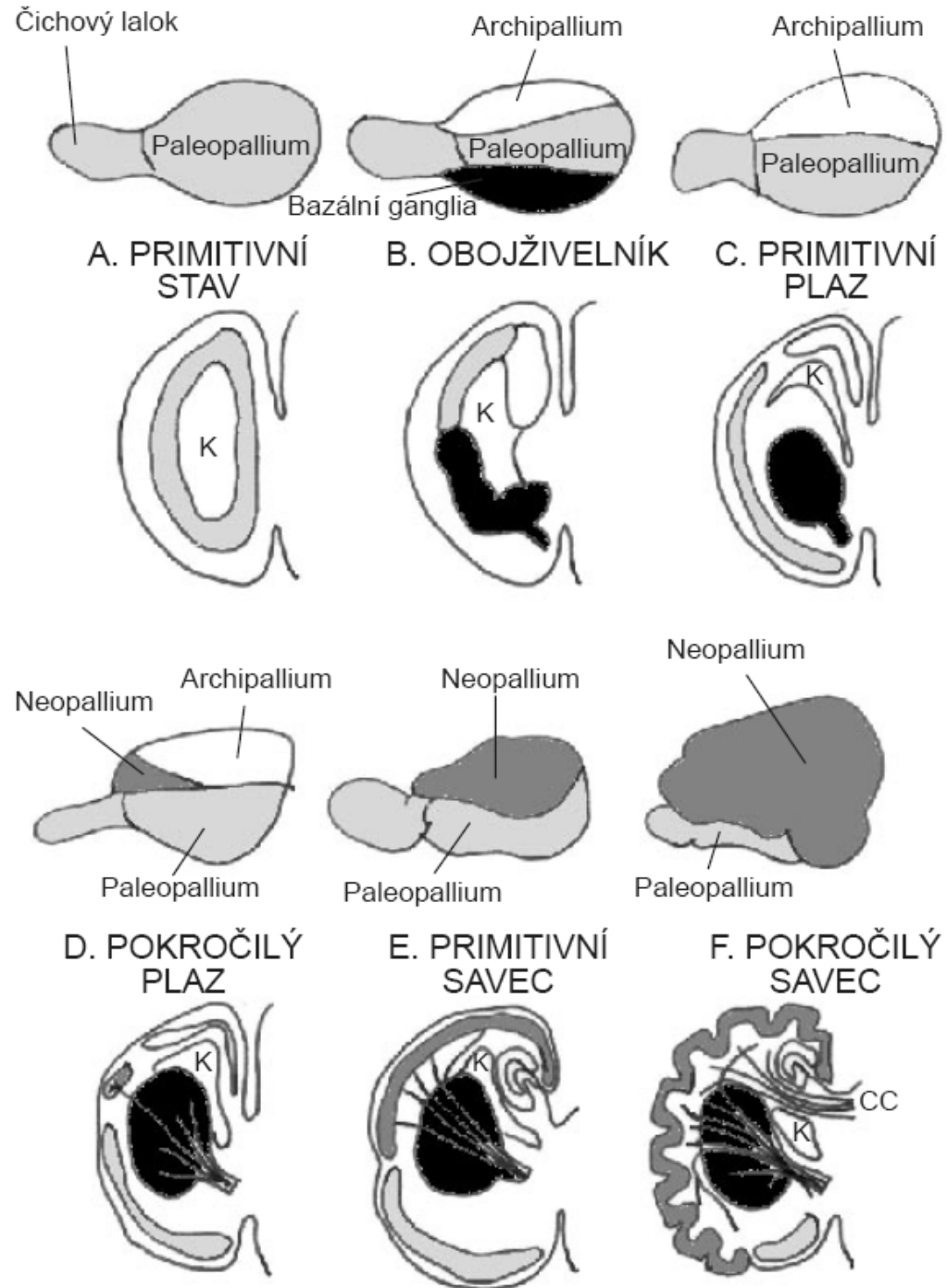
## Mezimozek



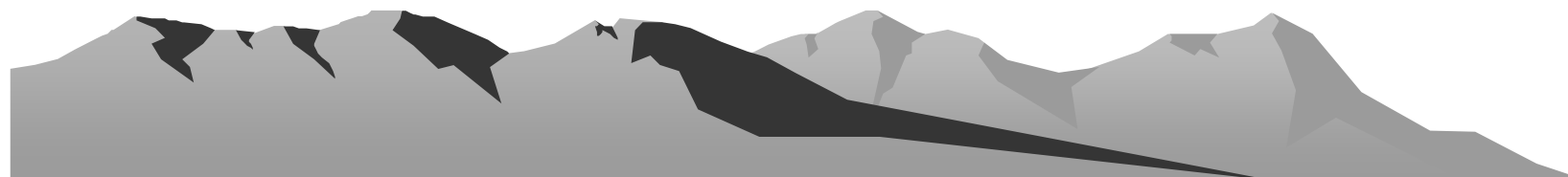
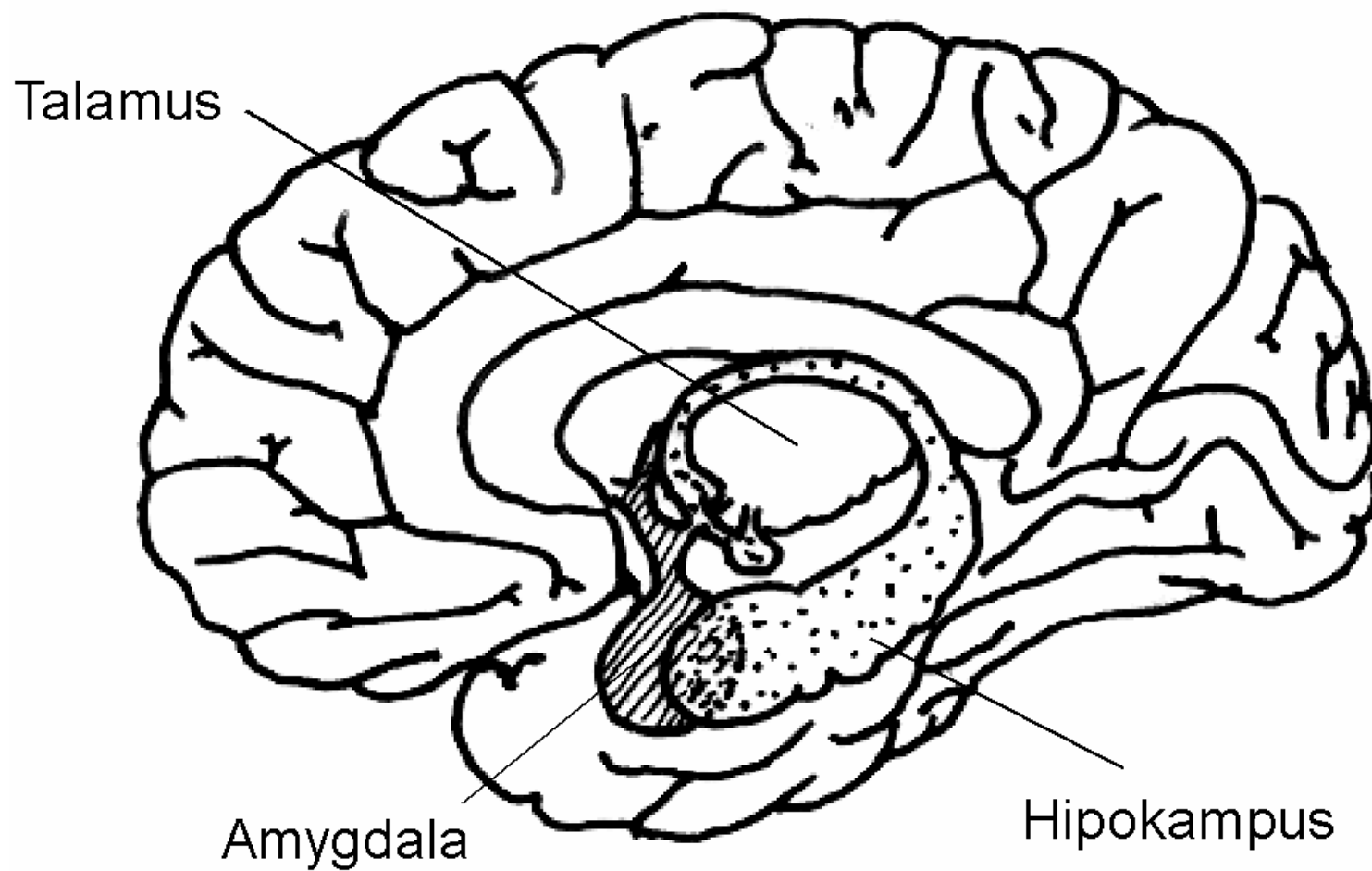
## Koncový mozek - telencefalon



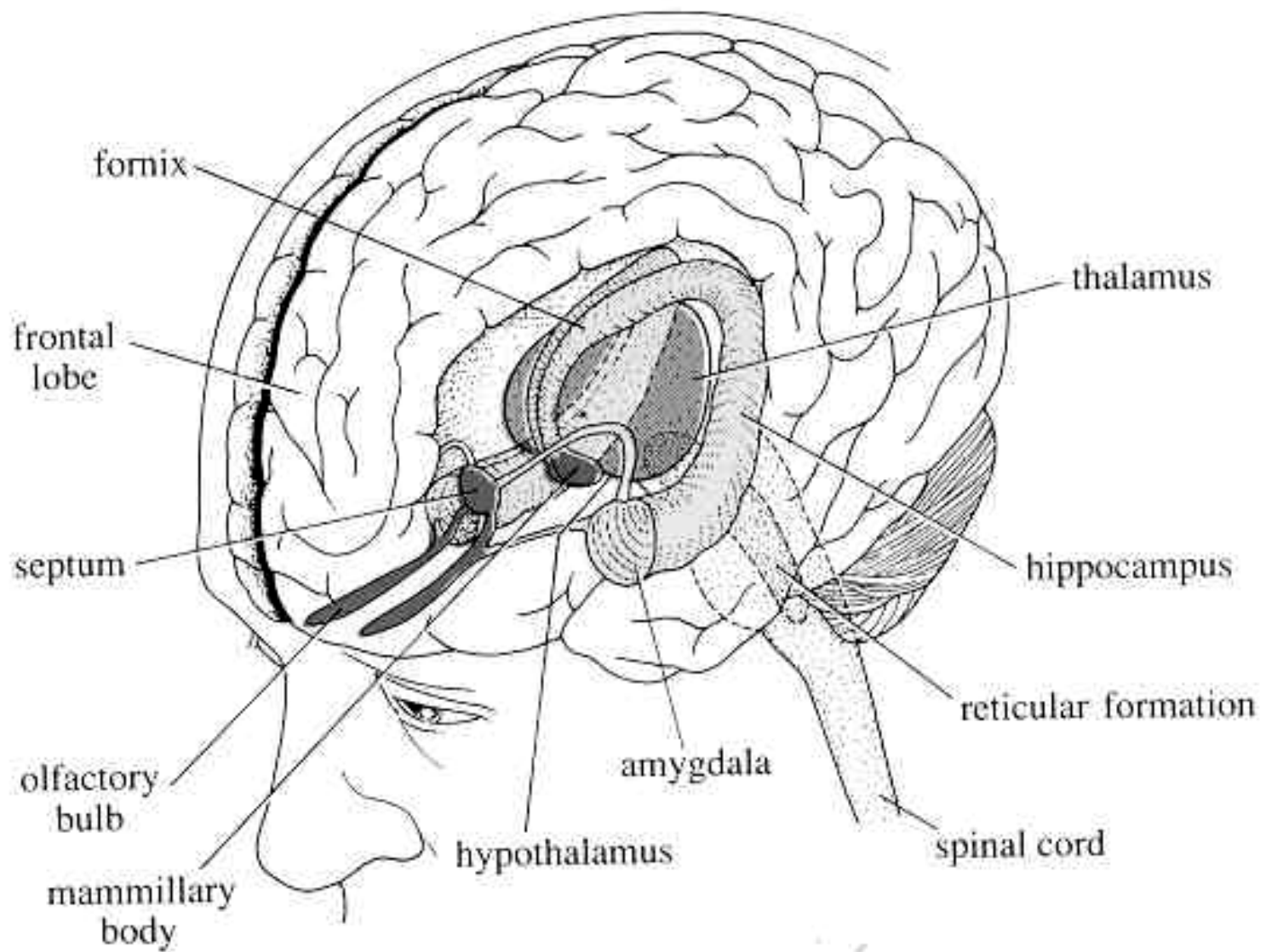
# Vývoj kůry telencefala



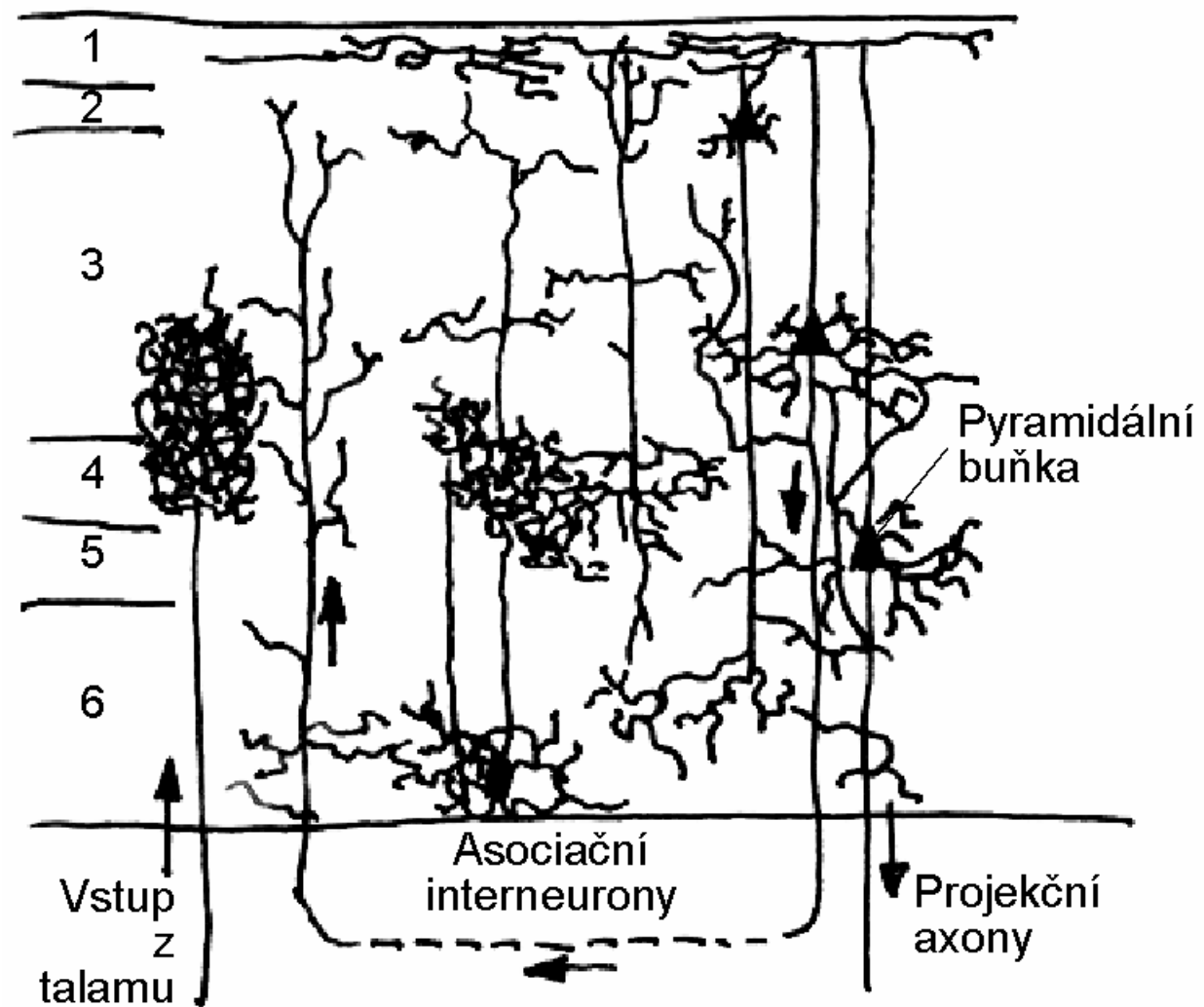
# Limbecký systém



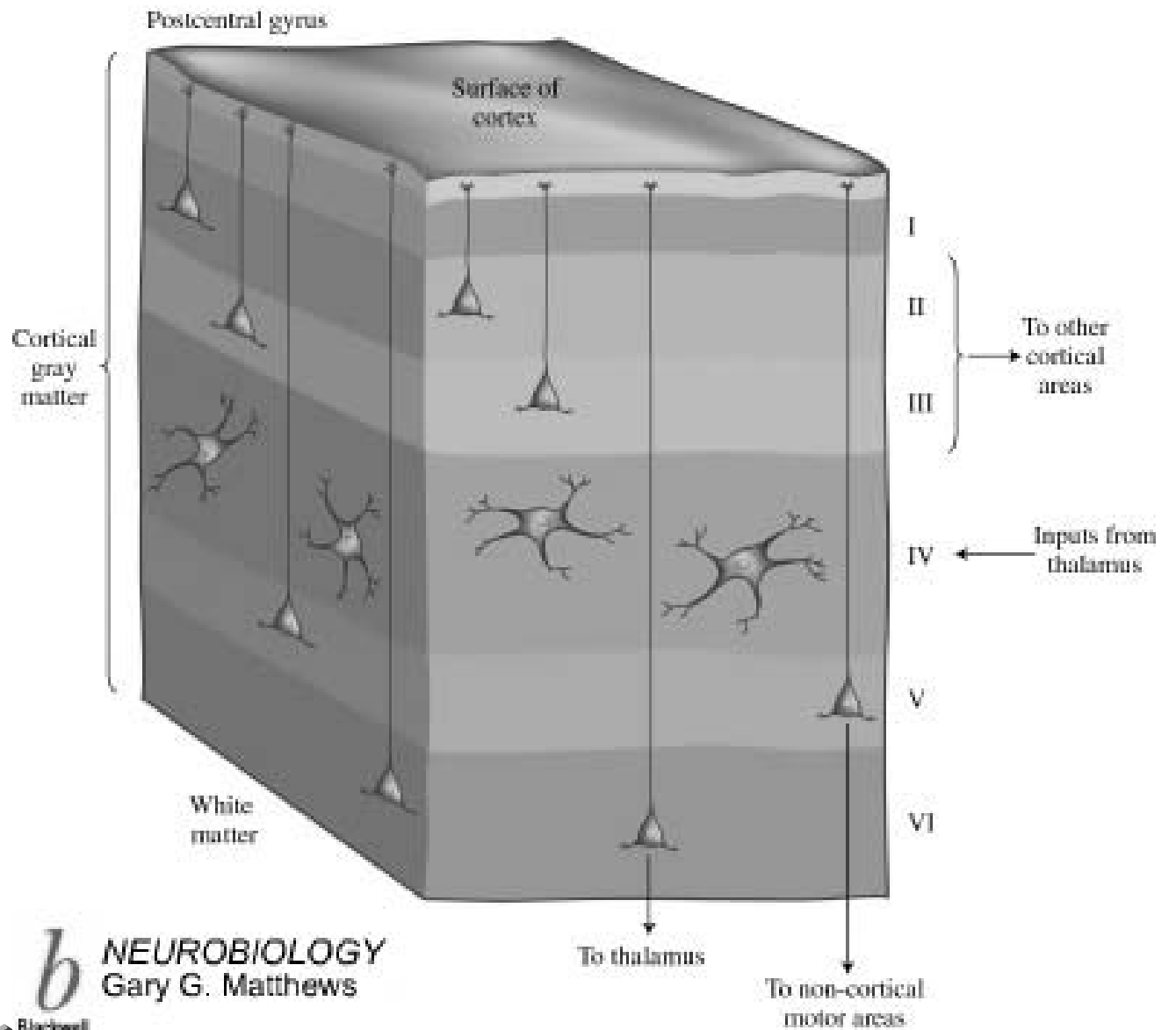




Vertikální členění  
6 vrstev šedé kůry



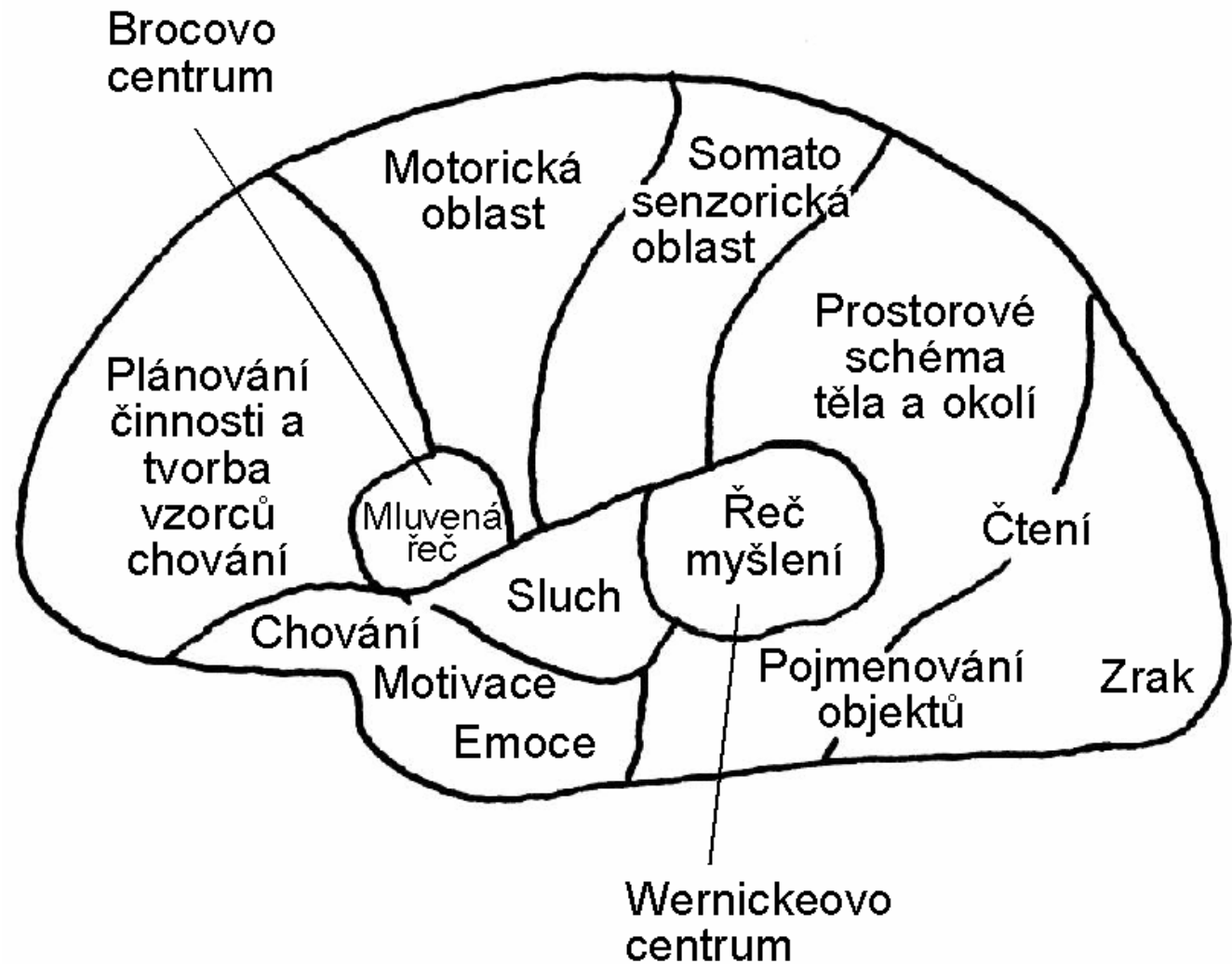
# Vertikální členění 6 vrstev šedé kůry

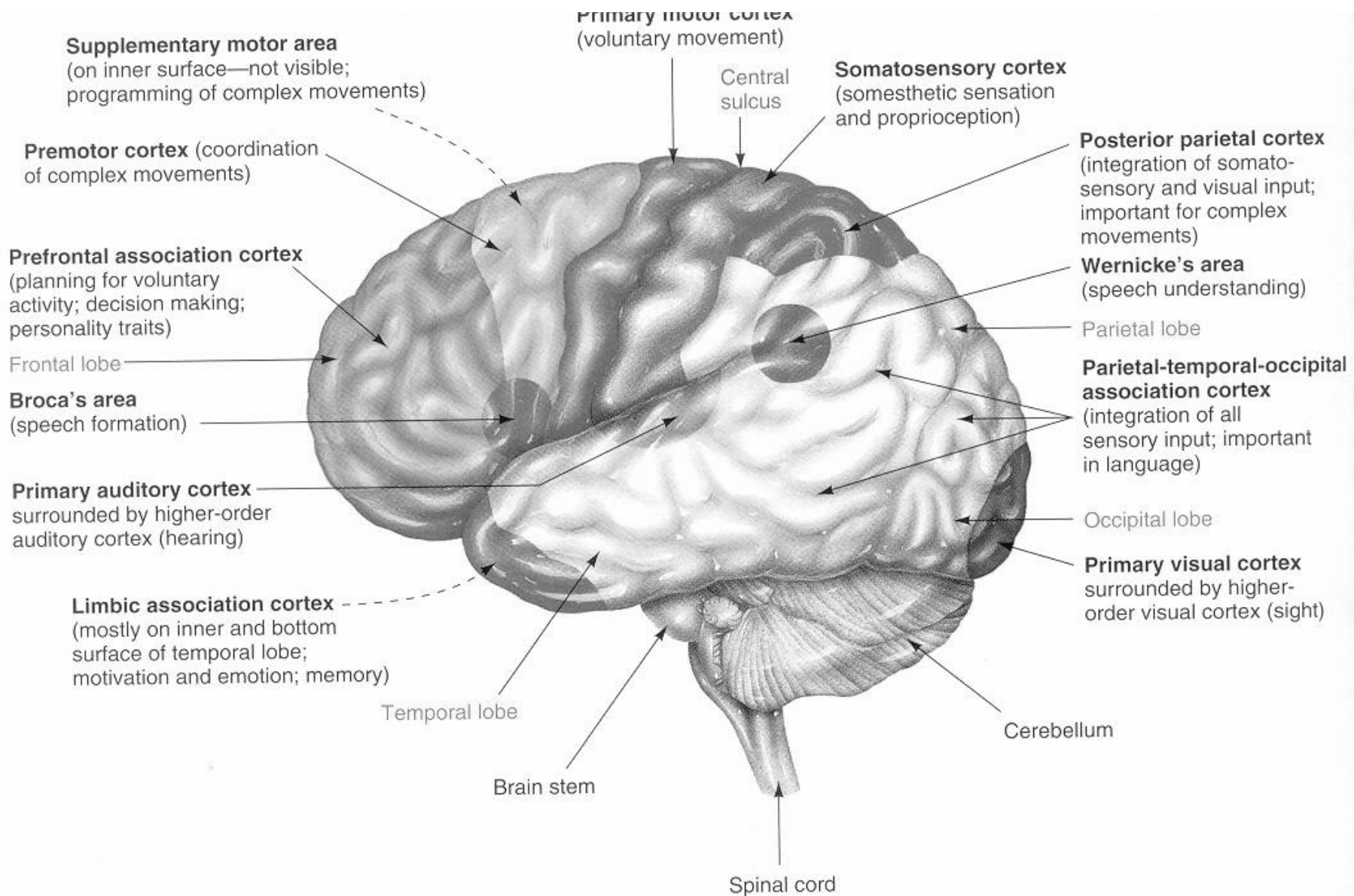


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# Horizontální členění cytoarchitektonická mapa





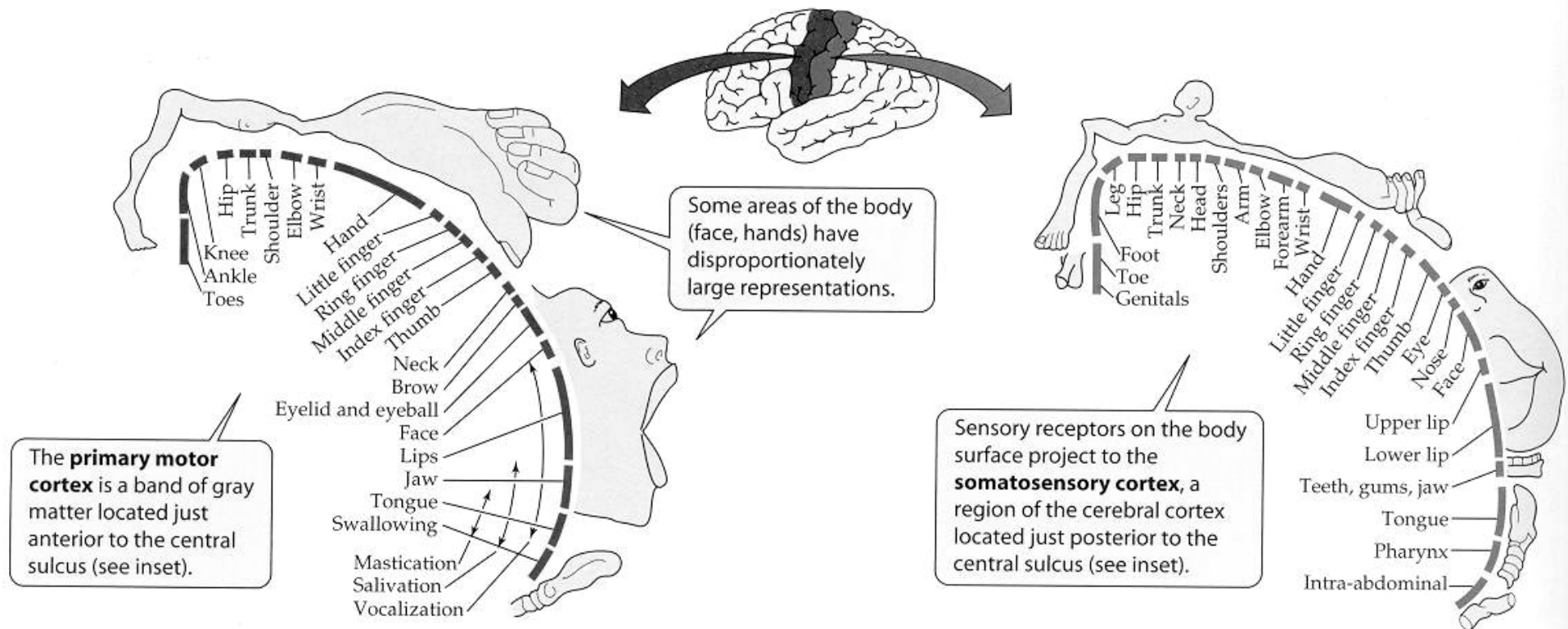
(a)

# Horizontální členění

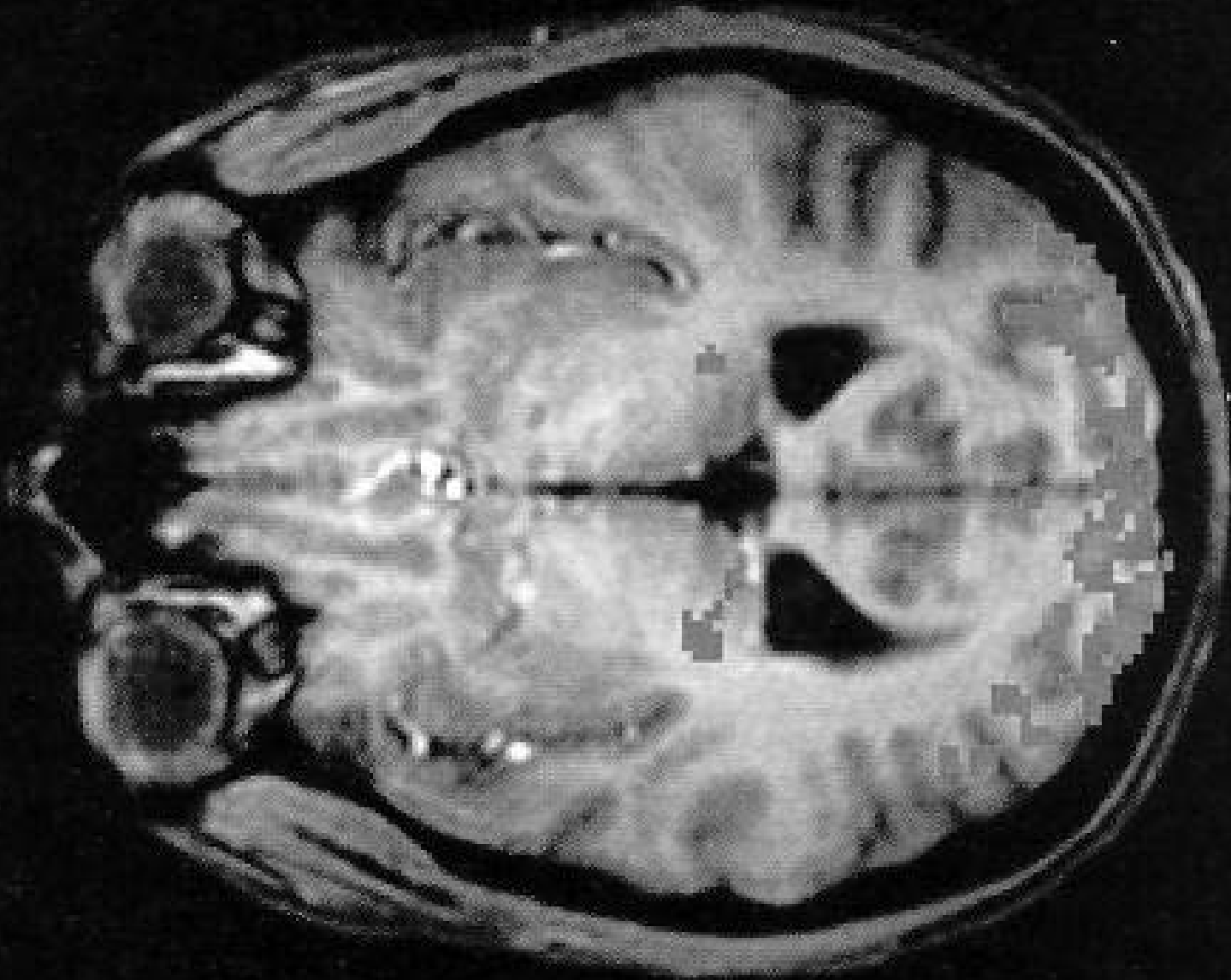
## Motorická a sensorická kůra - somatotopie

(a) Motor homunculus

(b) Sensory homunculus



Zobrazovací metody: MRI, TMS, PET, CT



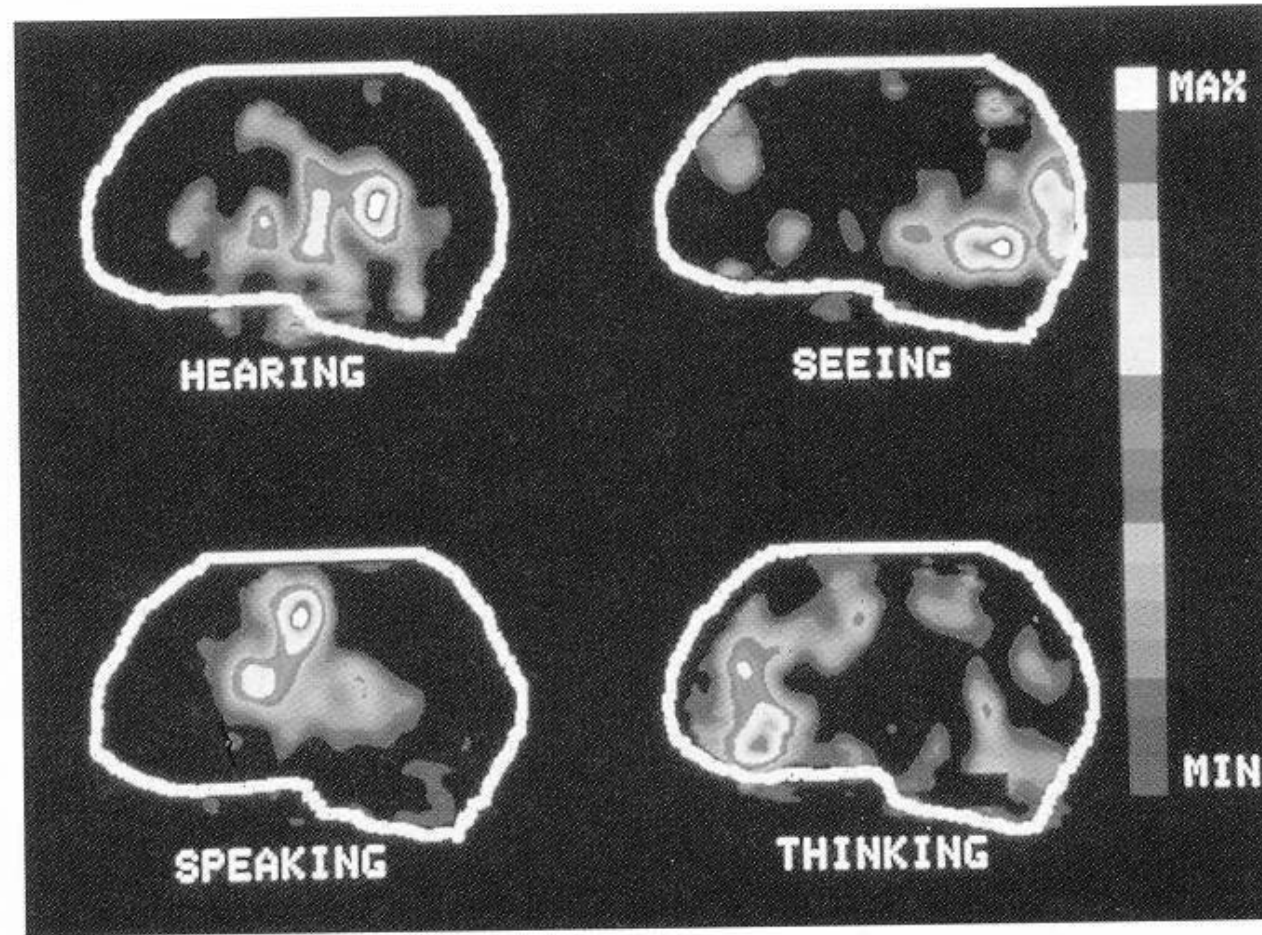


Photo: Courtesy Washington State University School of Medicine, St. Louis

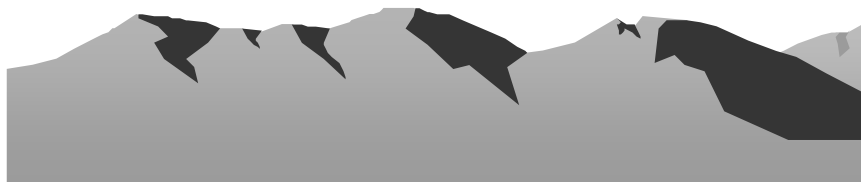
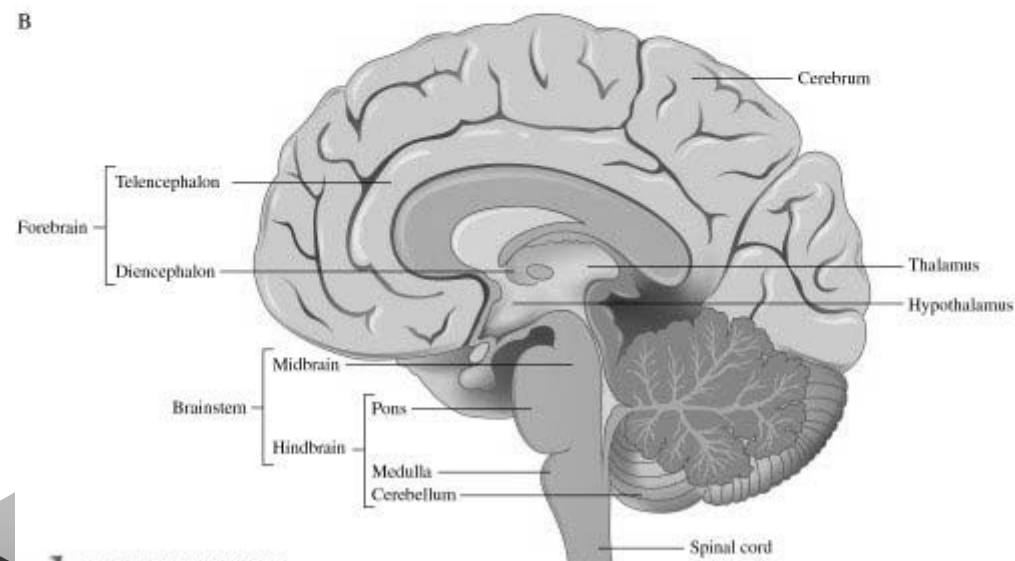
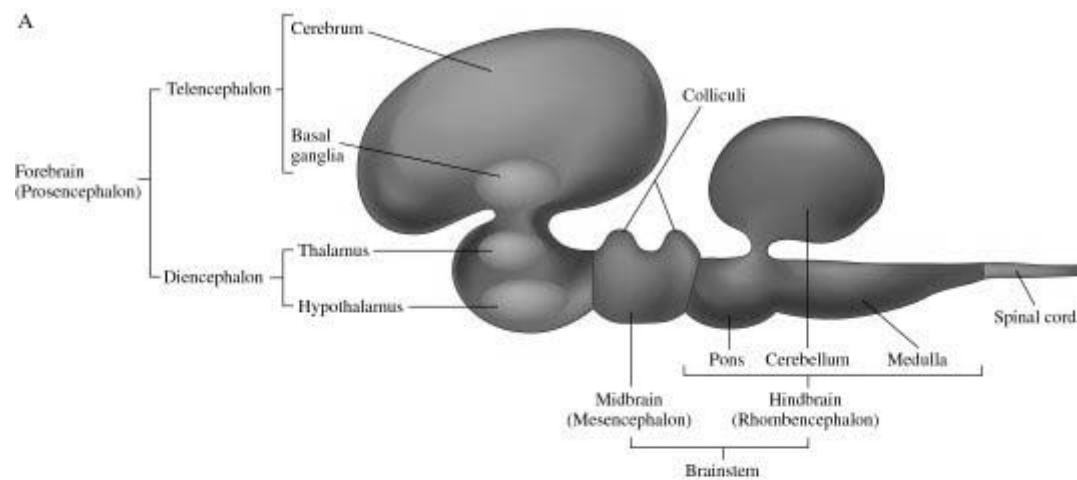
(b)

**Figure 5-18 • Functional areas of the human cerebral cortex.** (a) Various regions of the cerebral cortex are primarily responsible for various aspects of neural processing, as indicated in this schematic lateral view of the brain. (b) Different areas of the brain “light up” on positron emission tomography (PET) scans as a person performs different tasks. PET scans detect the magnitude of blood flow in various regions of the brain. Because more blood flows into a particular region of the brain when it is more active, neuroscientists can use PET scans to “take pictures” of the brain at work on various tasks.

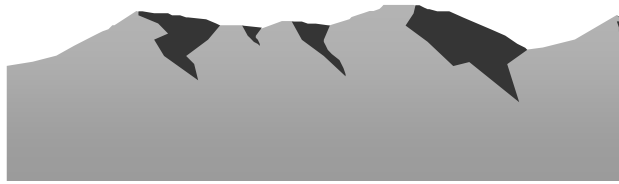
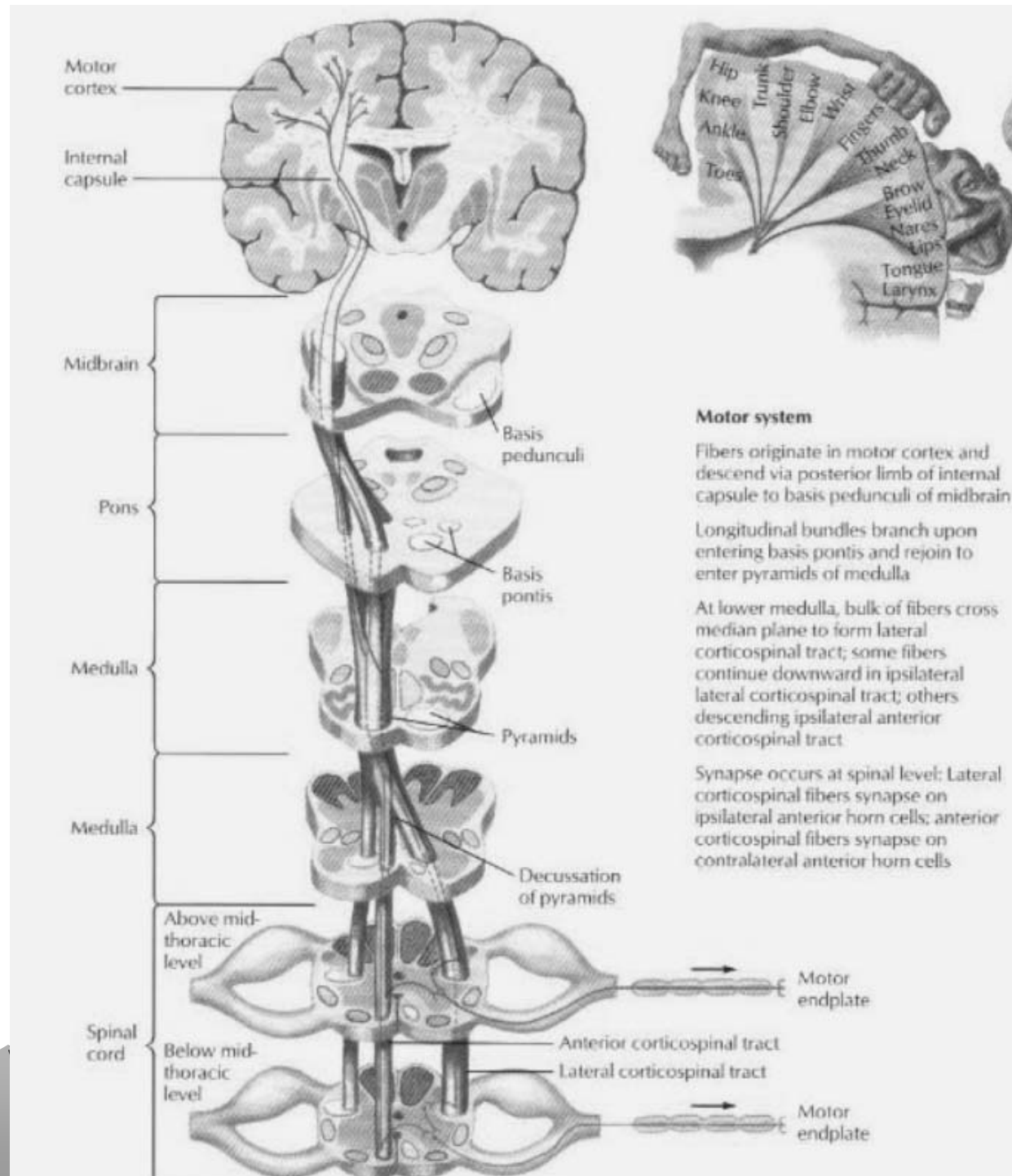


# Soustavy hybnosti:

- Autonomie ganglií mimo mozek
- Tektoretikulární soustava
- Talamostriátová soustava
- Z neopalia: extrapyramidová, pyramidová

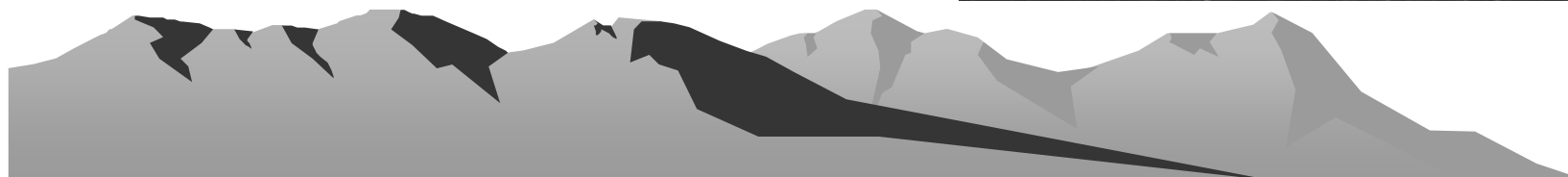


# Pyramidová dráha



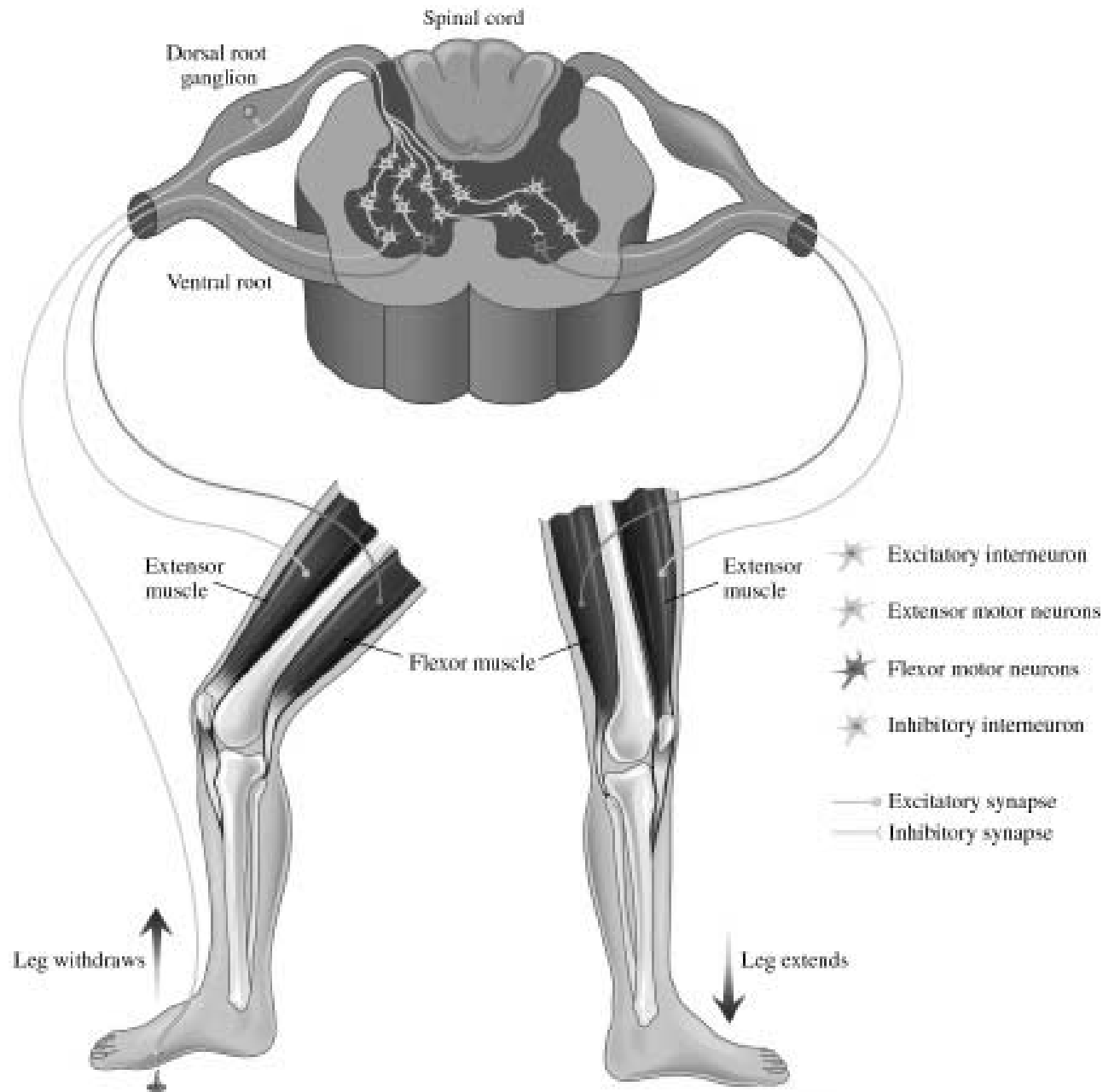
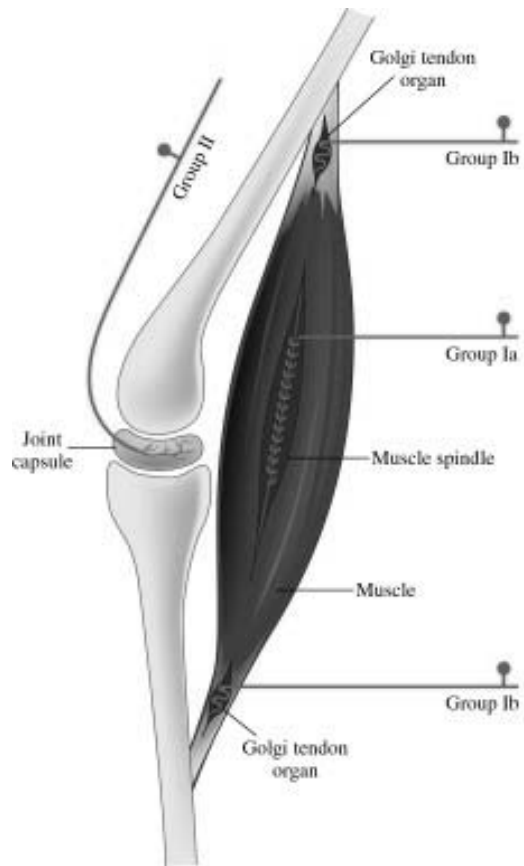
# Hierarchie řízení motoriky

- Tonus
- Opěrná motorika
- Cílená motorika



# Tonus

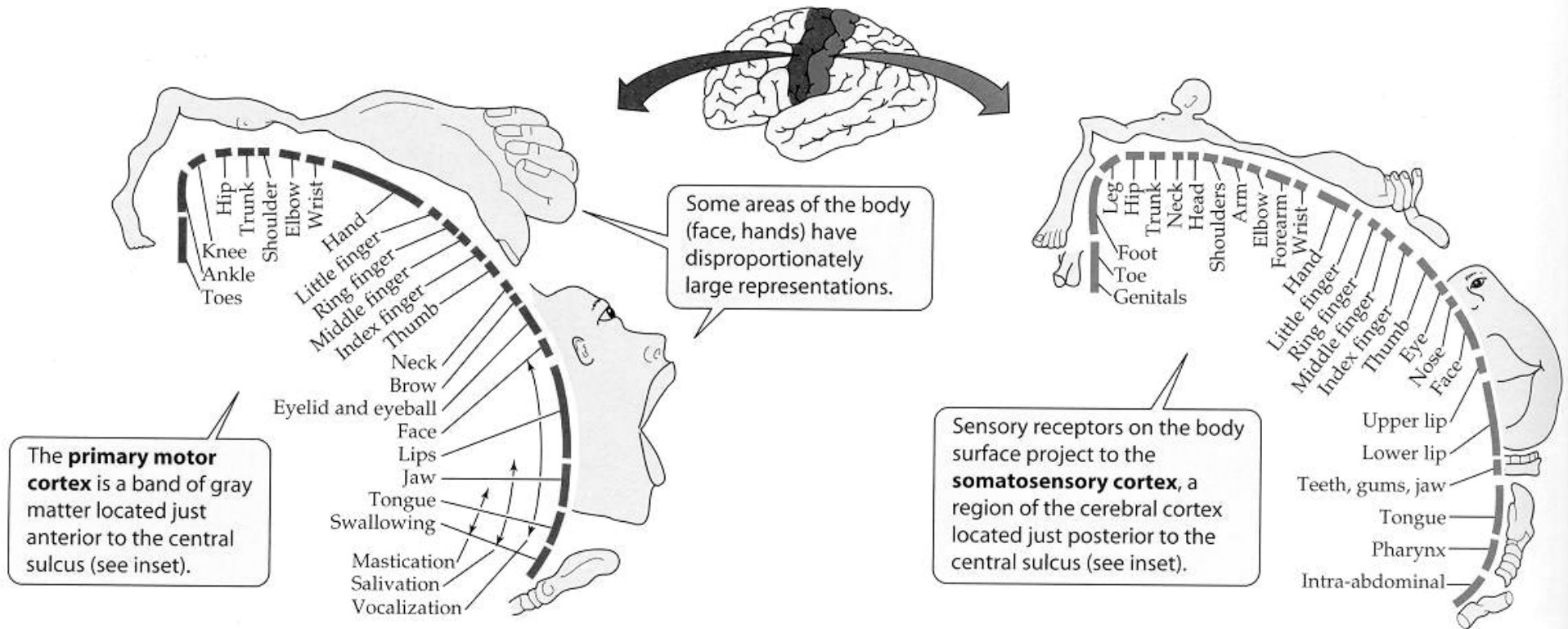
## Opěrná motorika



# Cílená motorika

(a) Motor homunculus

(b) Sensory homunculus



## A. Od ideje pohybu k provedení

### 1 rozhodnutí

kortikální  
a subkorti-  
kální motivační  
oblasti

„Já chci  
míč.“

1a pohnutka k pohybu

„Musím ho  
chytit.“

1b strategie

### 2 programování

„To je můj  
program.“

(zúčastněné svaly,  
časové odpovědi,  
síla tahu)

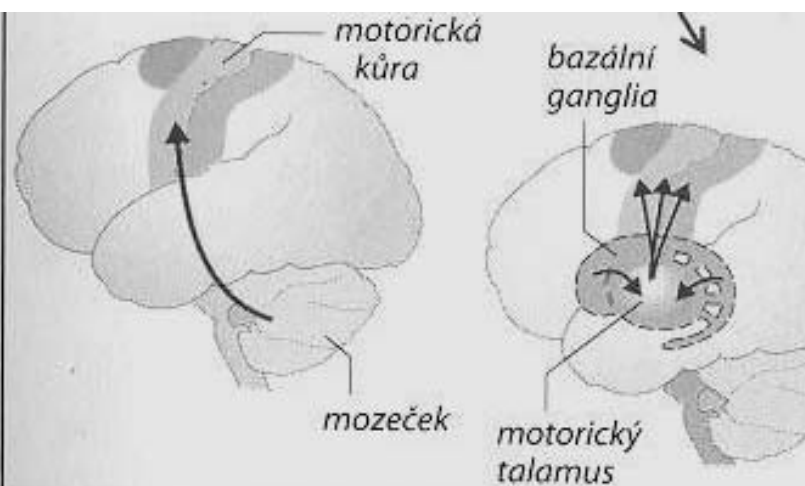
area 6  
area 4  
bazální ganglia  
mozeček  
motorická

asociační  
mozková  
kůra

somato-  
senzorika

slyšení

vidění



### 3 příkaz k pohybu

zpětnovazebné  
signály ze senzorů

„Nyní ho  
chyt!“

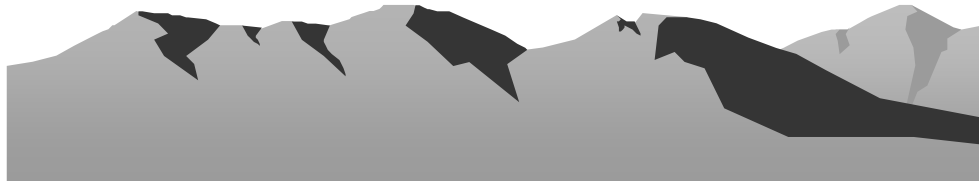
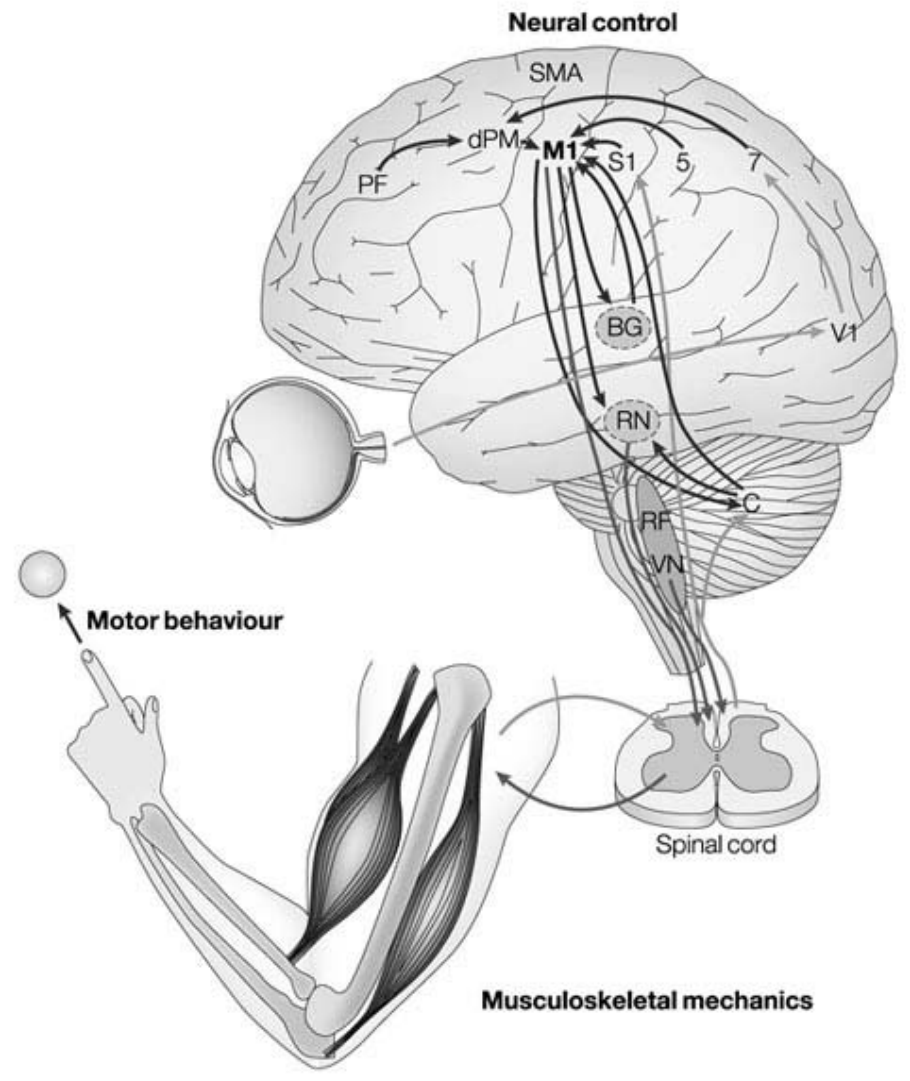
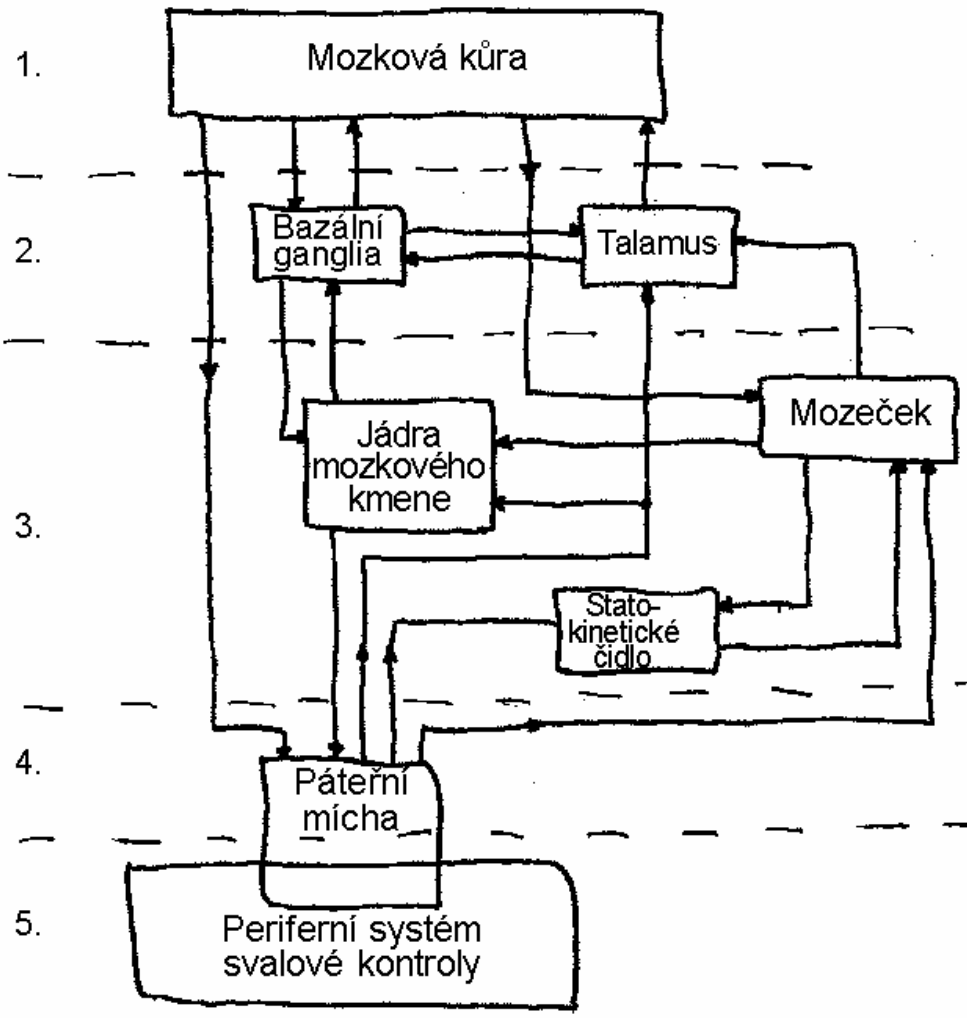
reflexní systém,  
motoneurony

### 4 provedení pohybu

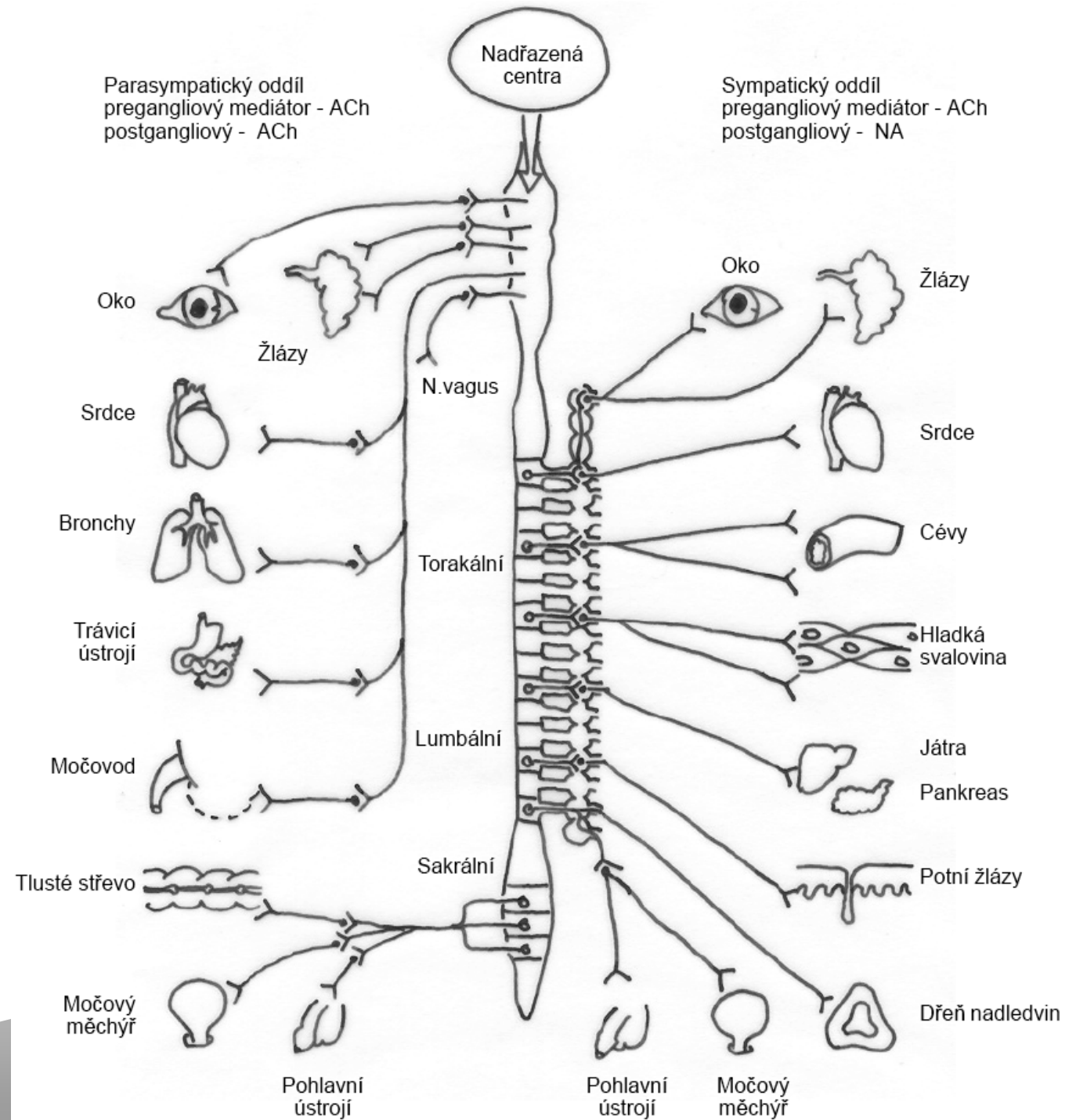


(podle V. B. Brookse)

(foto: J. Jeannerod)

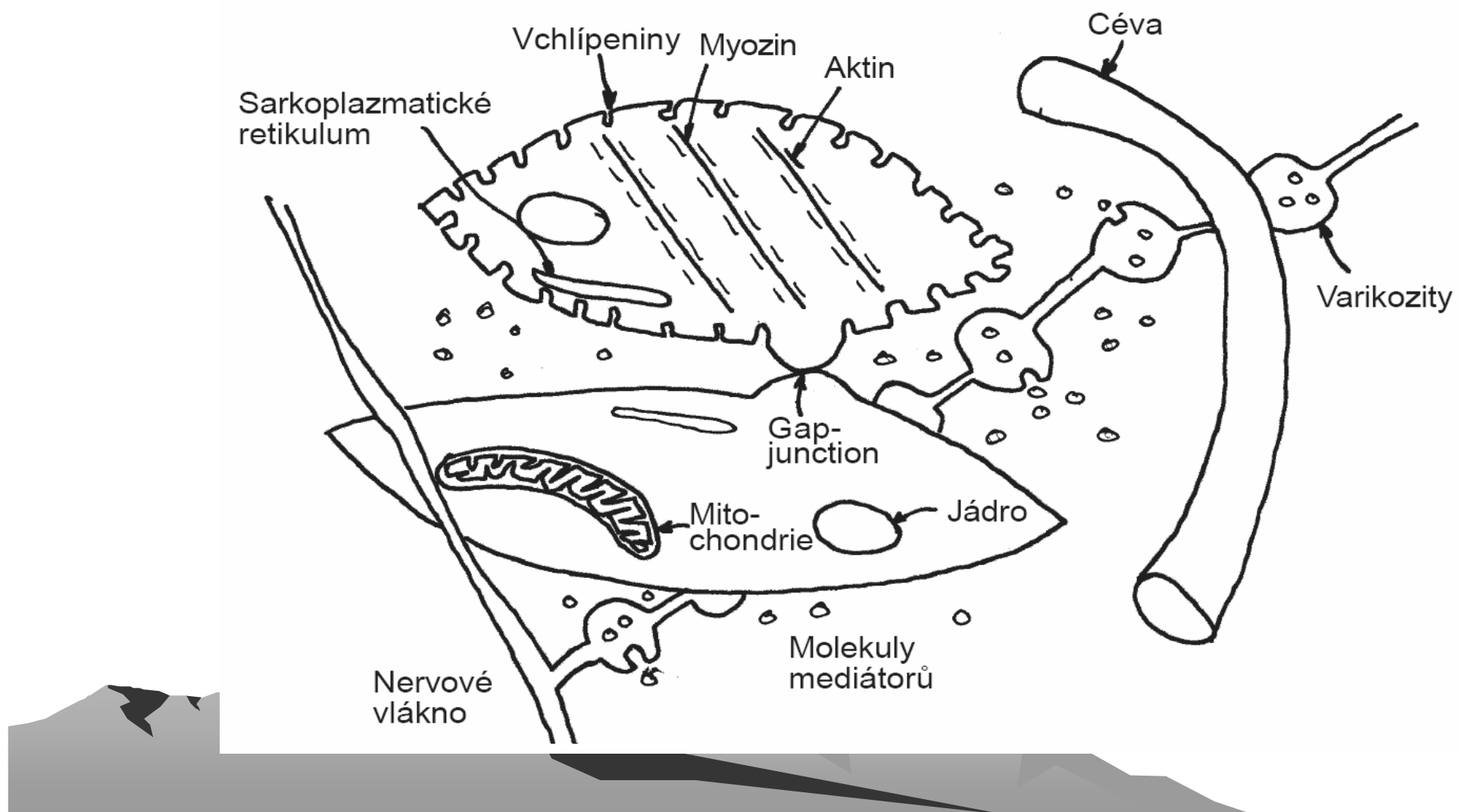


# Vegetativní systém



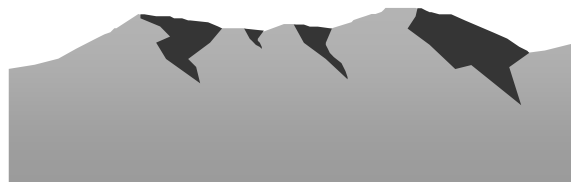


# Vegetativní inervace hladkého svalu

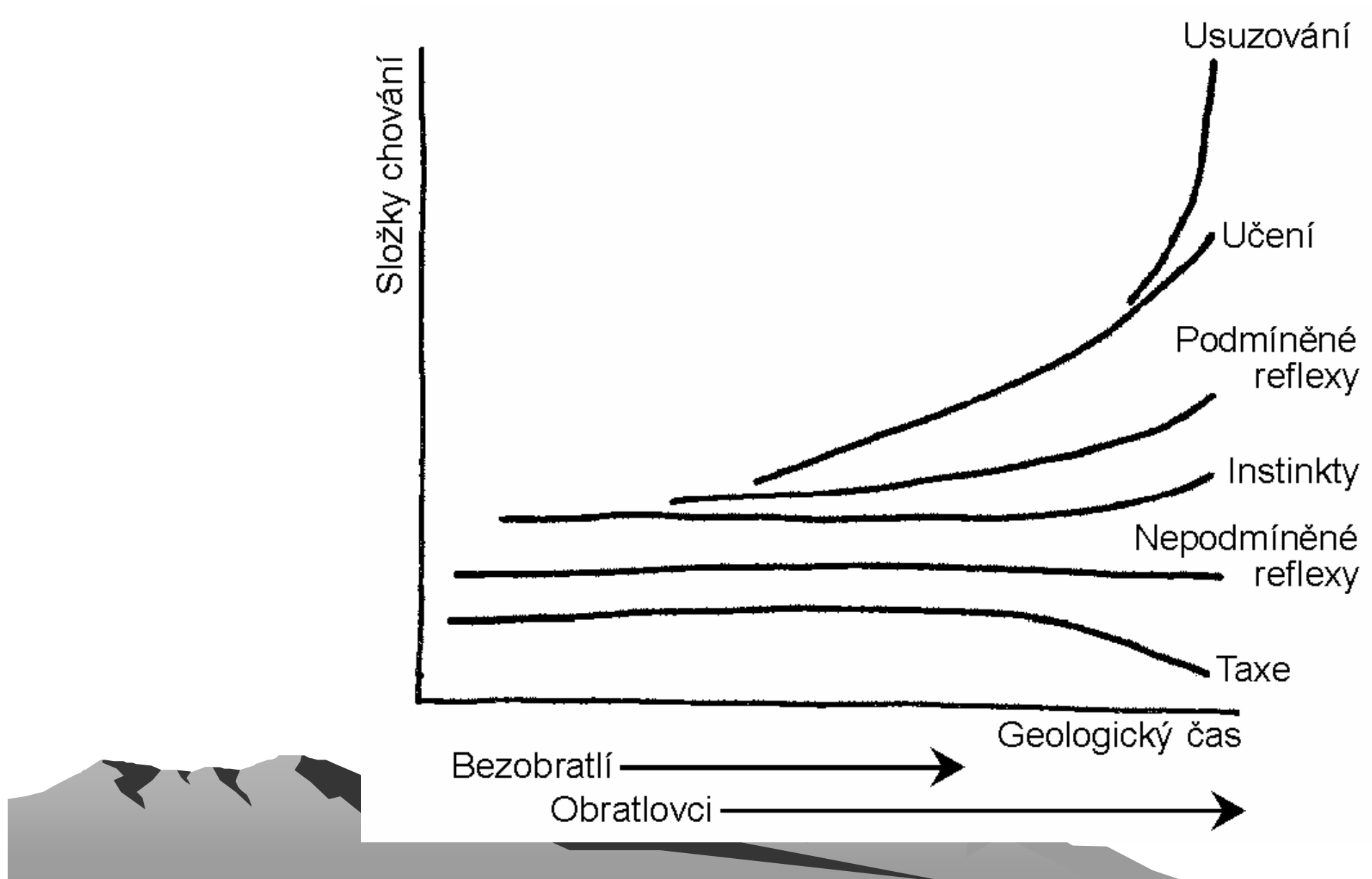


# Funkční antagonismus

Orgán	Vliv sympatiku	Vliv parasympatiku
<b>1. Orgány s dvojí inervací:</b>		
Srdce	Zrychlení tepu	Zpomalení tepu
Hladké svaly:		
Trávicí trubice	Snížení hybnosti	Zvýšení hybnosti
Sfinktery trávicí trubice	Stah	Uvolnění
Bronchy	Uvolnění	Stah
Zornice oka:		
m. sphincter pupillae		Stah – zúžení zornice
m. dilatator pupillae	Stah – rozšíření zornice	
<b>2. Orgány inervované hlavně sympatikem:</b>		
Hladké svaly:		
Arterioly kůže a ledvin	Vazokonstrikce	
m. arrectores pilorum	Stah – ježení chlupů	
Žlázy:		
Dřeň nadledvin	Sekrece	
Potní žlázy	Sekrece	
<b>3. Orgány inervované hlavně parasympatikem:</b>		
Hladké svaly:		
Cévy vnějších pohl. org.		Vazodilatace – erekce
m. ciliaris		Stah – akomodace
Žlázy:		
Slinné		Sekrece
Žaludeční		Sekrece
Pankreas		Sekrece



# Chování: Vrozené a získané prvky



Chování:

Vrozené => učení => získané prvky



Chování:

Vrozené: Taxe, nepodmíněné reflexy, motorické programy,  
instinkty, emoce

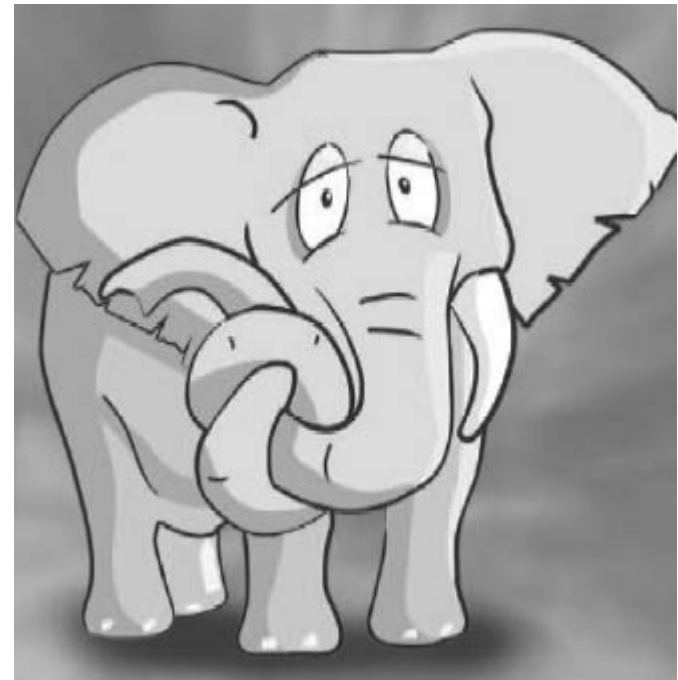
Získané: neasociativní, asociativní učení (podmíněné reflexy,  
napodobování, hra, vtištění, vhléd)



Paměť:

Čas: krátkodobá, střednědobá, dlouhodobá

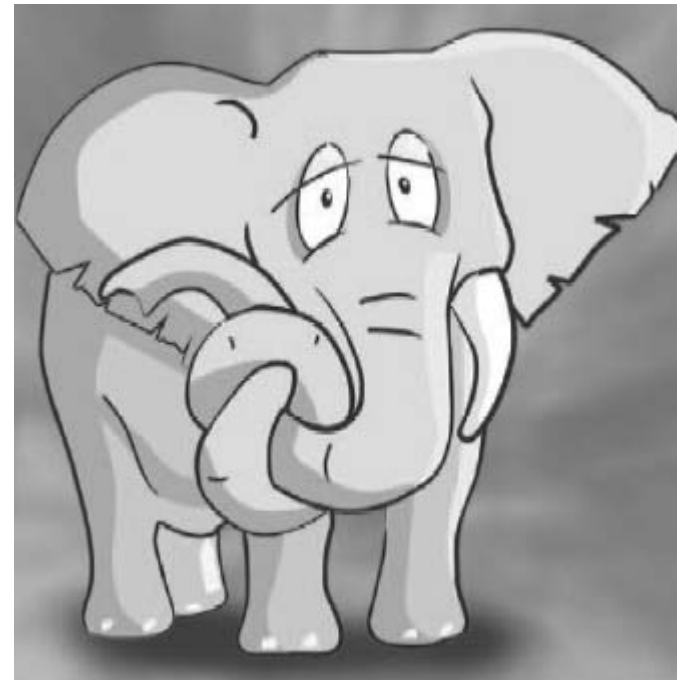
Typ informace: nedeklarativní, deklarativní



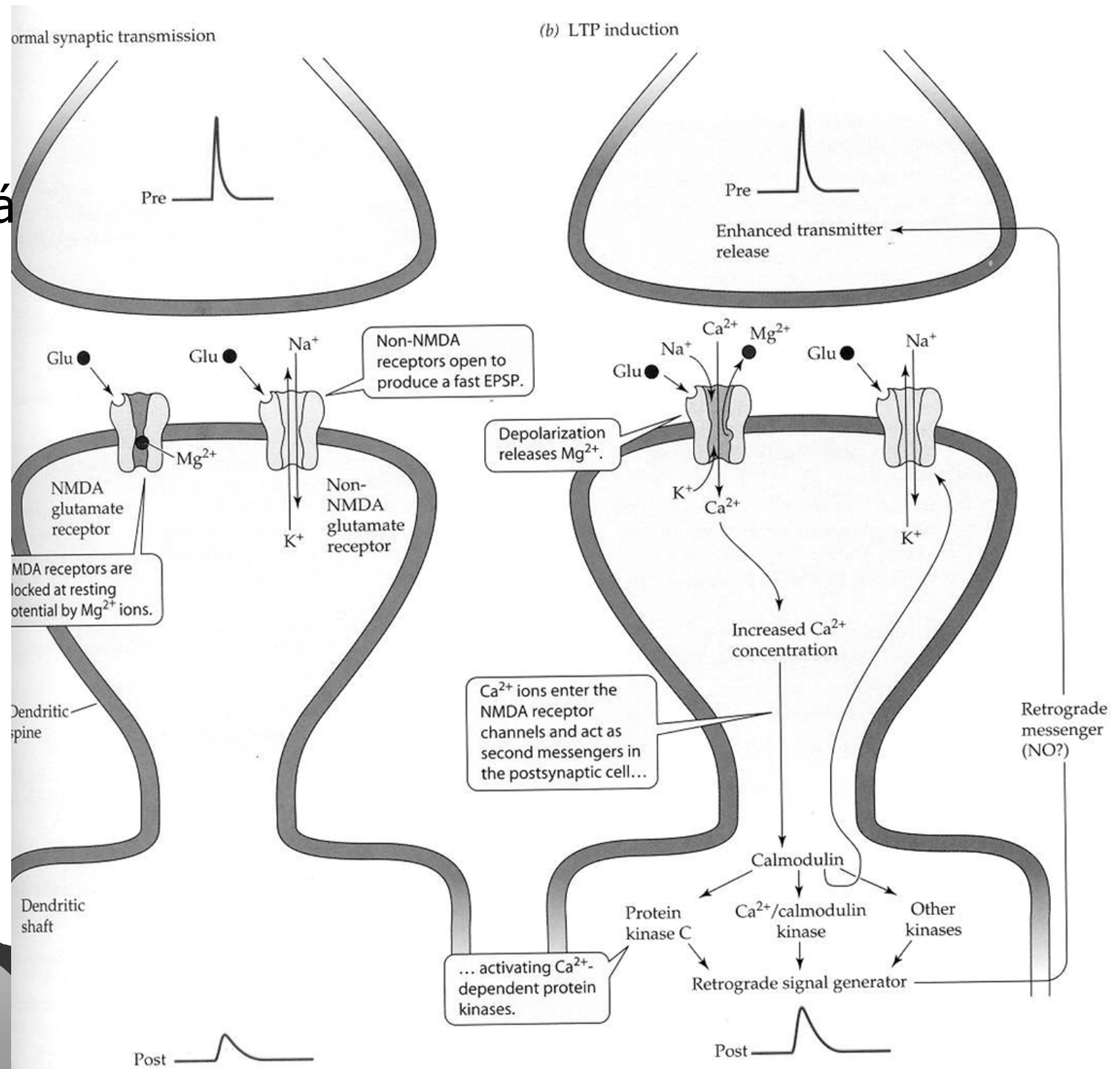
Mechanismus?

Krátkodobá – změny funkční

Dlouhodobá – změny morfologické

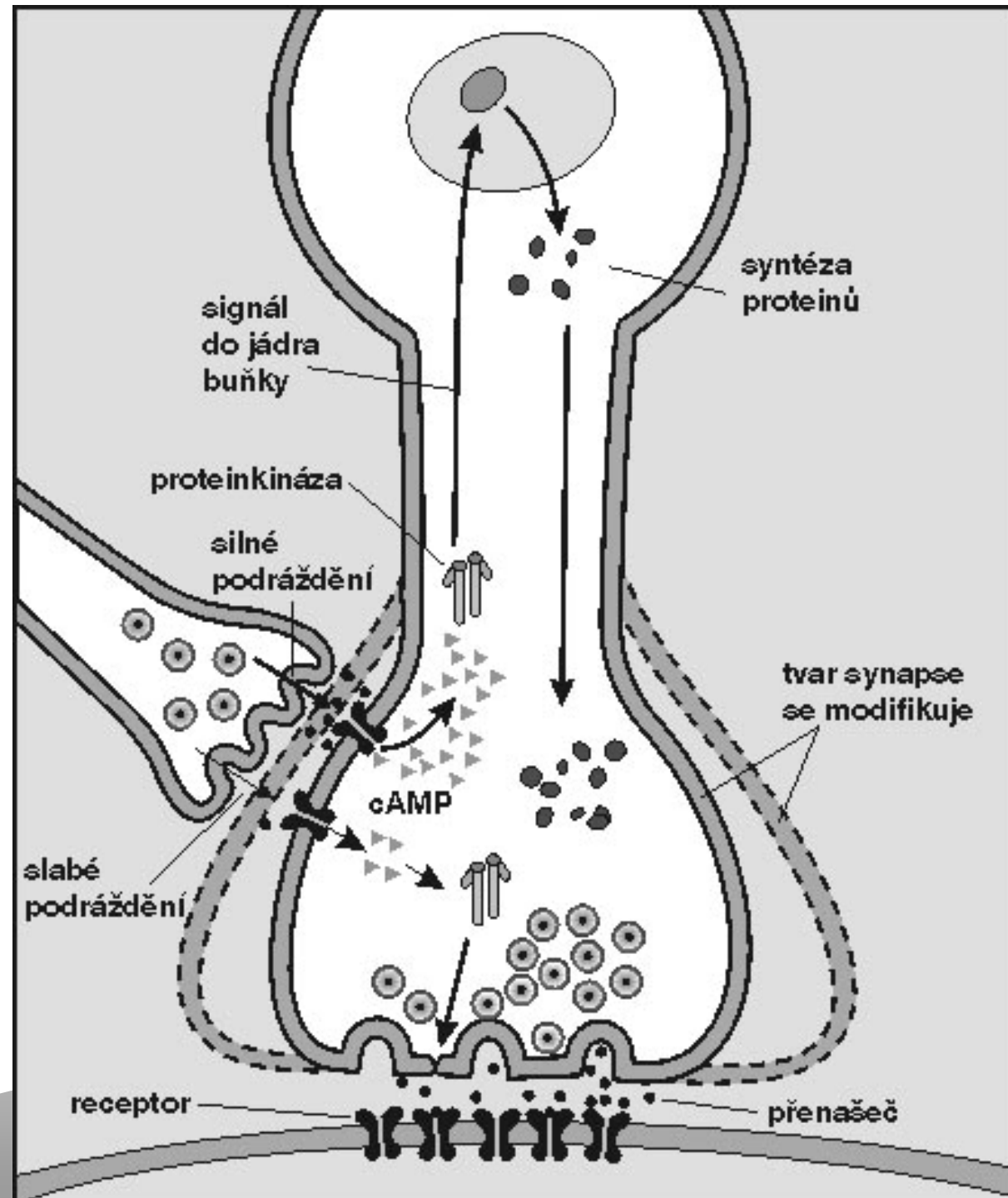


# Synaptická Plasticita- Postsynaptická modifikace



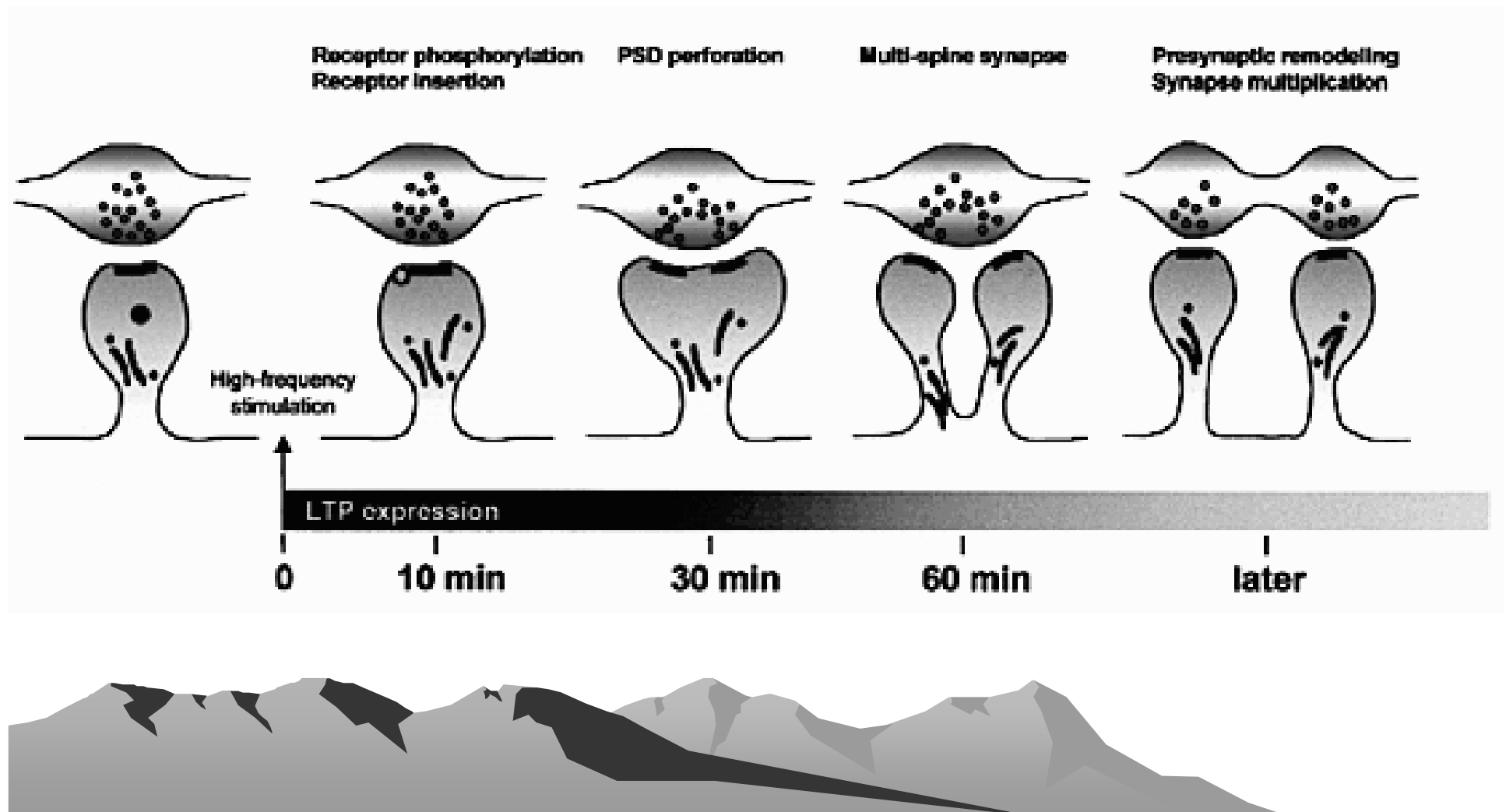


# Synaptická Plasticita- Presynaptická modifikace



# Synaptická plasticita

## Dendritické trny místem přestavby



Dendritické trny  
místem přestavby

