BRAIN
AWARENESS
WEEK

SETTIMANA DELLA CONOSCENZA DEL CERVELLO

13-19 marzo 2017

Perché venire a parlare a voi giovani liceali?

L’albero mentre cresce è tenero e flessibile e quando è duro e resistente, muore. Rigidità e forza sono compagni della morte, debolezza e flessibilità esprimono la freschezza dell’esistenza

Stalker, di A. Tarkovskij

Lugaro diceva:

- “Nessun organo si presenta così complesso ed oscuro come il cervello. Il cervello discerne, guarda, ascolta, fiuta, assapora, tocca, pesa, ricorda, pensa, fantastica, giudica, esita e vuole. Soffre e tripudia. E’ insieme un osservatorio, un archivio, un Tribunale, un governo.”

Persino più attraente della foresta vergine, c'era la giungla che si stendeva sotto di me in quel momento: il Sistema Nervoso Centrale

Rita Levi Montalcini

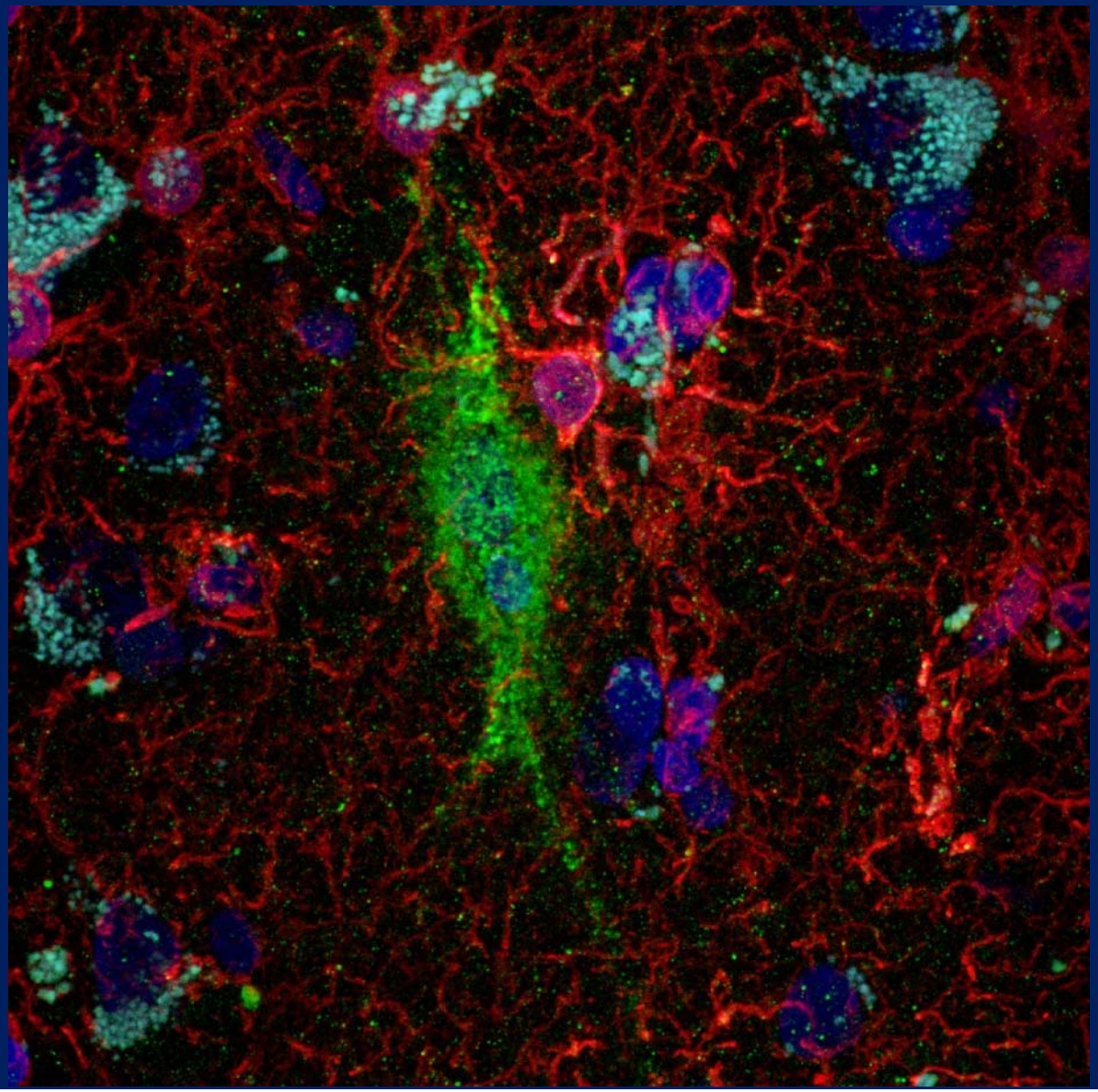
La notte dei morti viventi

Il cervello con i suoi cento miliardi di neuroni, che si collegano tra loro tramite un numero vertiginoso di sinapsi 10^{15}, costituisce l'oggetto più complesso dell'universo conosciuto

Goldberg E

NATURA CELLULARE DEL SISTEMA NERVOSO

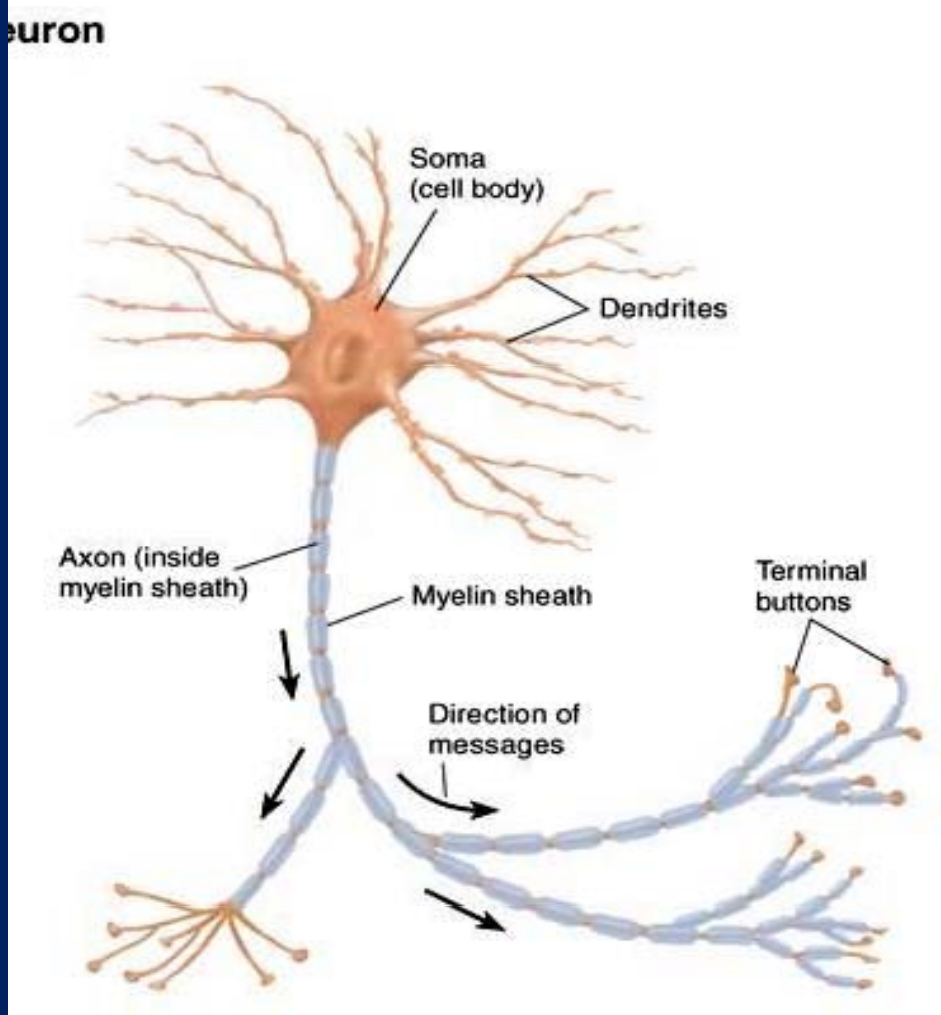
- NEURONI
- GLIA



- VASI SANGUIGNI
- FASCI DI FIBRE NERVOSE

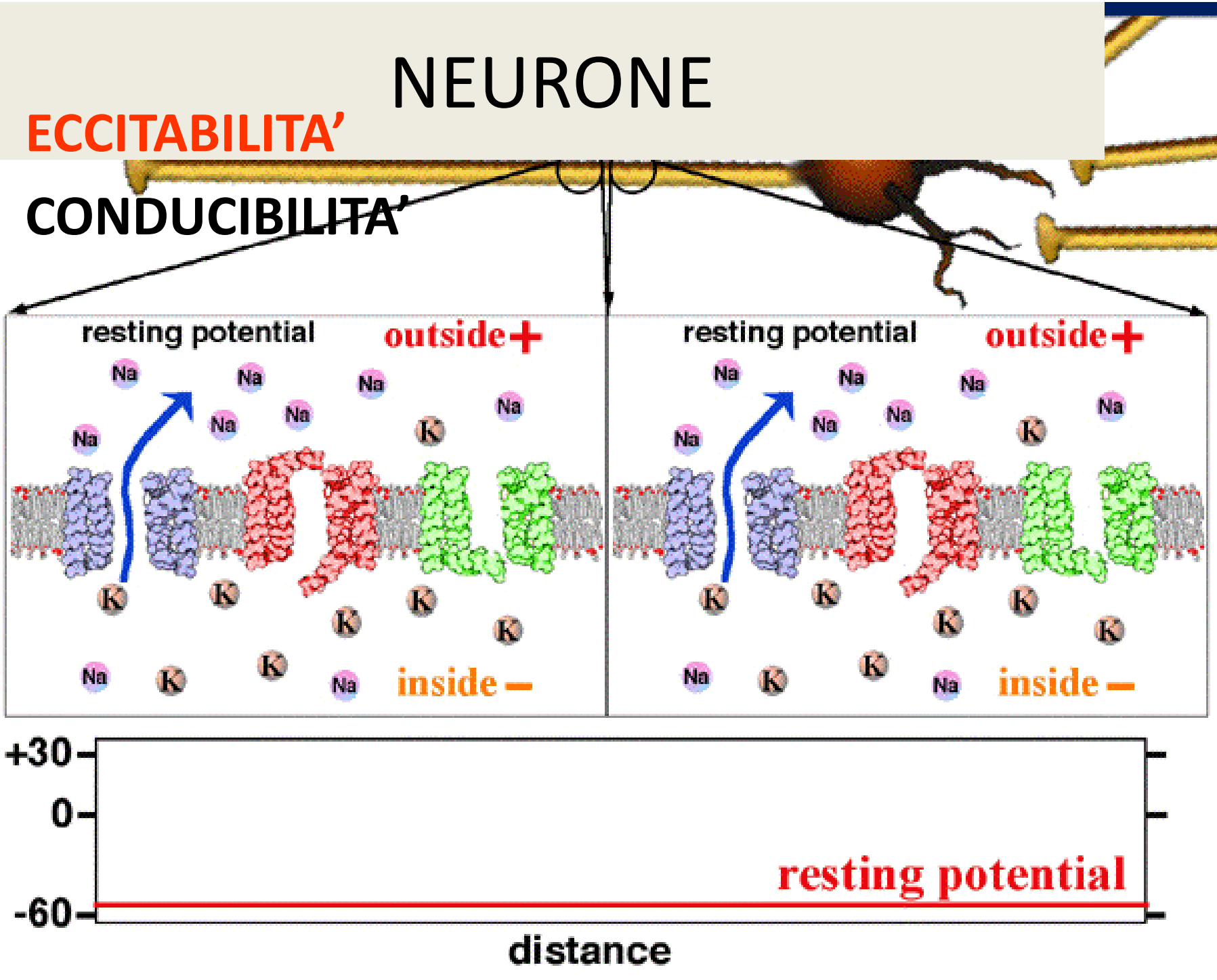
Ogni neurone ha una funzione RICETRASMITTENTE

- SINAPSI CHIMICHE
- SINAPSI ELETTRICHE



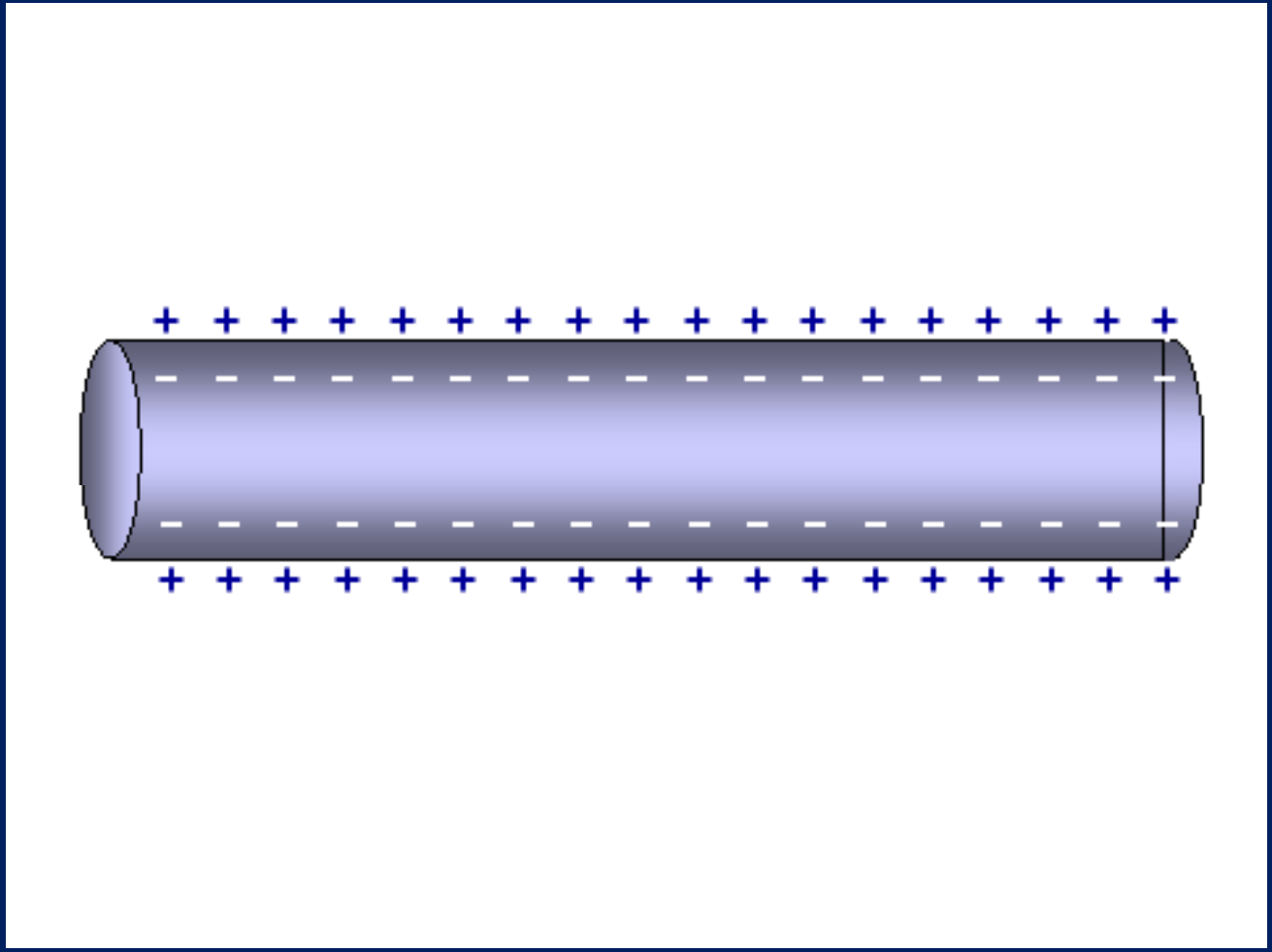
NEURONE

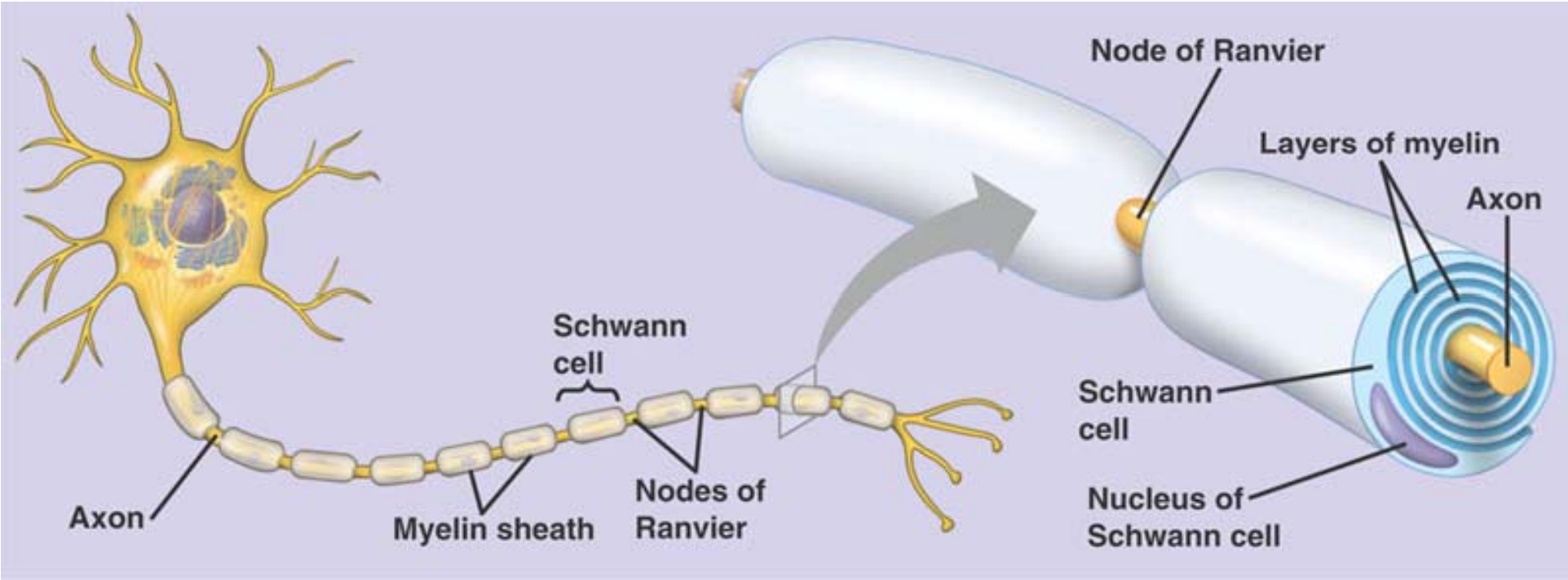
- **ECCITABILITA'**
- **CONDUCIBILITA'**



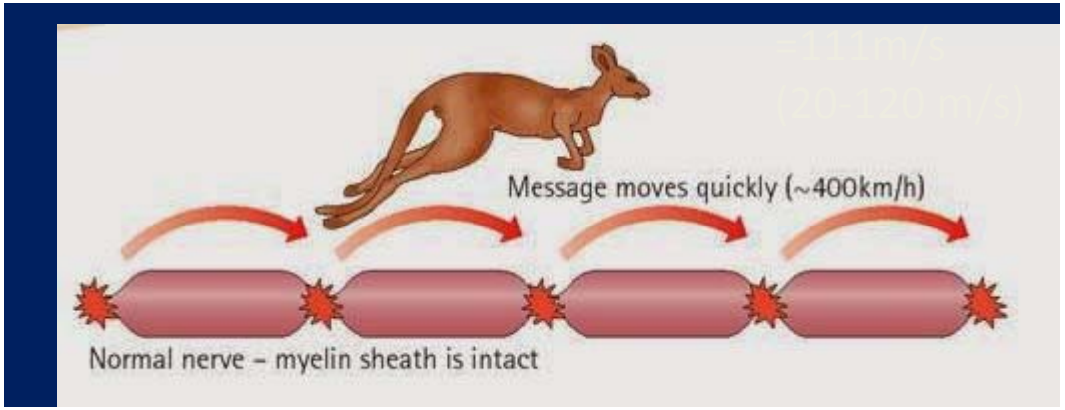
NEURONE

- **ECCITABILITA’**
- **CONDUCIBILITA’**



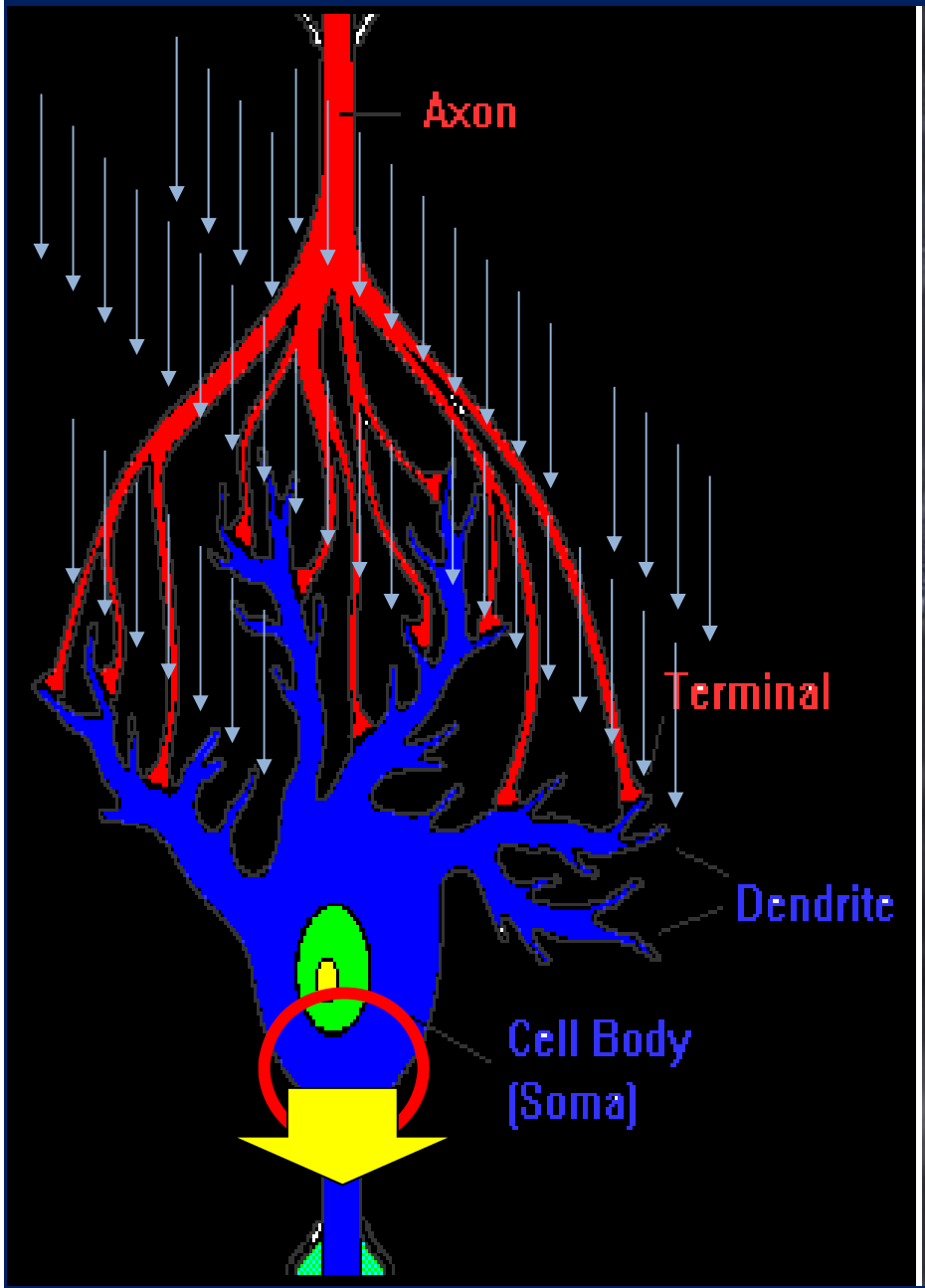


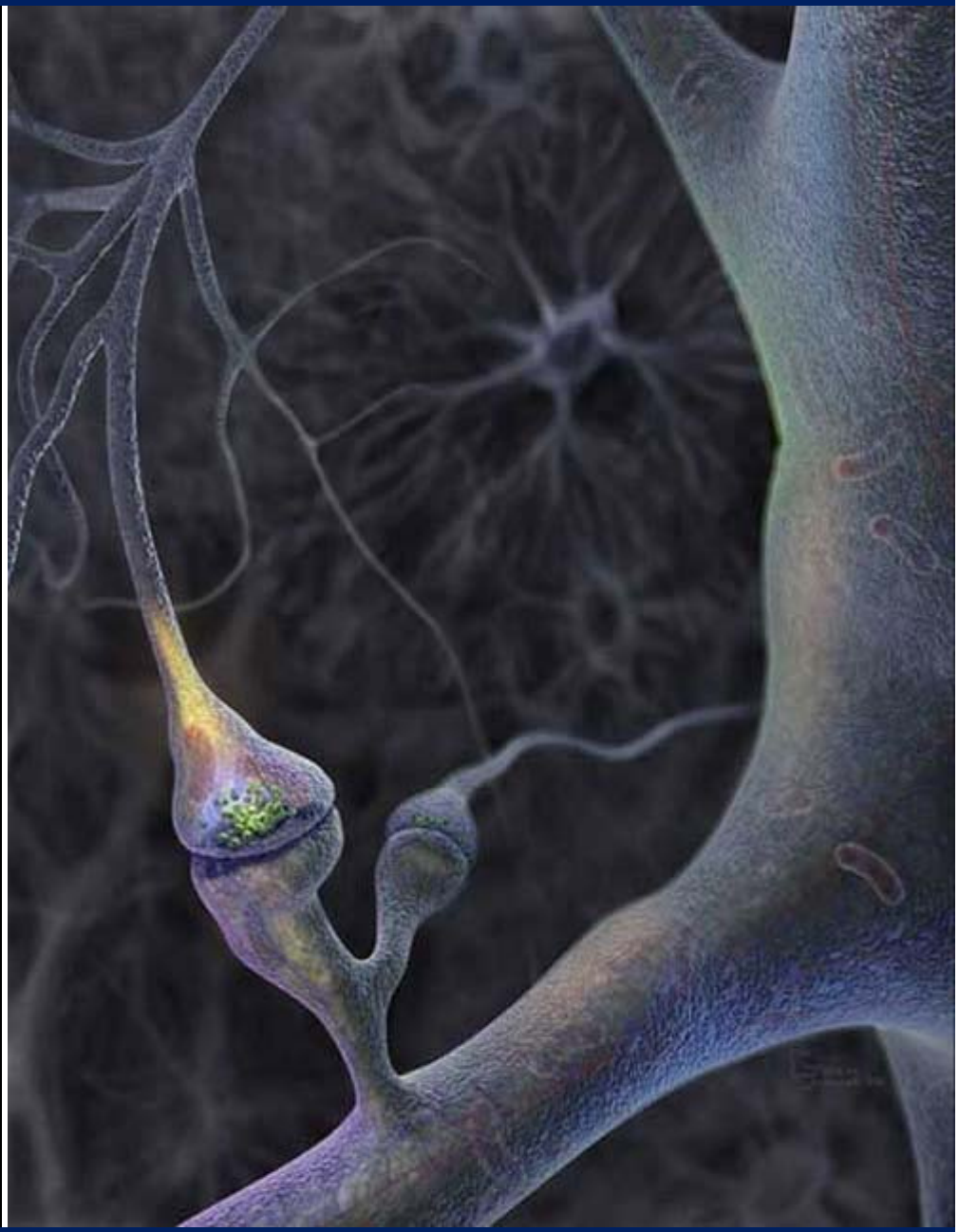
CONDUZIONE SALTATORIA DELL'IMPULSO NERVOSO GRAZIE AL RIVESTIMENTO MIELINICO DELL'ASSONE



CANALI DEL SODIO PRESENTI SOLO AI NODI DI RANVIER

Le sinapsi si formano in corrispondenza delle spine dendritiche





SISTEMA NERVOSO CENTRALE

SISTEMA NERVOSO PERIFERICO

SISTEMA NERVOSO CENTRALE =

ENCEFALO
MIDOLLO SPINALE

Derivati dal tubo neurale

SISTEMA NERVOSO PERIFERICO =

GANGLI

NERVI - FIBRE NERVOSE

E LA SEZIONE PERIFERICA DEL SISTEMA NERVOSO VISCERALE O AUTONOMO

Derivano dalle creste neurali

APPARATI DI SENSO

ORGANI E ORGANULI DI SENSO

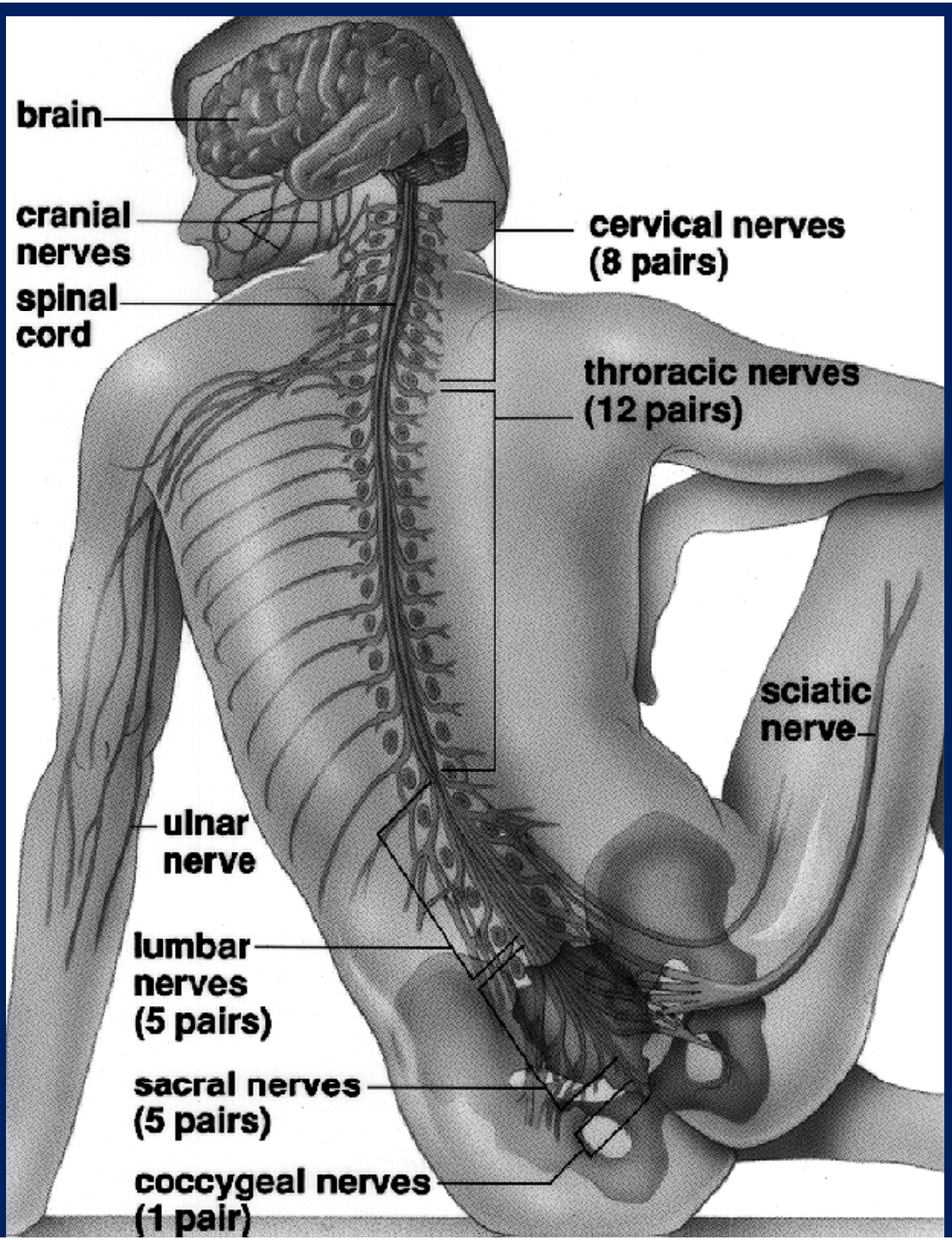
(ad esempio, occhio, corpuscolo di Meissner, ecc.)

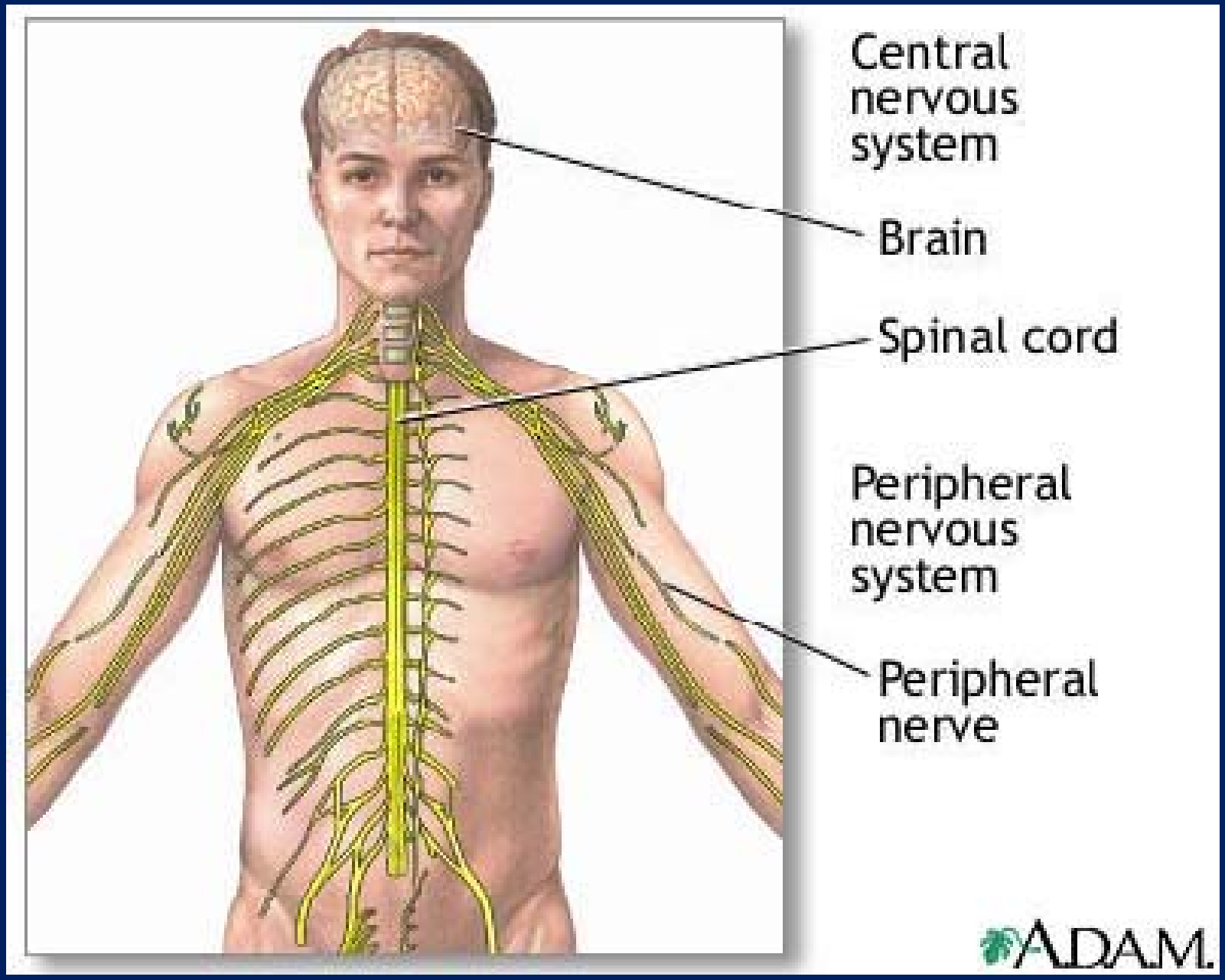
Derivano dalle creste neurali

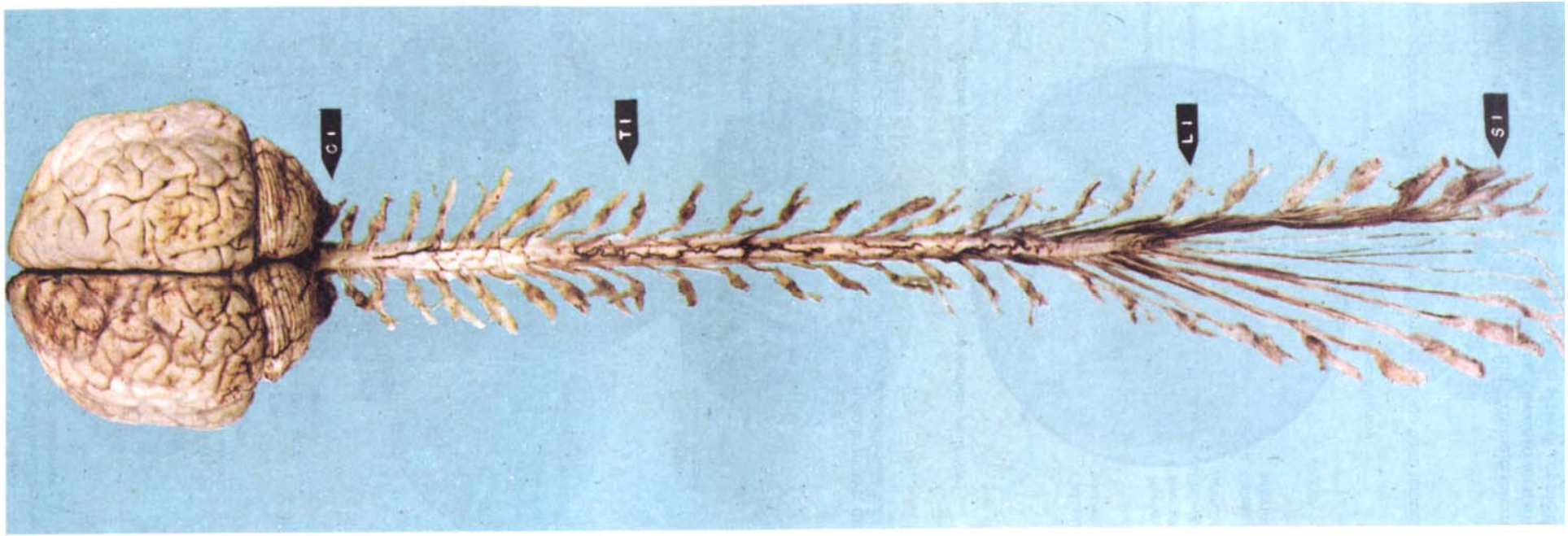
1. SISTEMA NERVOSO CENTRALE

2. SISTEMA NERVOSO PERIFERICO

3. APPARATI DI SENSO:
ORGANI E ORGANULI DI SENSO
(ad esempio, occhio e corpuscolo di Meissner)

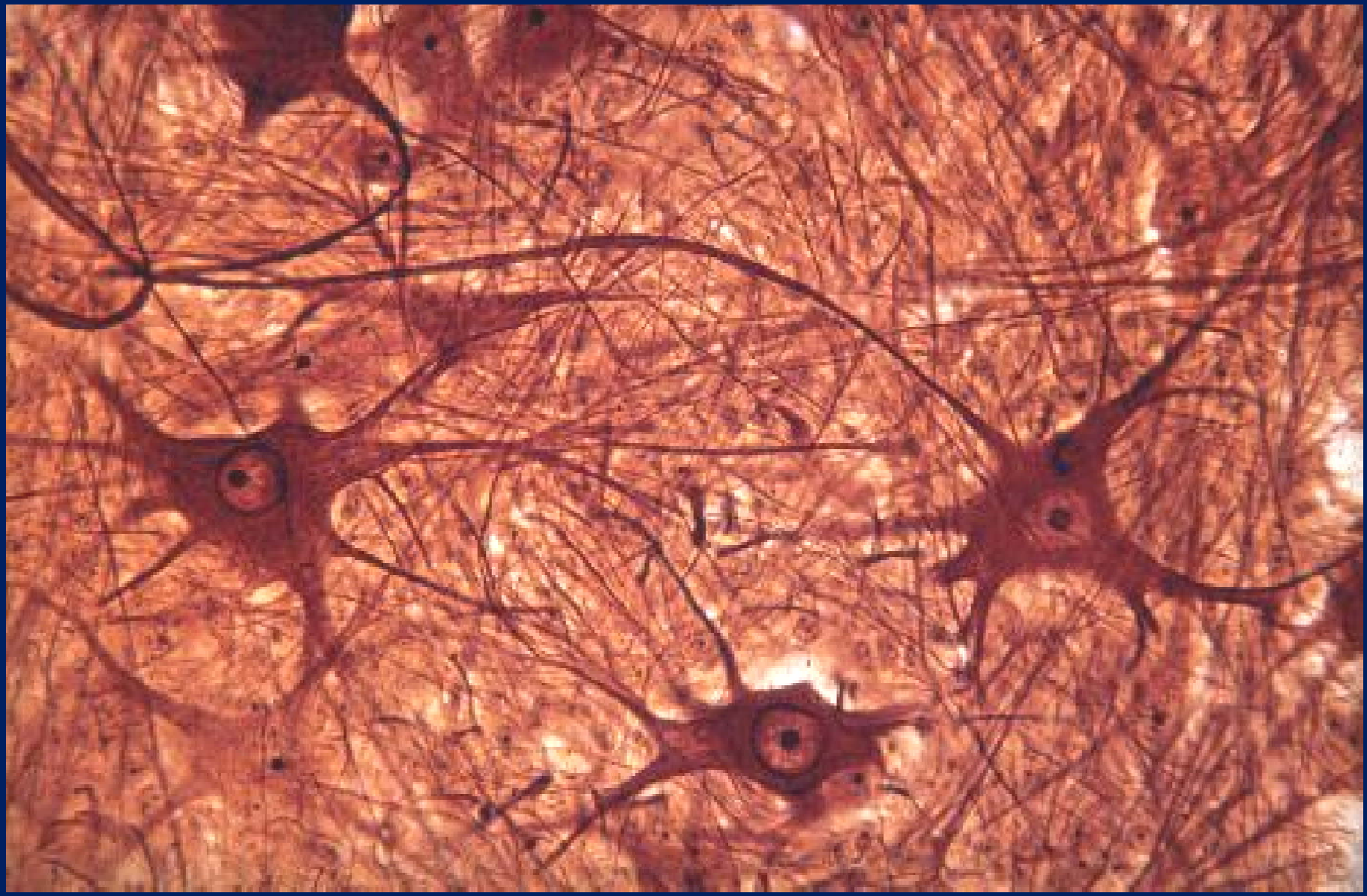

brain
cranial nerves
spinal cord
cervical nerves (8 pairs)
throracic nerves (12 pairs)
sciatic nerve
ulnar nerve
lumbar nerves (5 pairs)
sacral nerves (5 pairs)
coccygeal nerves (1 pair)


Central nervous system
Brain
Spinal cord
Peripheral nervous system
Peripheral nerve
A.D.A.M.



Encefalo: ovoide a polo maggiore posteriore, 1500 gr. circa, contenuto nella cavità neurocranica

Midollo spinale: cilindroide lungo 44-45 cm, fino a L2, 30 gr circa, contenuto nel canale vertebrale

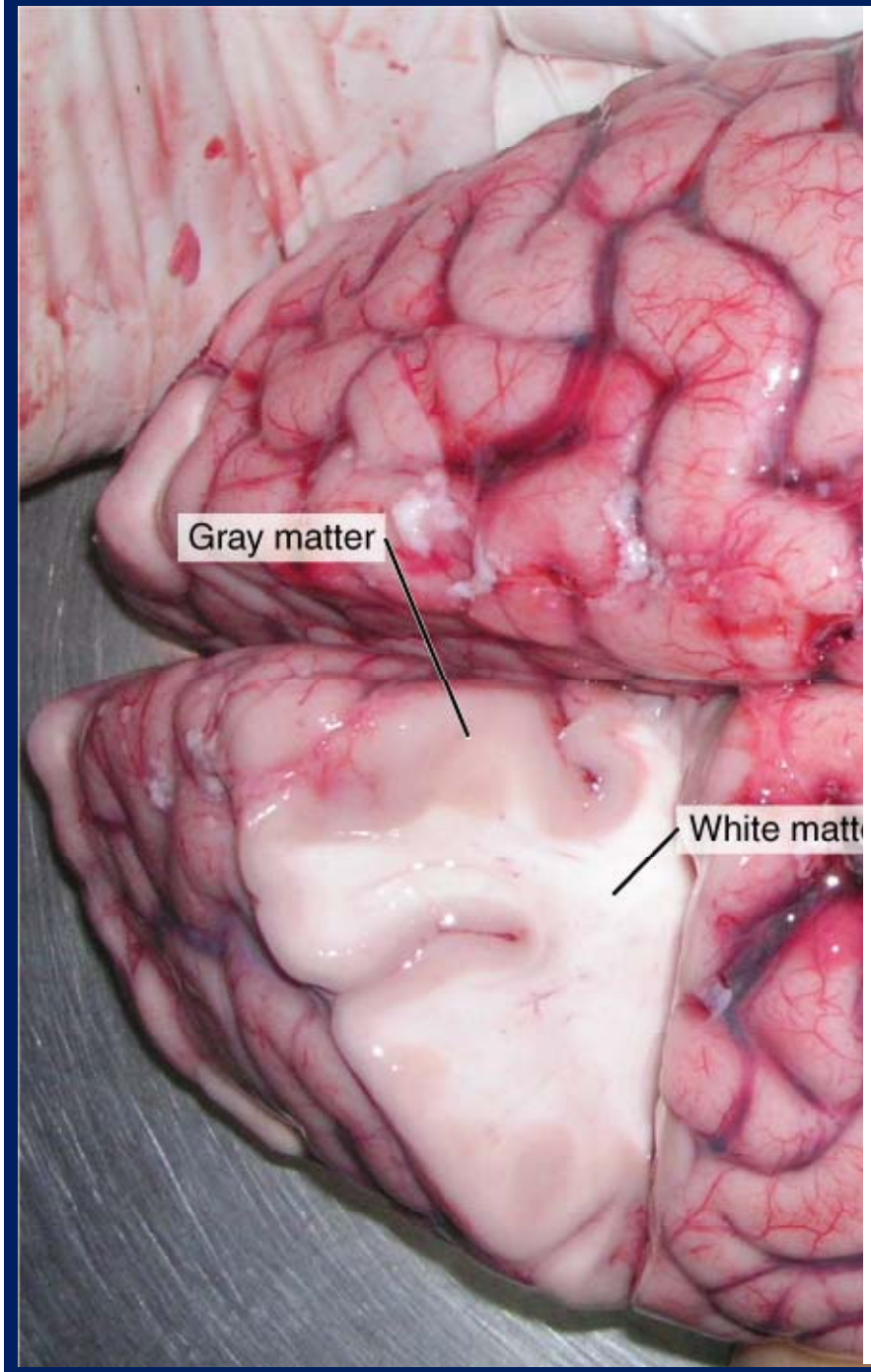


KEEP YOUR BRAIN SAFE AND SOUND!!!

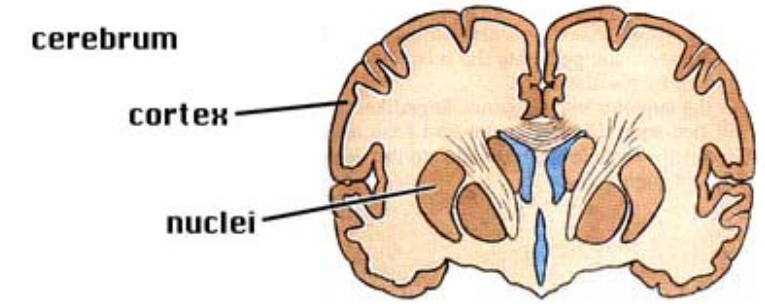

USALO !!!
E' GRATIS

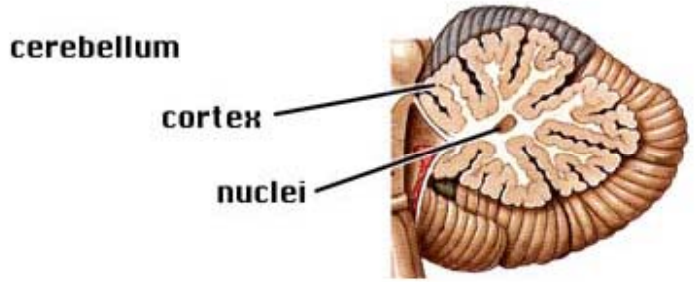
…il cervello è l'alambicco ove si distilla un'anima.

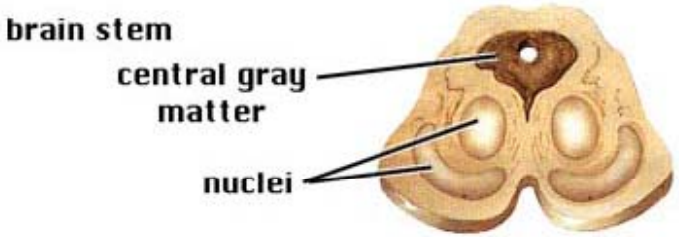
Marguerite Yourcenar



Distribution of Gray Matter in the Central Nervous System







The Nobel Prize in Physiology or Medicine 1906

Camillo Golgi

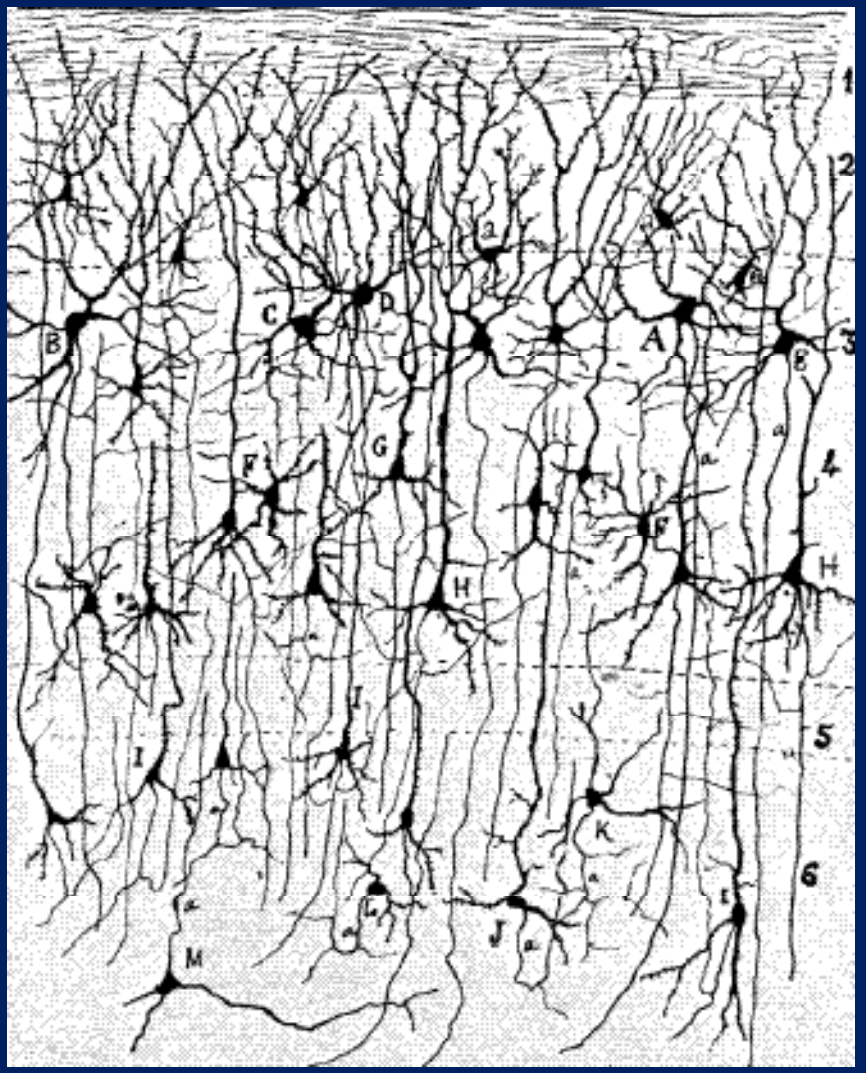
Prize share: 1/2

Santiago Ramón y Cajal

Prize share: 1/2

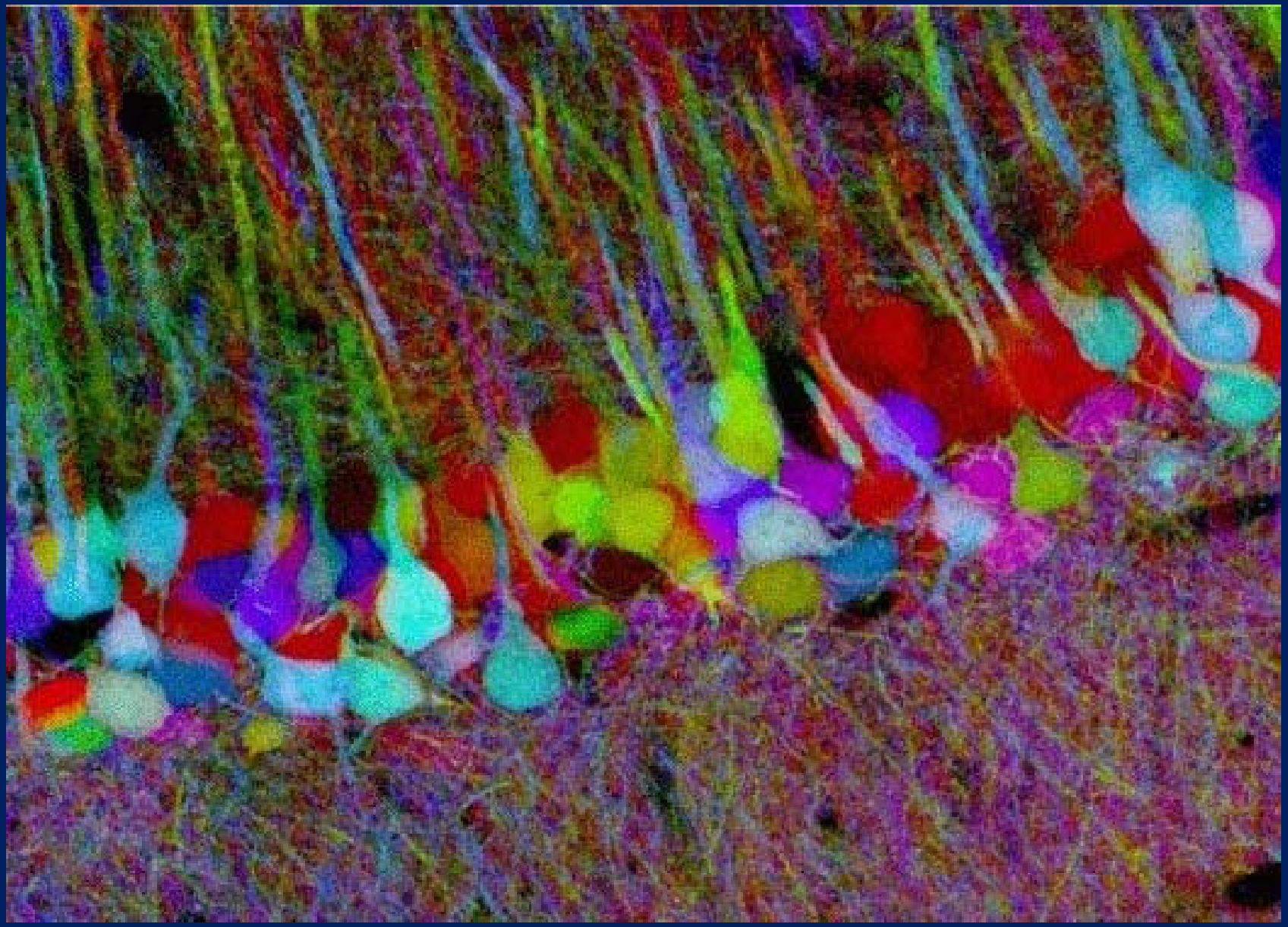
The Nobel Prize in Physiology or Medicine 1906 was awarded jointly to Camillo Golgi and Santiago Ramón y Cajal *"in recognition of their work on the structure of the nervous system"*

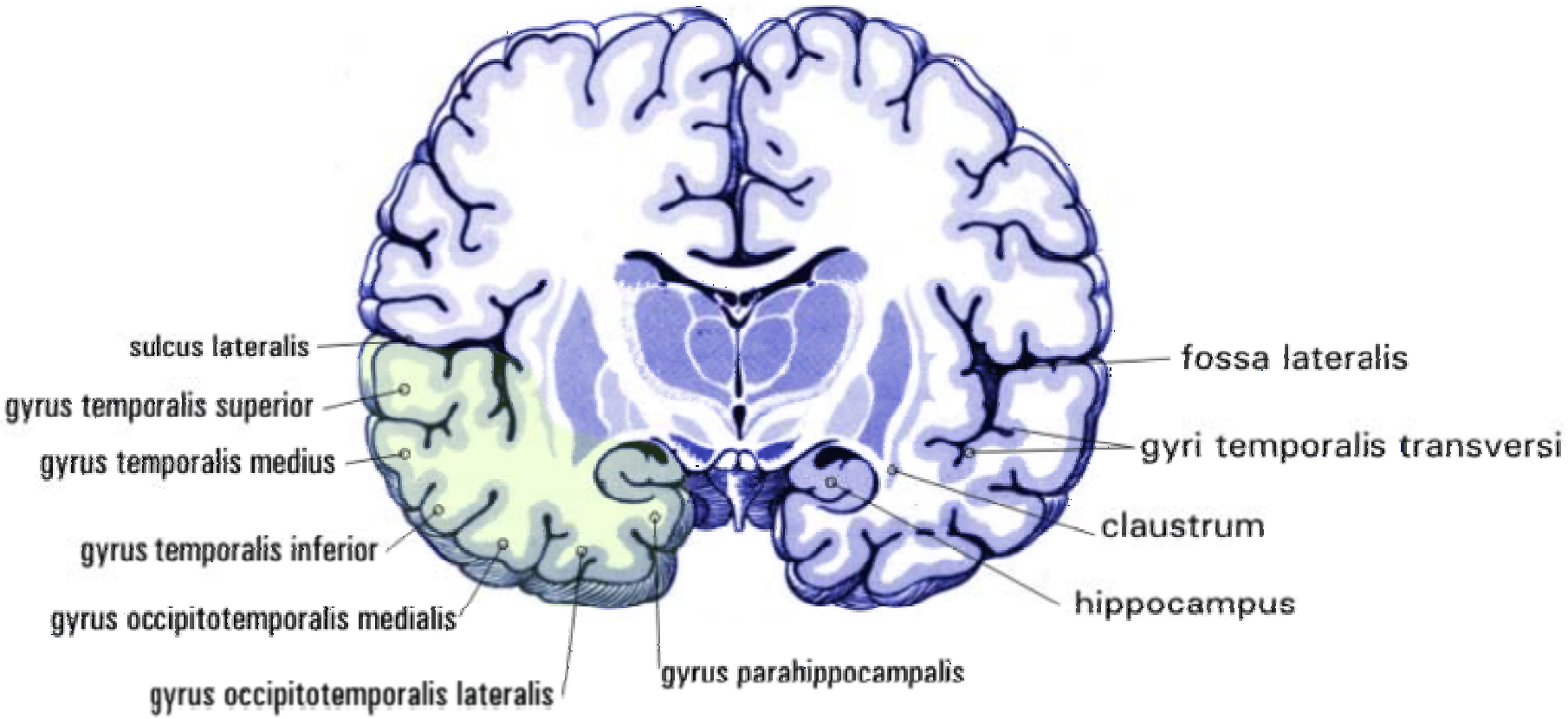
Principali componenti funzionali di un neurone



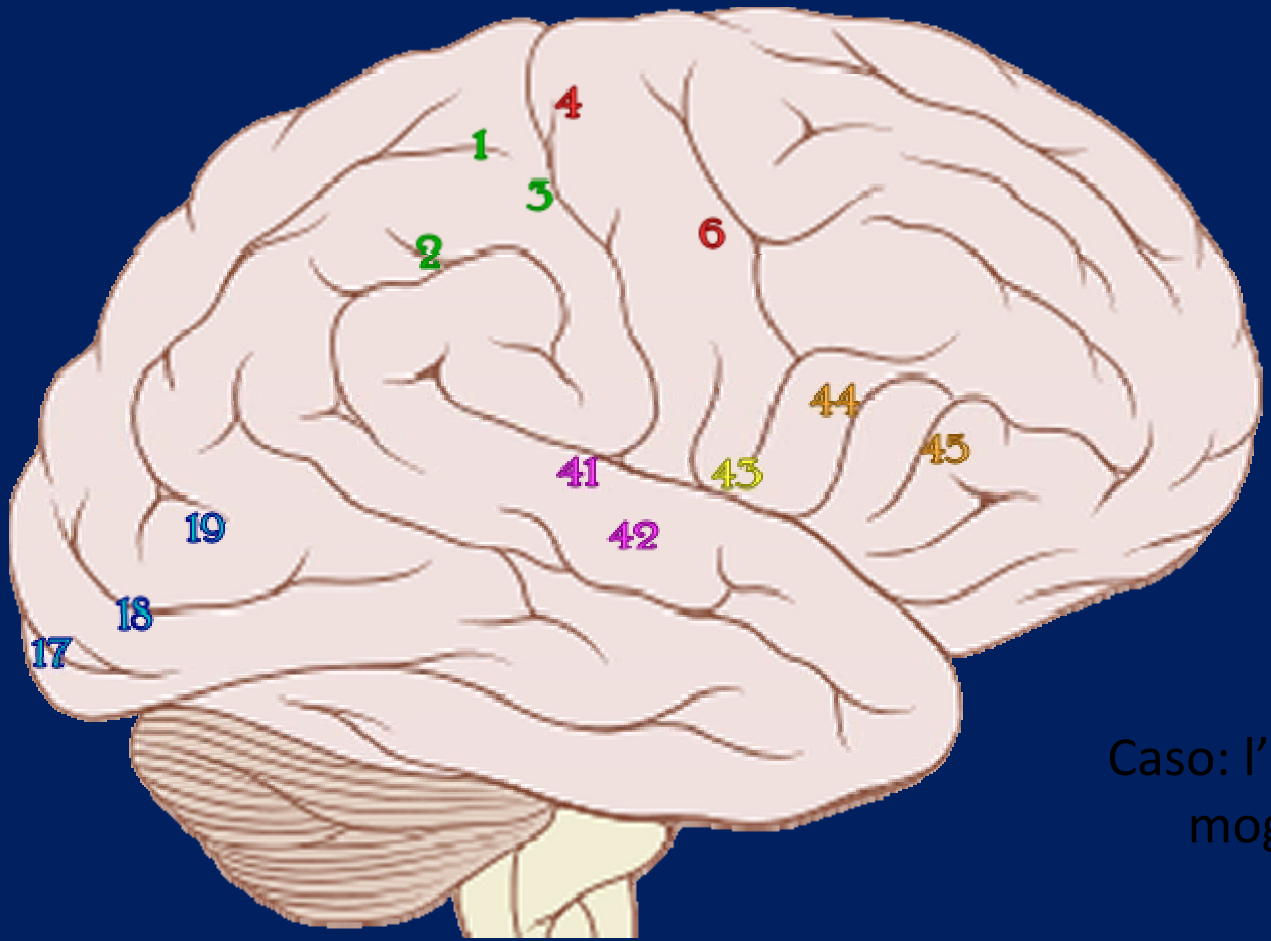
‘reazione nera’ oggi **metodo di Golgi**, dopo la fissazione con bicromato di potassio impregnazione con sali di argento.

Ramon y Cajal

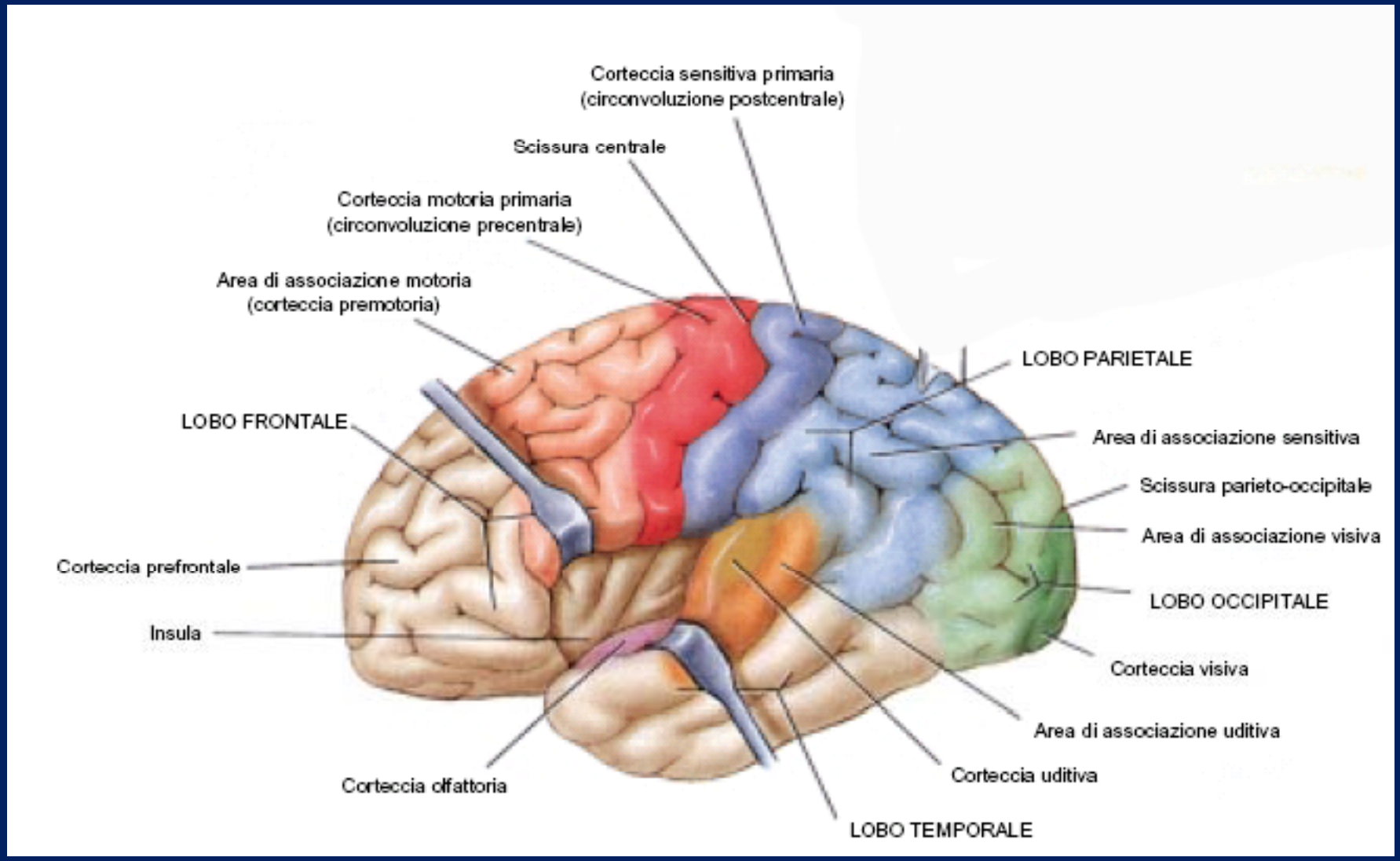



sulcus lateralis
gyrus temporalis superior
gyrus temporalis medius
gyrus temporalis inferior
gyrus occipitotemporalis medialis
gyrus occipitotemporalis lateralis
gyrus parahippocampalis
fossa lateralis
gyri temporalis transversi
claustrum
hippocampus

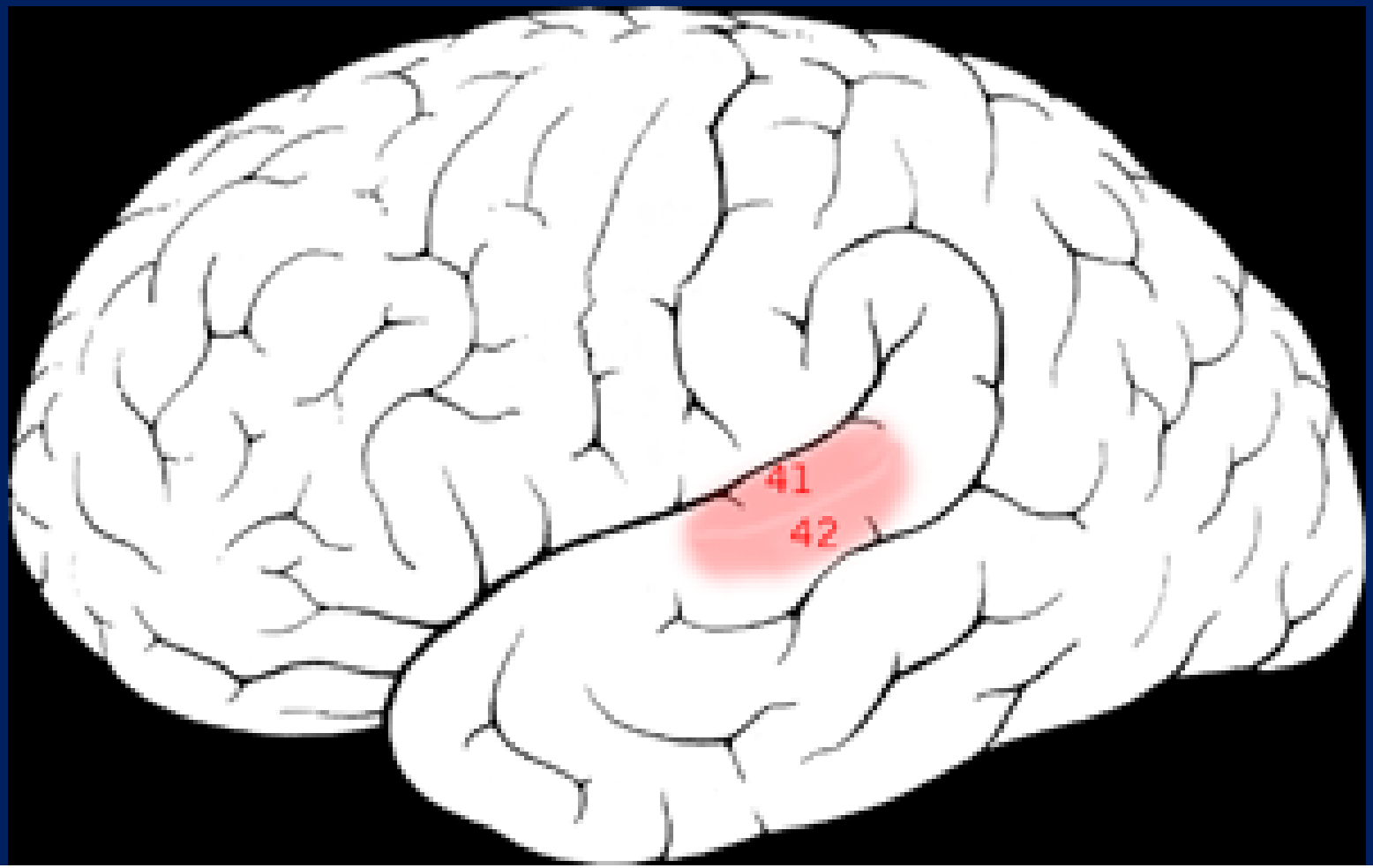
Principali aree di Brodmann



Caso: l'uomo che scambiò sua moglie per un cappello

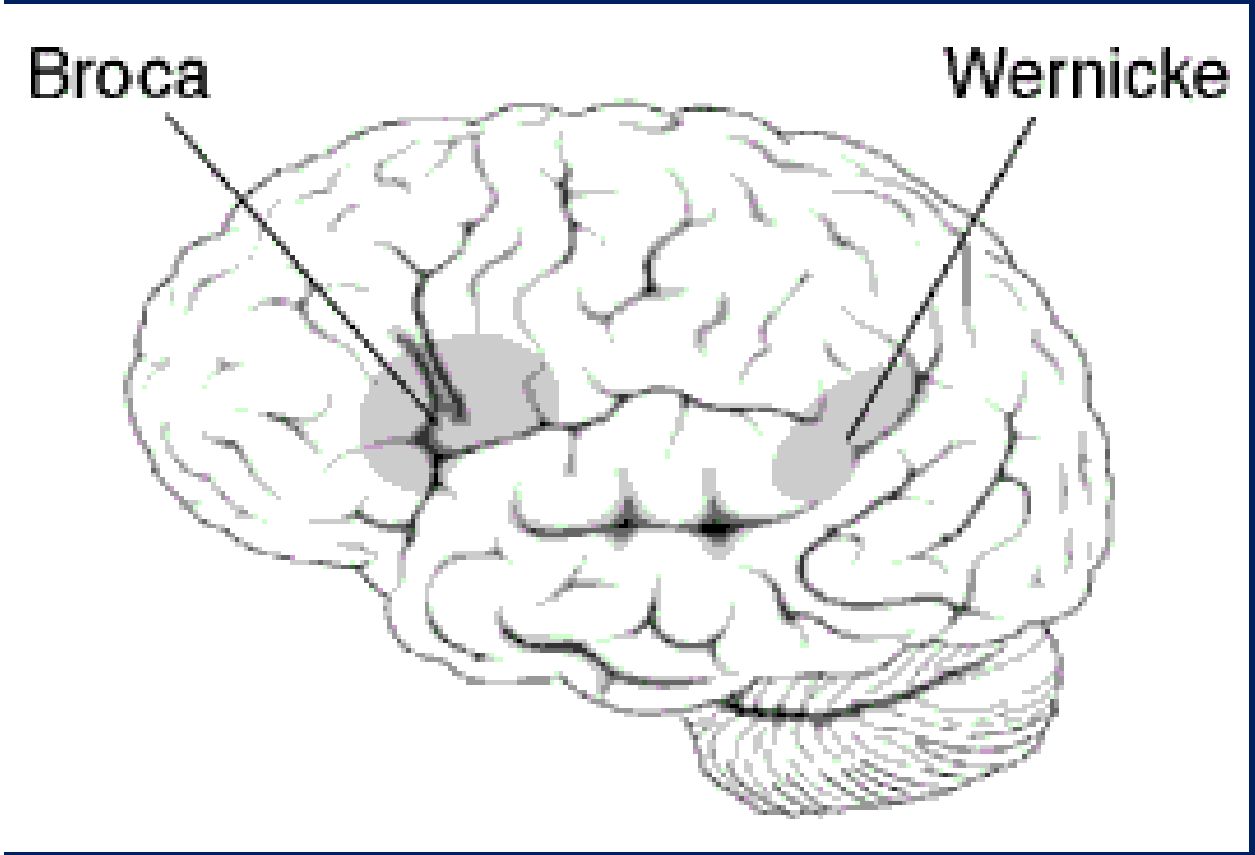

Corteccia sensitiva primaria
(circonvoluzione postcentrale)
Scissura centrale
Corteccia motoria primaria
(circonvoluzione precentrale)
Area di associazione motoria
(corteccia premotoria)
LOBO FRONTALE
Corteccia prefrontale
Insula
Corteccia olfattoria
LOBO PARIETALE
Area di associazione sensitiva
Scissura parieto-occipitale
Area di associazione visiva
LOBO OCCIPITALE
Corteccia visiva
Area di associazione uditiva
Corteccia uditiva
LOBO TEMPORALE

Aree 41 e 42 di BRODMANN: aree acustiche, giro temporale superiore

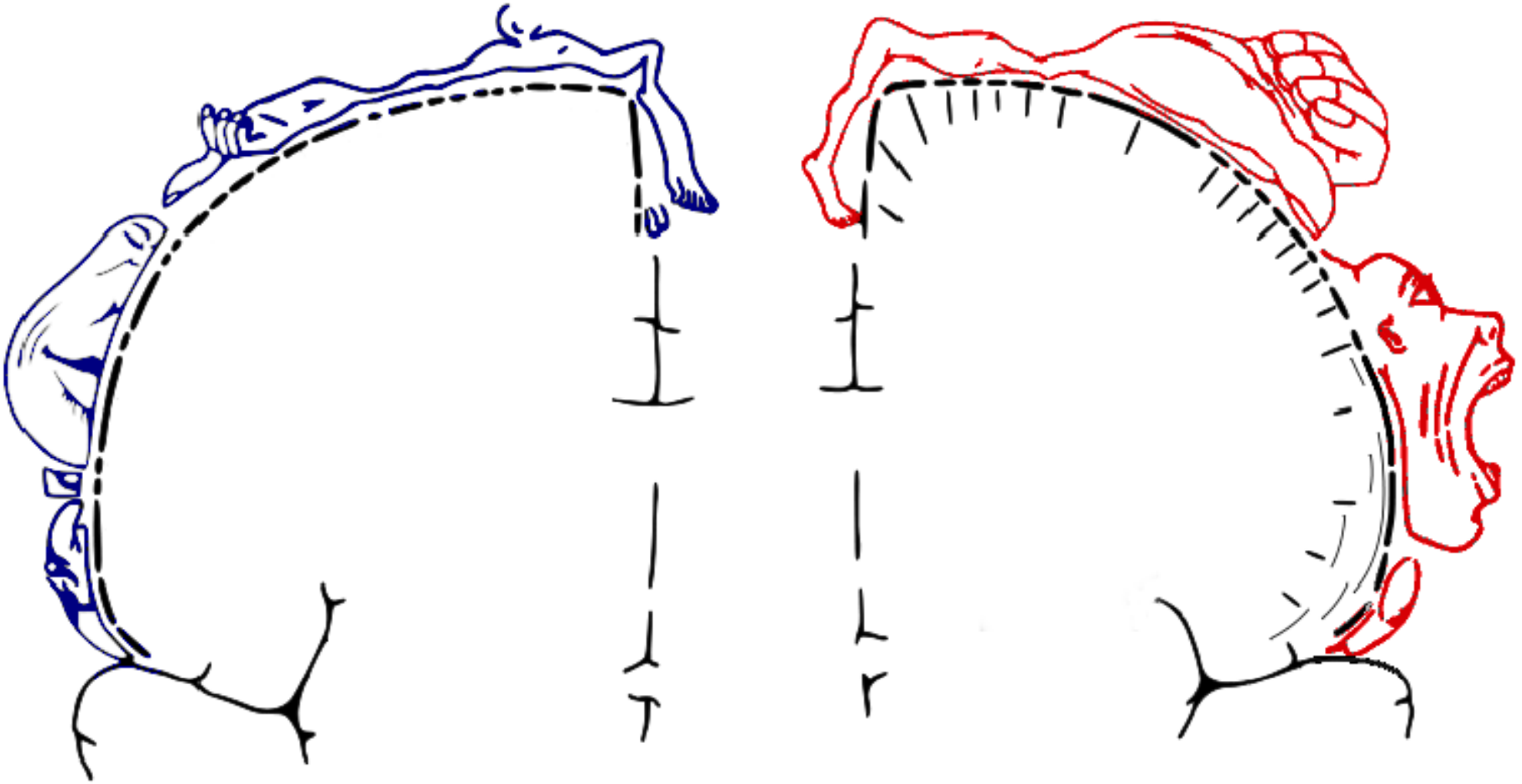


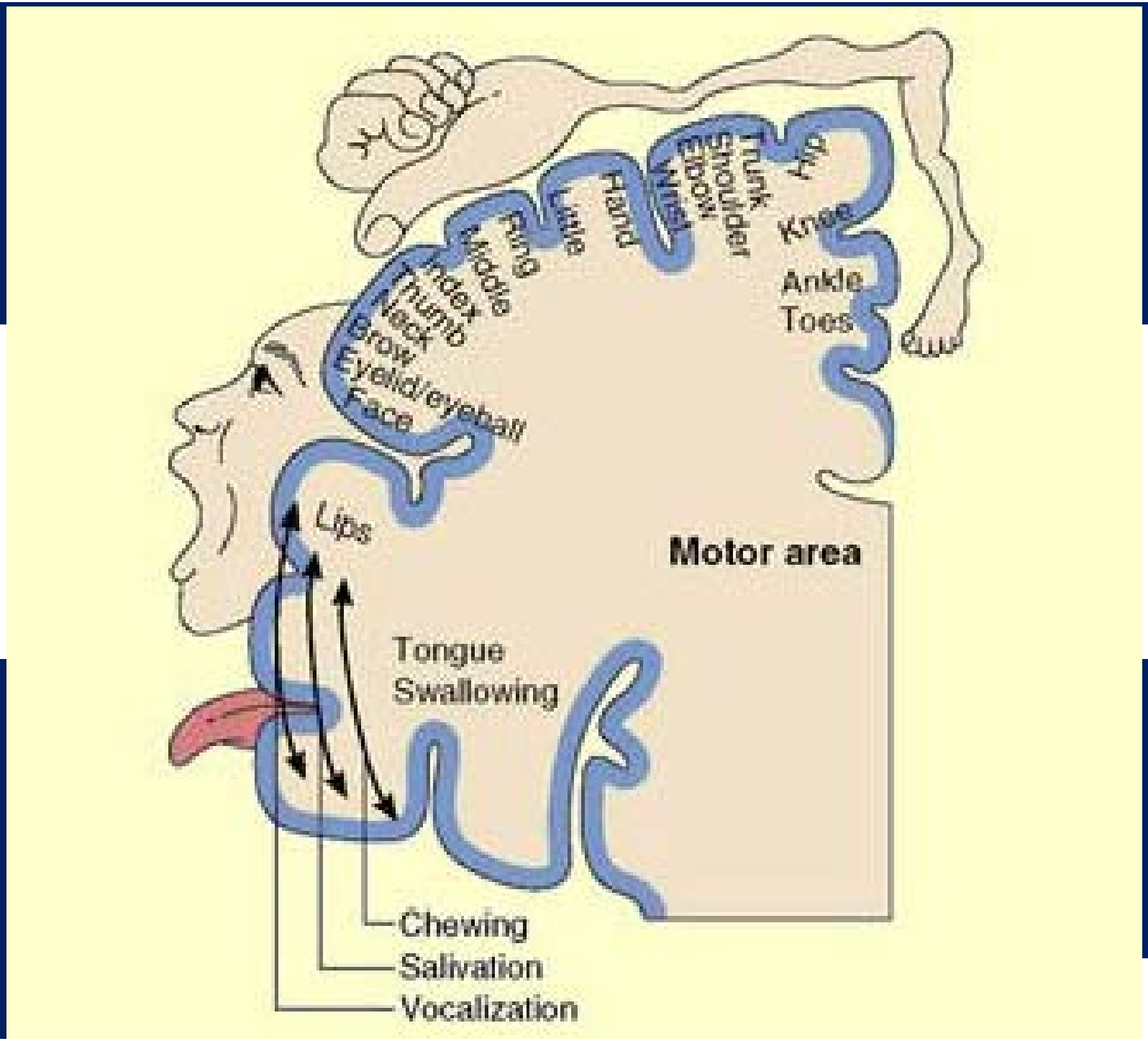
Caso: reminiscenza

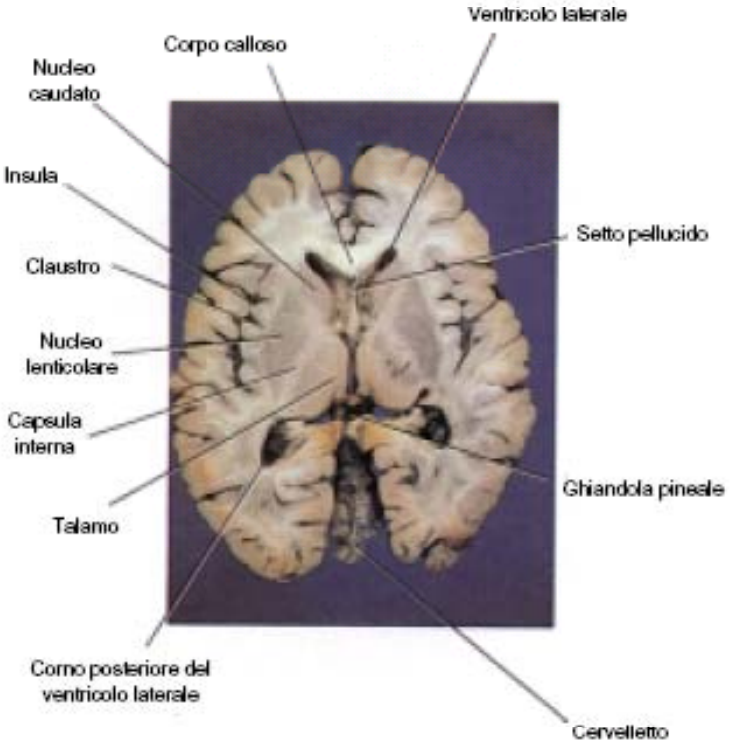
Aree del linguaggio: motoria (di Broca) e sensitiva (di Wernicke). Disturbo = afasia

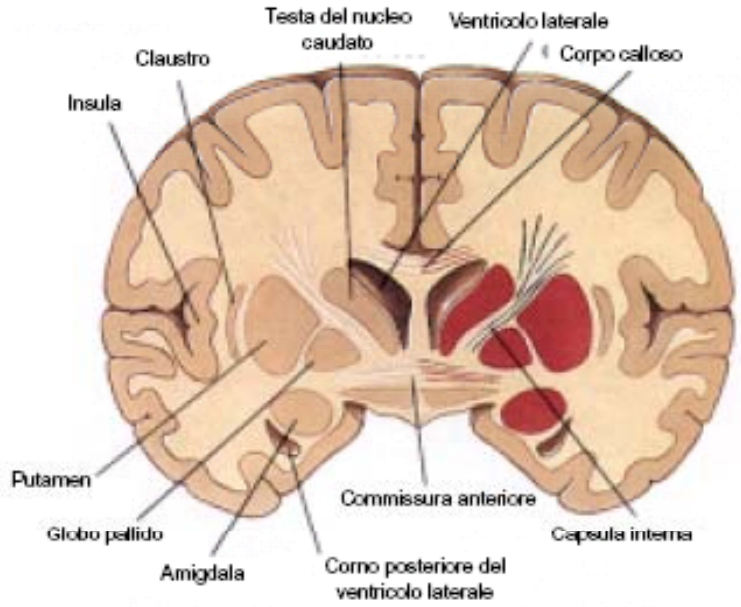


Opercoli motorio e sensitivo




Hip
Knee
Ankle
Toes
Trunk
Shoulder
Elbow
Wrist
Hand
Little
Ring
Middle
Index
Thumb
Neck
Brow
Eyelid/eyeball
Face
Lips
Motor area
Tongue
Swallowing
Chewing
Salivation
Vocalization





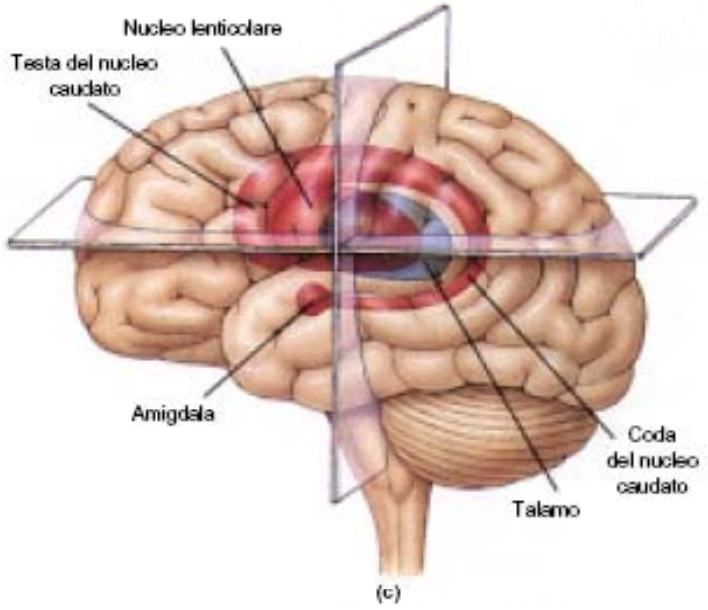
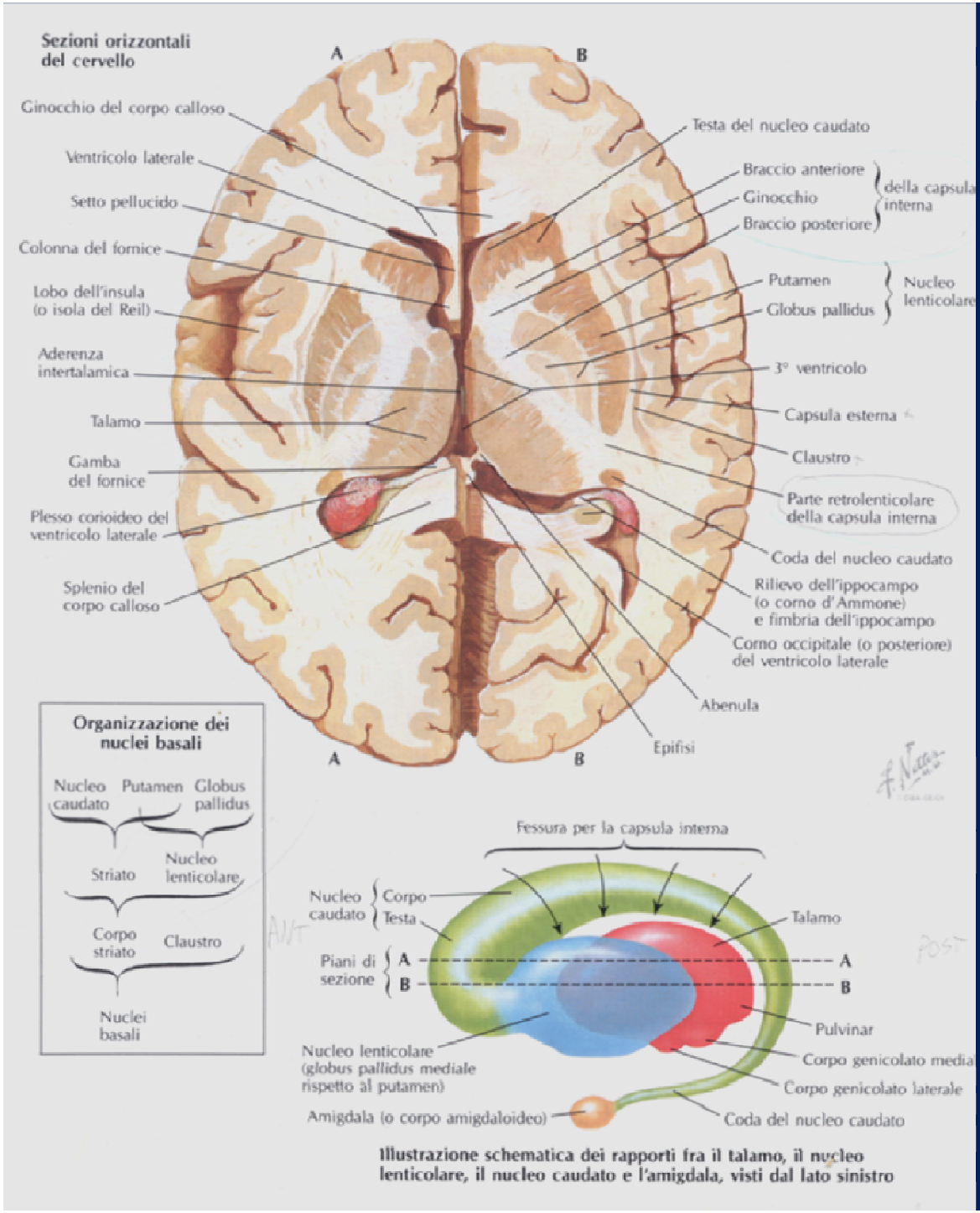


Figura 14.5 - I nuclei cerebrali. Le posizioni relative dei nuclei cerebrali possono essere comprese paragonando la sezione orizzontale (a) e la sezione frontale (b) con la rappresentazione tridimensionale (c).

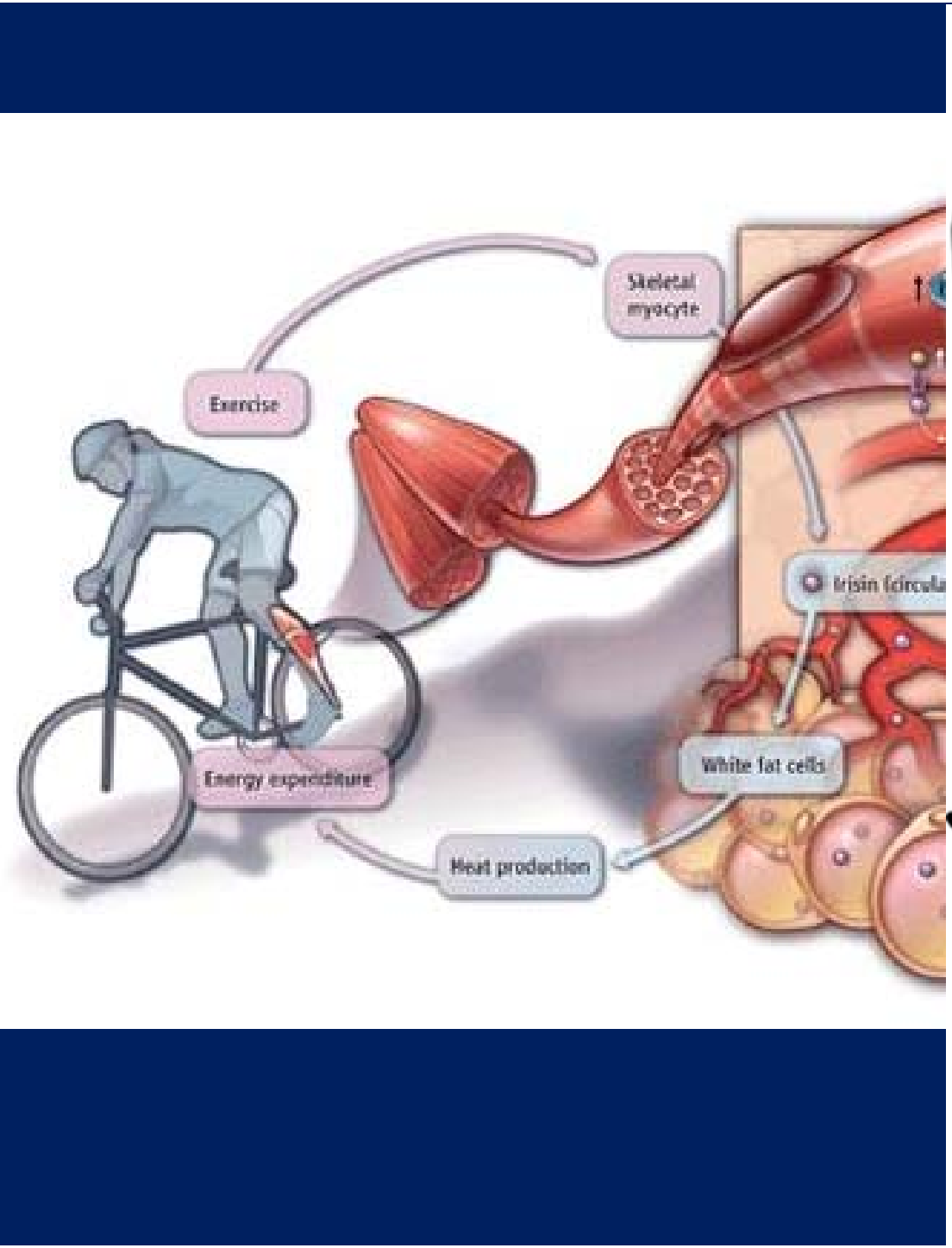


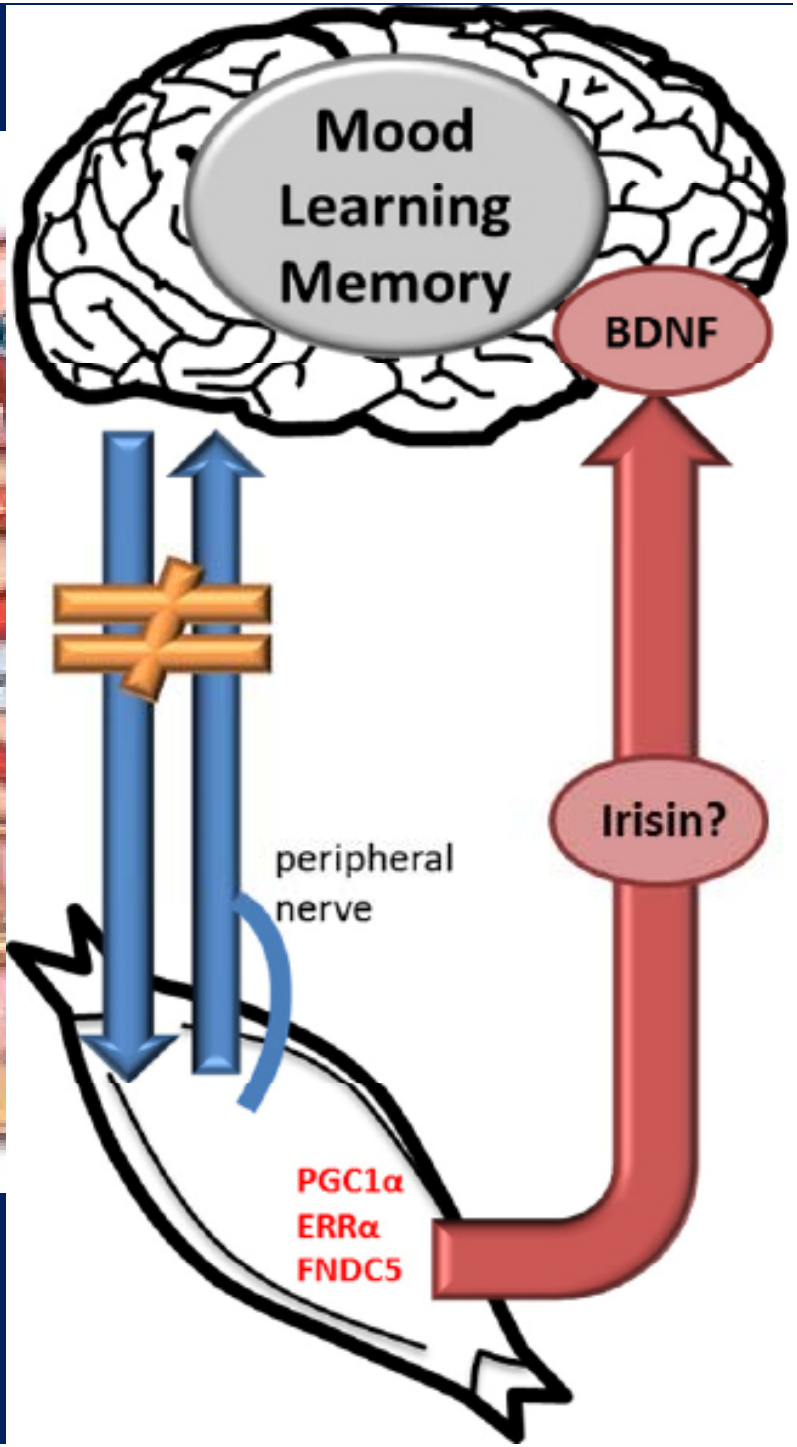
Nuclei della base: nucleo caudato, putamen, amigdala, claustro, nucleo subtalamico (diencefalico)

Sezione frontale del cervello (veduta posteriore)

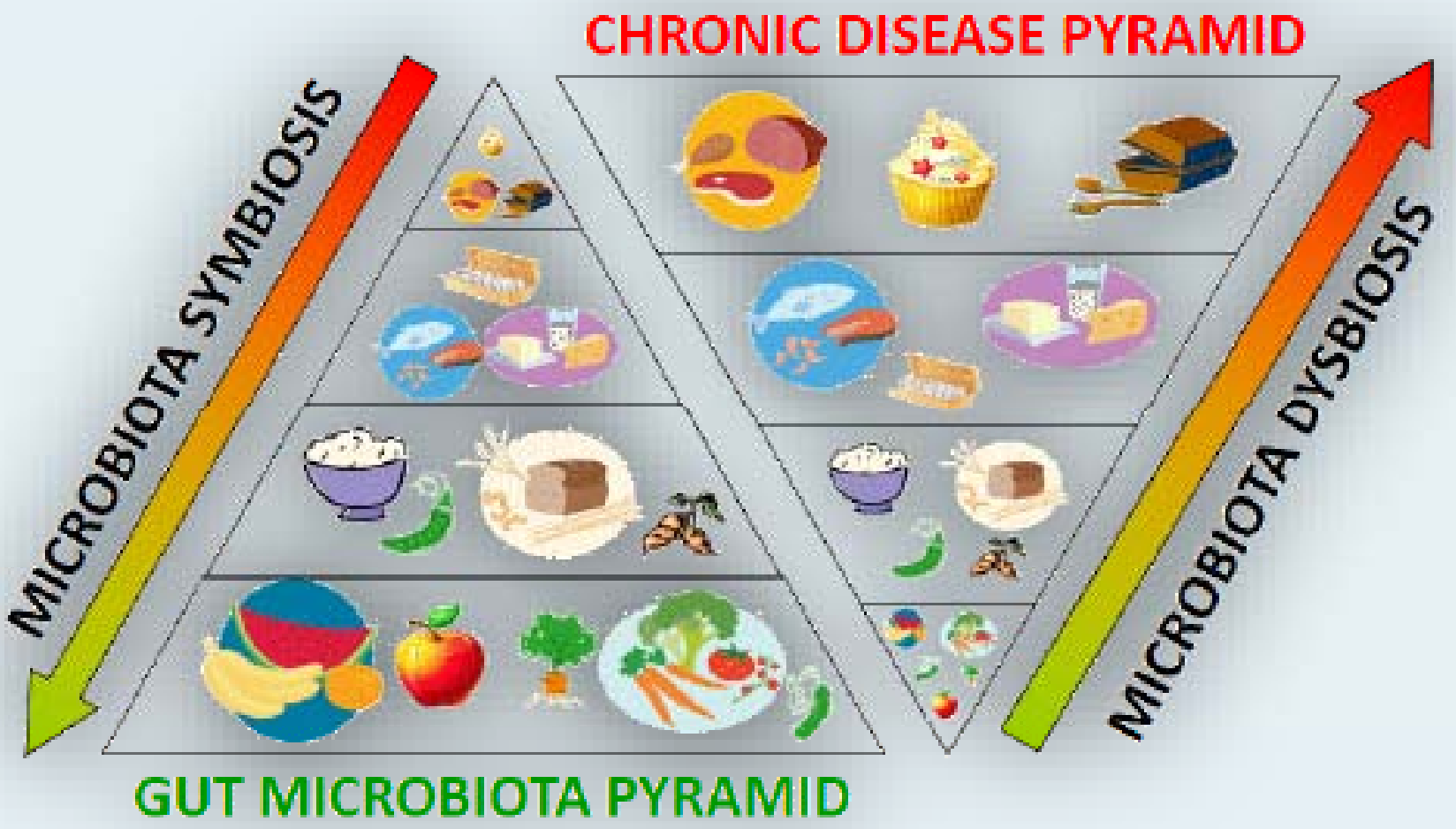
Caso: Raimondo dai mille tic, Parkinson, ecc.

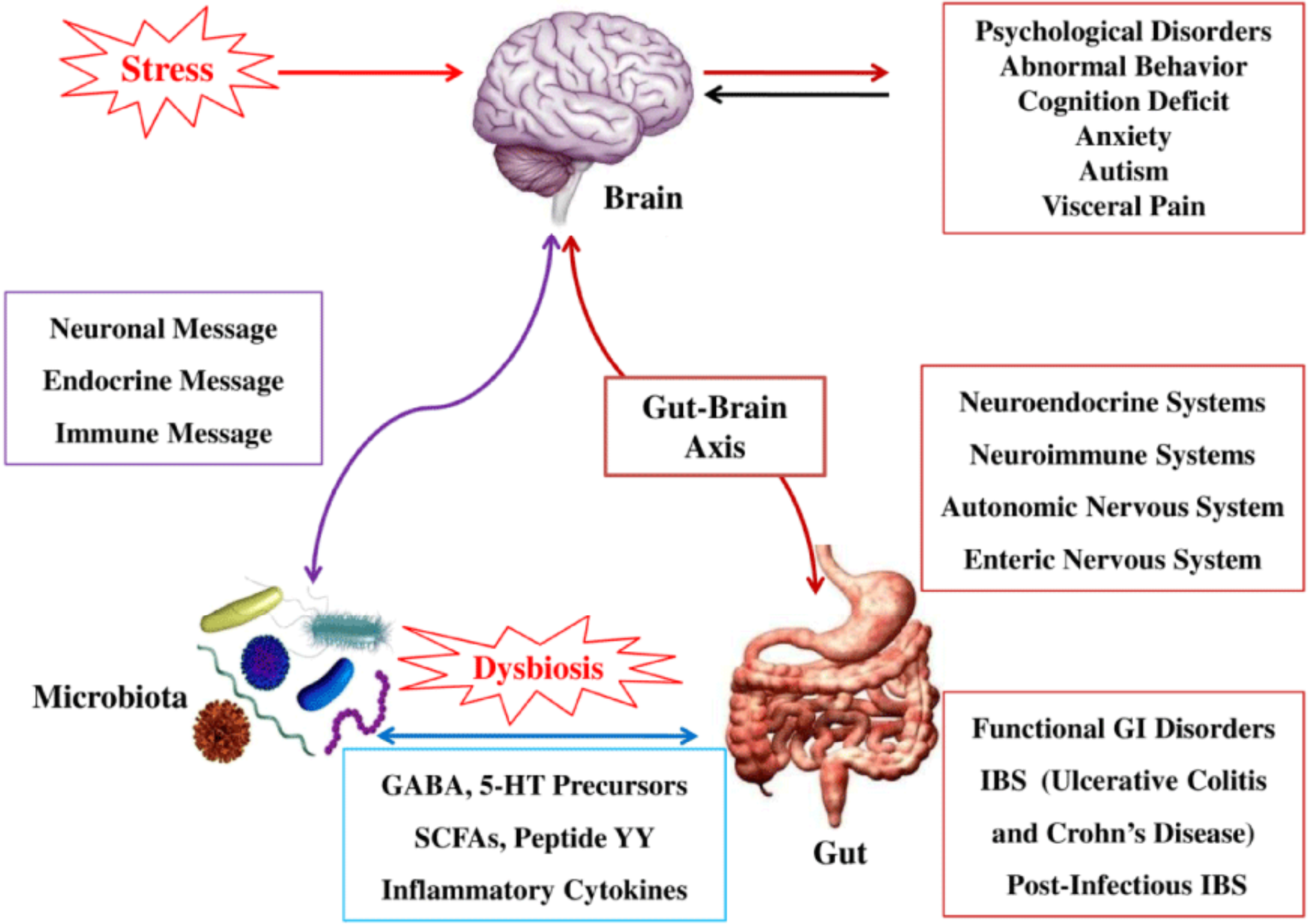
VIAGGIO ALLUCINANTE DI ISAAC ASIMOV, 1966


Skeletal myocyte
Exercise
Irisin (circula
Energy expenditure
White fat cells
Heat production


Mood
Learning
Memory
BDNF
Irisin?
peripheral
nerve
PGC1α
ERRα
FNDC5


XTRAVERGINE EXTRAVERGINE
OLIVAOLIVA


CHRONIC DISEASE PYRAMID
MICROBIOTA SYMBIOSIS
MICROBIOTA DYSBIOSIS
GUT MICROBIOTA PYRAMID


Stress
Brain
Psychological Disorders
Abnormal Behavior
Cognition Deficit
Anxiety
Autism
Visceral Pain
Neuronal Message
Endocrine Message
Immune Message
Gut-Brain Axis
Neuroendocrine Systems
Neuroimmune Systems
Autonomic Nervous System
Enteric Nervous System
Microbiota
Dysbiosis
GABA, 5-HT Precursors
SCFAs, Peptide YY
Inflammatory Cytokines
Gut
Functional GI Disorders
IBS (Ulcerative Colitis
and Crohn's Disease)
Post-Infectious IBS

Sleep Loss

▲ hypothalamic activity
↓
▲ cortisol
↓
▲ appetite and lipoprotein lipase
↓
▲ weight gain
↓
overweight and obesity

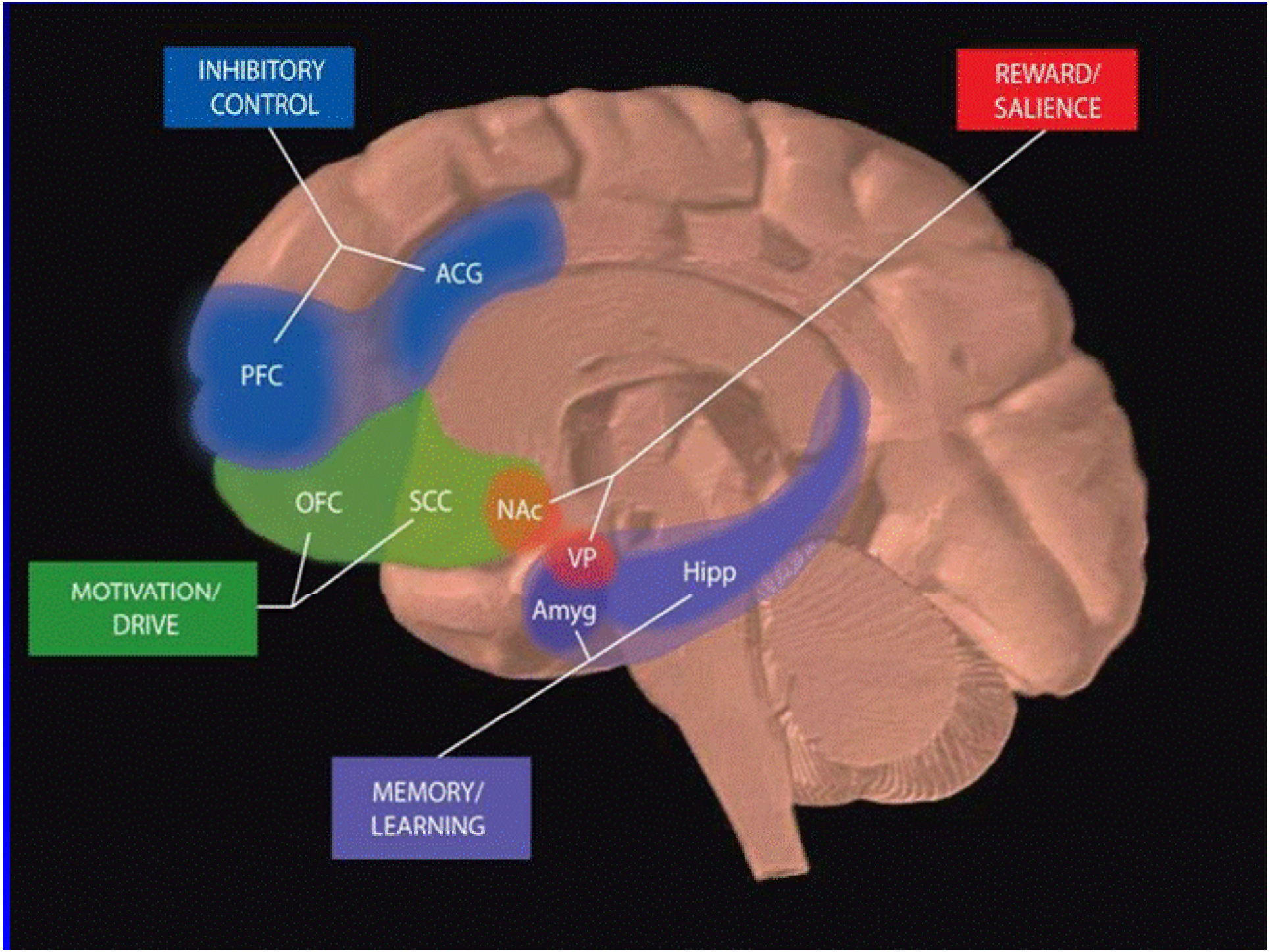
▼ brain glucose utilization
↓
altered glucose metabolism
↓
insulin resistance
↓
type 2 diabetes

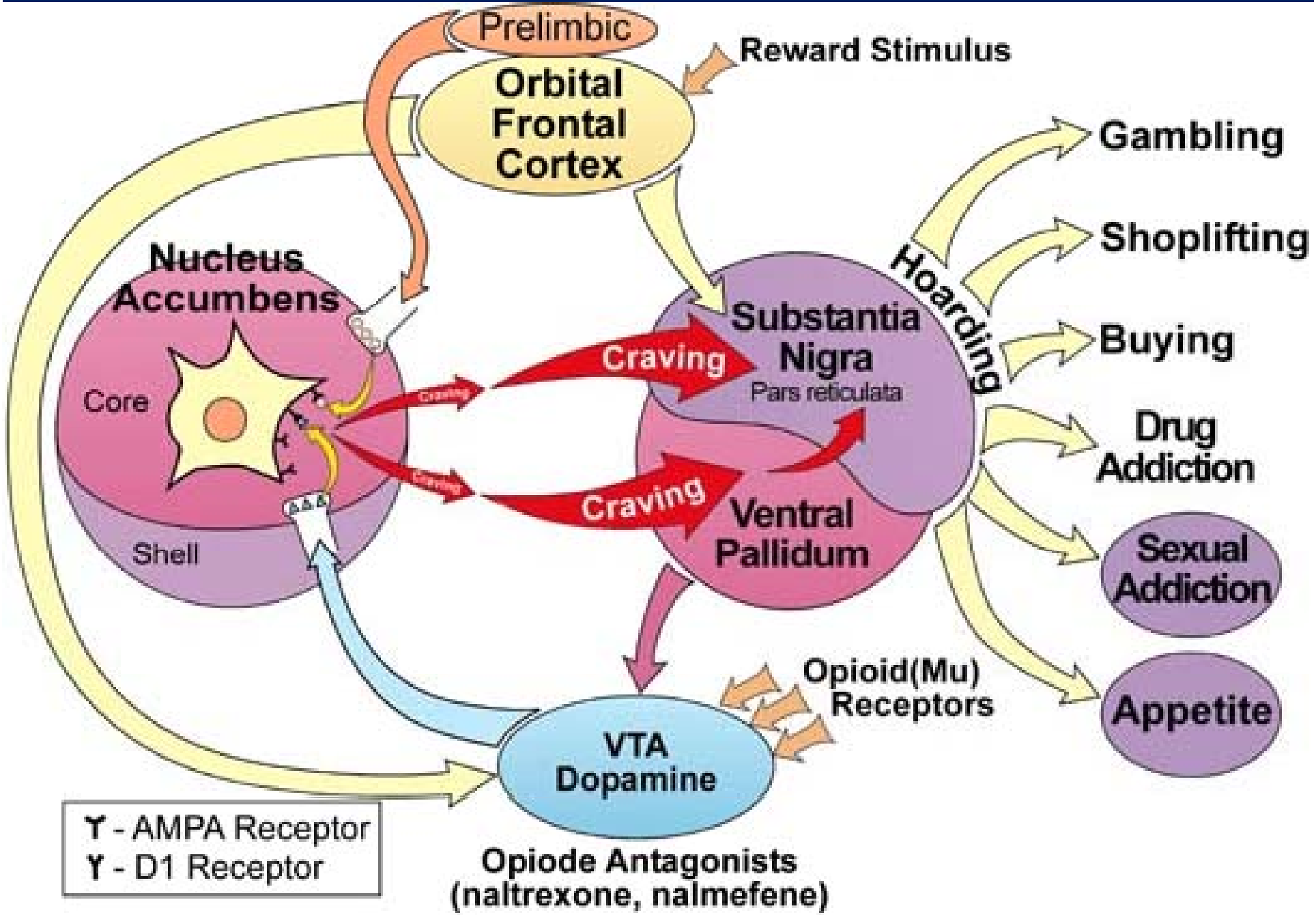
▼ immune system function: ▲ sick days and ailments

▲ sympathetic nervous activity
↓
▲ blood pressure
↓
hypertension and cardiovascular disease

COMPLEX RELATIONSHIP OF SLEEP LOSS AND HEALTH CONSEQUENCES


STRESSED
spelled backward is
DESSERTS


INHIBITORY CONTROL
REWARD/ SALIENCE
ACG
PFC
OFC
SCC
NAc
VP
Hipp
Amyg
MOTIVATION/ DRIVE
MEMORY/ LEARNING


Prelimbic
Reward Stimulus
Orbital Frontal Cortex
Gambling
Shoplifting
Buying
Drug Addiction
Sexual Addiction
Appetite
Hoarding
Nucleus Accumbens
Core
Shell
Substantia Nigra
Pars reticulata
Ventral Pallidum
Craving
Craving
Craving
Opioid(Mu) Receptors
VTA Dopamine
Y - AMPA Receptor
Y - D1 Receptor
Opiode Antagonists
(naltrexone, nalmefene)