Neuropsihologia clinică

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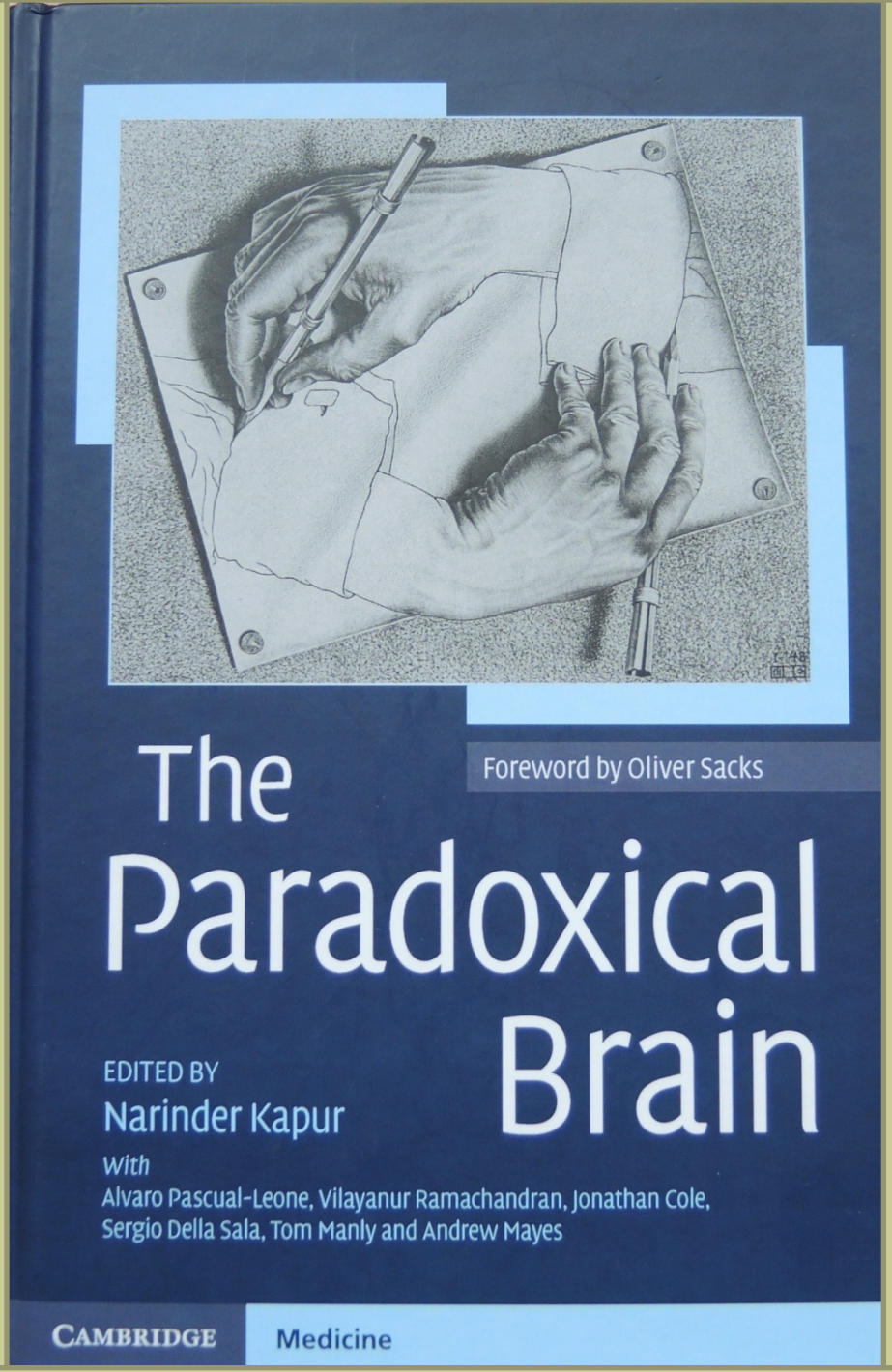
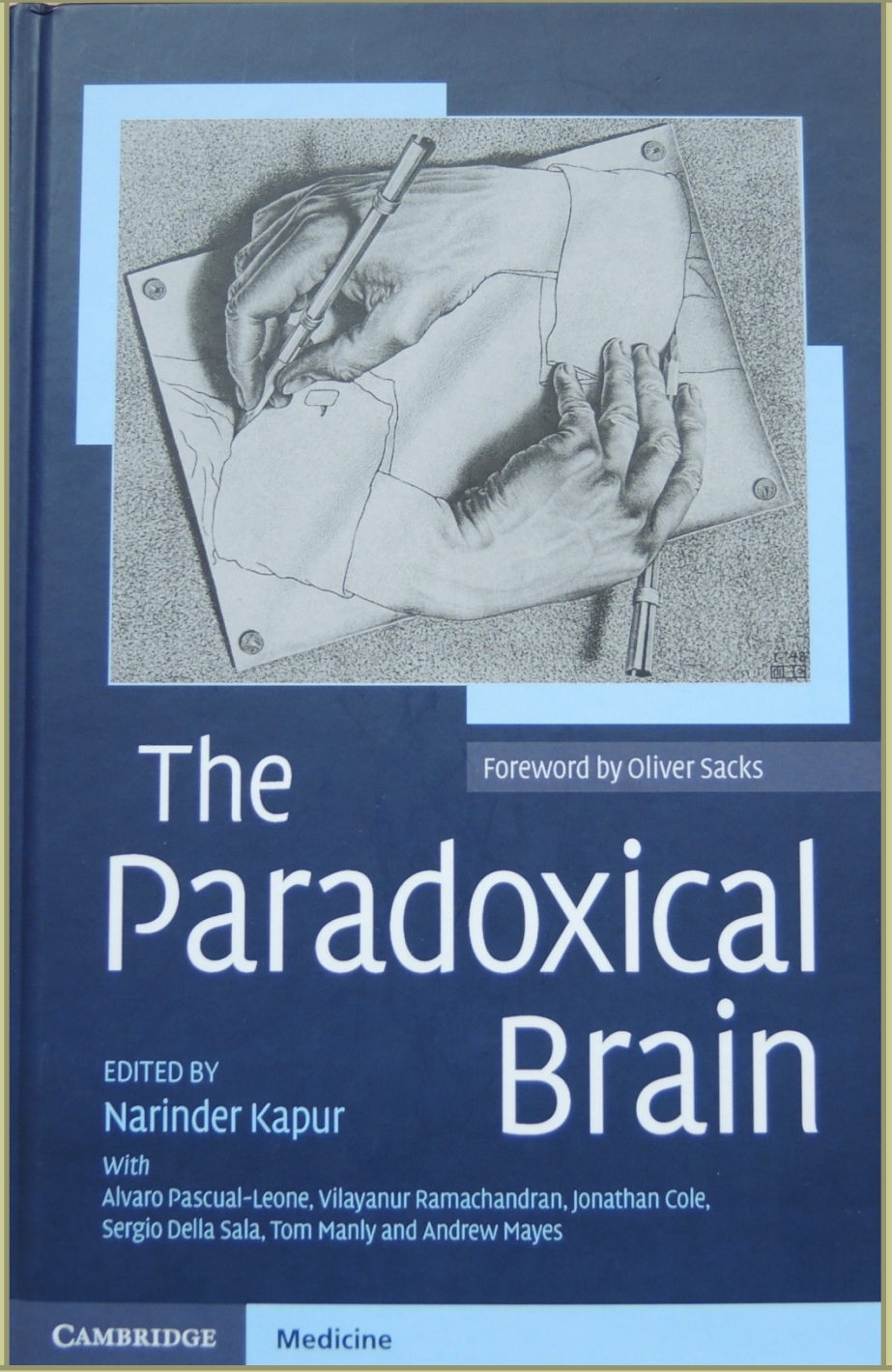
Prof. Ion V. Moldovanu

- Institutul de Neurologie și Neurochirurgie
- USMF “N.Testemitanu”

Două revoluţii ştiinţifice paralele:

Cosmologia
Neuroştiinţele


The
Paradoxical
Brain
Foreword by Oliver Sacks
EDITED BY
Narinder Kapur
With
Alvaro Pascual-Leone, Vilayanur Ramachandran, Jonathan Cole,
Sergio Della Sala, Tom Manly and Andrew Mayes
CAMBRIDGE
Medicine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Medicine

Introducere

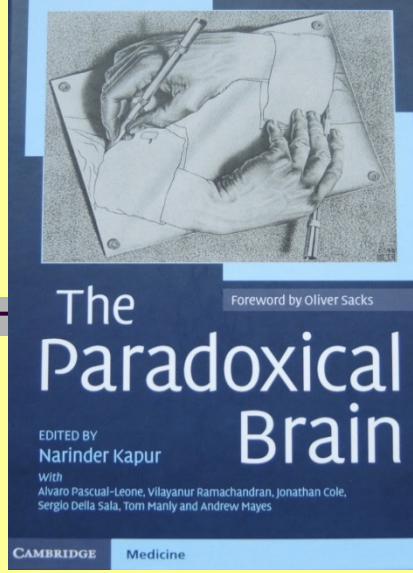
Studiul creierului uman a fost în mod diferit menționată ca "ultima frontieră mare", sau o provocare echivalentă cu cea de a înțelege universul.

Cosmologia si Neuroştiinţele, de fapt, au aceleași lucruri în comun.

Galaxia noastră, Calea Lactee, are mii de milioane de stele și unii savanţi au presupus ca numărul de stele din Calea Lactee, ar putea fi similar cu numărul de celule în creierul uman.

Narinder Kapur

Prefaţă



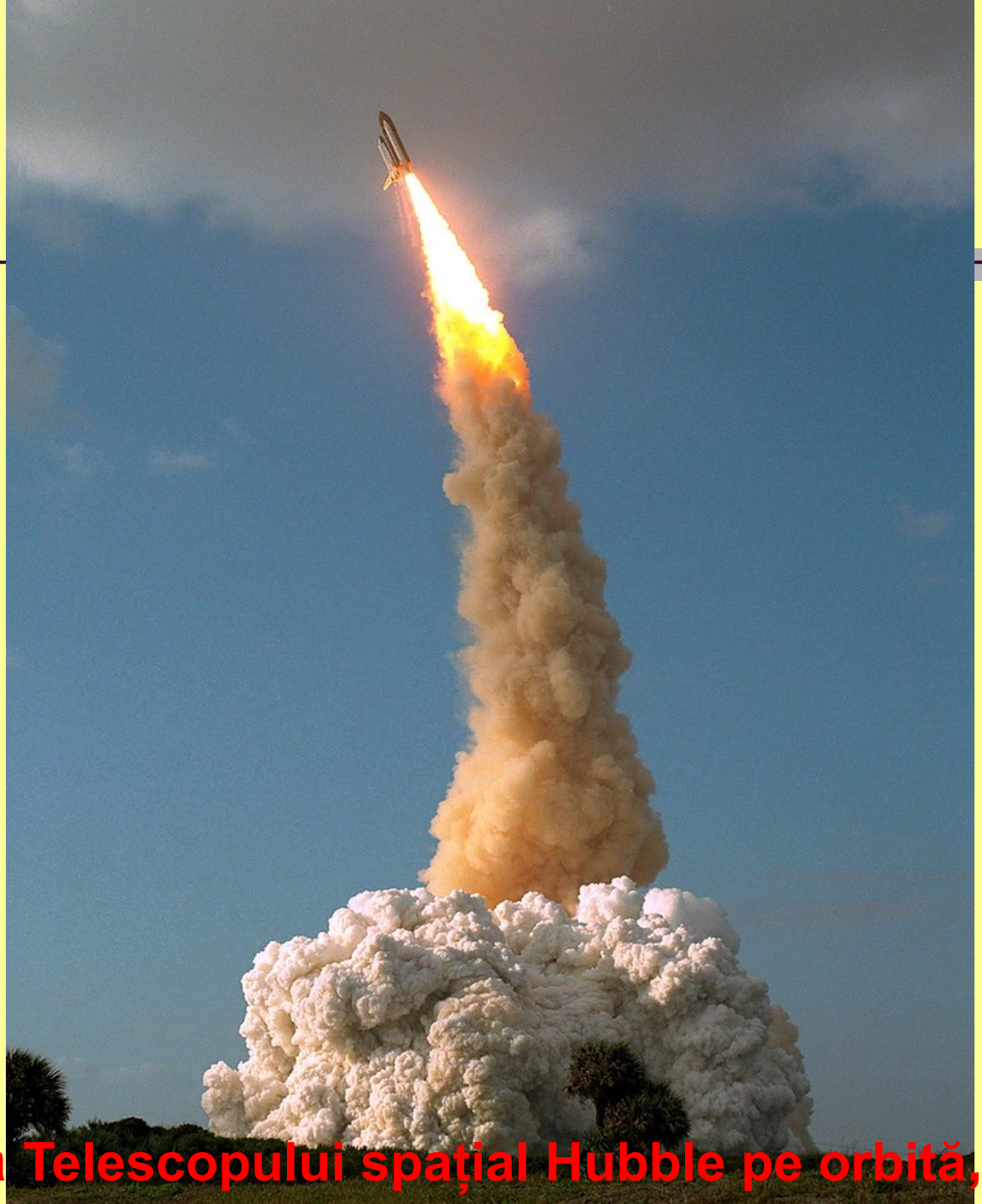
În ultimele trei decenii, de dezvoltare vertiginoasă a **neuro-imagisticei** si metodelor de detecție a tehnologiilor avansate în **astrofizică** au transformat radical atât domeniul Neurologiei și domeniul Cosmologiei.

Narinder Kapur

“Instrumentele” astro-fizice

Introducere

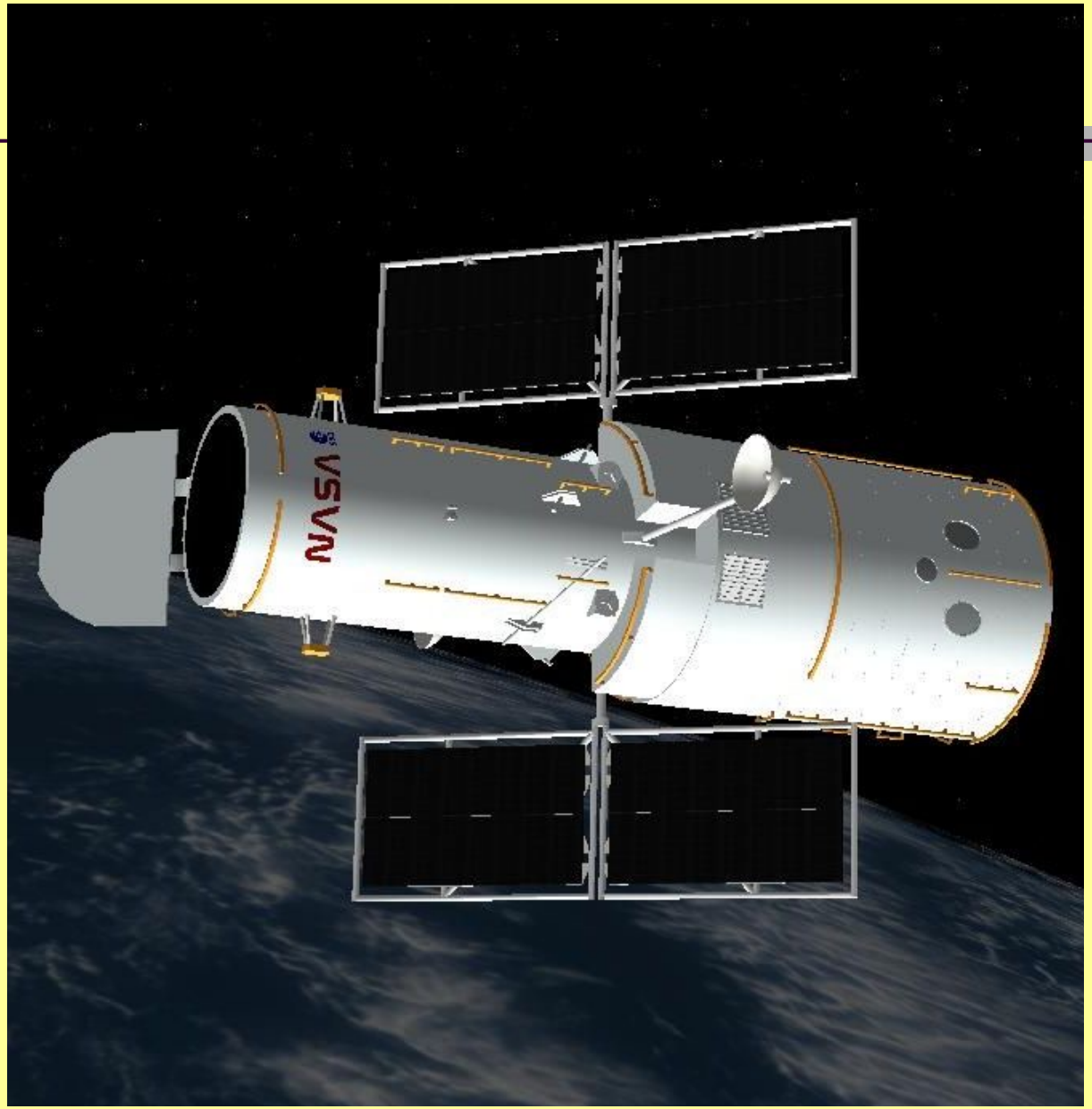
•Telescopul spațial **Hubble** este un telescop plasat pe orbită în jurul Pământului, numit așa după astronomul american Edwin Hubble.



Lansarea Telescopului spațial Hubble pe orbită, 1990


Introducere
Hubble
Rate: 1x
Set Time
Ambient Light Level: 0,00
Magnitude limit: 9,90
Galaxy Light Gain: 10%
Set Render Options
Solar System Browser
FOV: 34° 30' 31" (0,75x)
Measure
Distances
Cockpit
Compass
Telescopul spațial Hubble este un telescop plasat pe orbită în jurul Pământului, numit așa după astronomul american Edwin Hubble
24 aprilie 1990

Other images from Hubble



Hubble extends parallax stellar distance measurements 10 times deeper into our galaxy

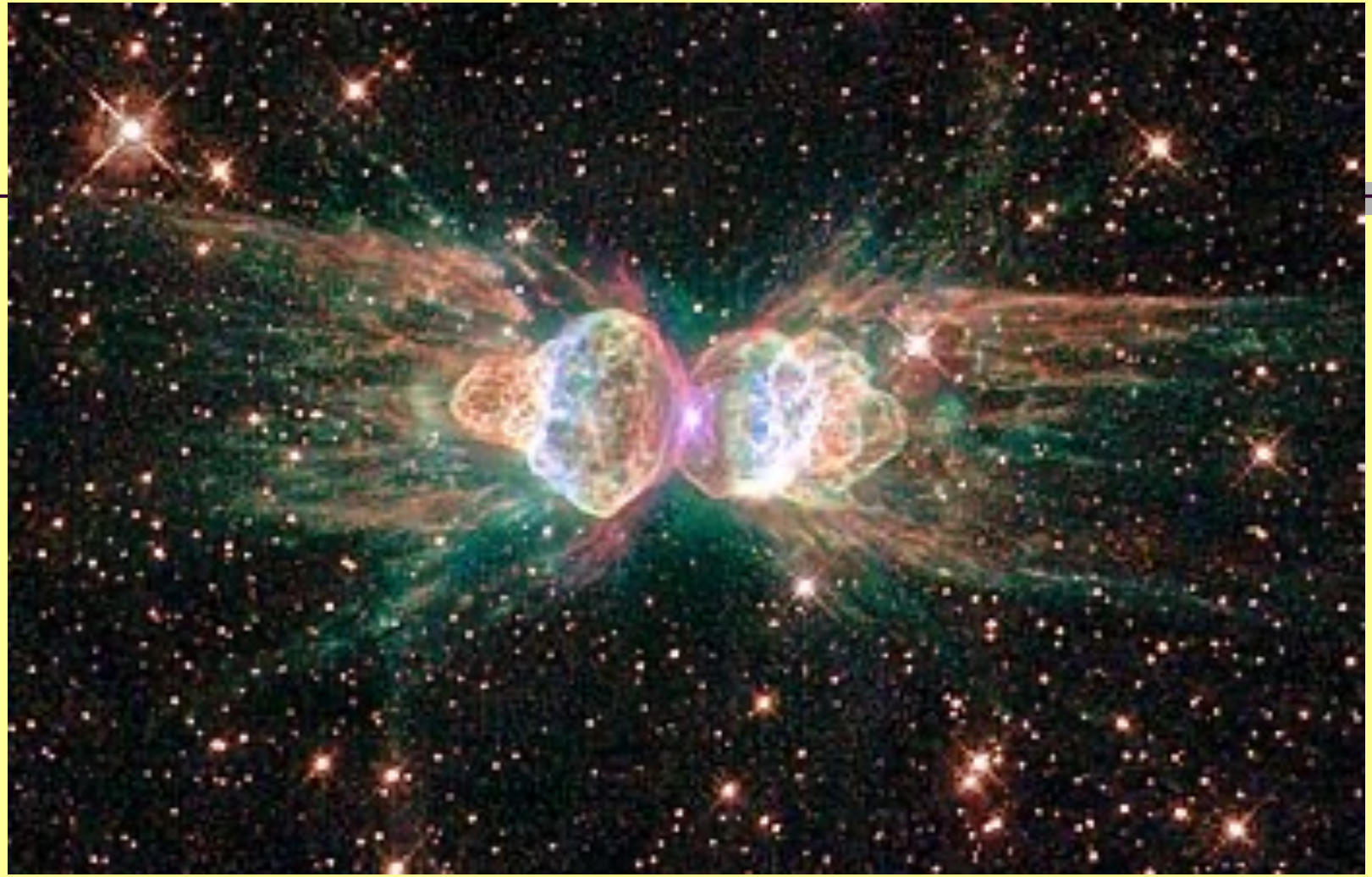
Introducere

Introducere

International Space Station


Introducere

The Milky Way



Then we have the Ant's Nebula so called because of its shape and located 3000 and 6000 light years.
Nebula furnicii

Then here is the Esquimo Nebula at 5000 light years.

In fourth place the Cat's Eye Nebula.

Ochiul Pisicii

Fifth place the Hour Glass Nebula located 8000 light years the result of an exploding star.
stea care explodează.

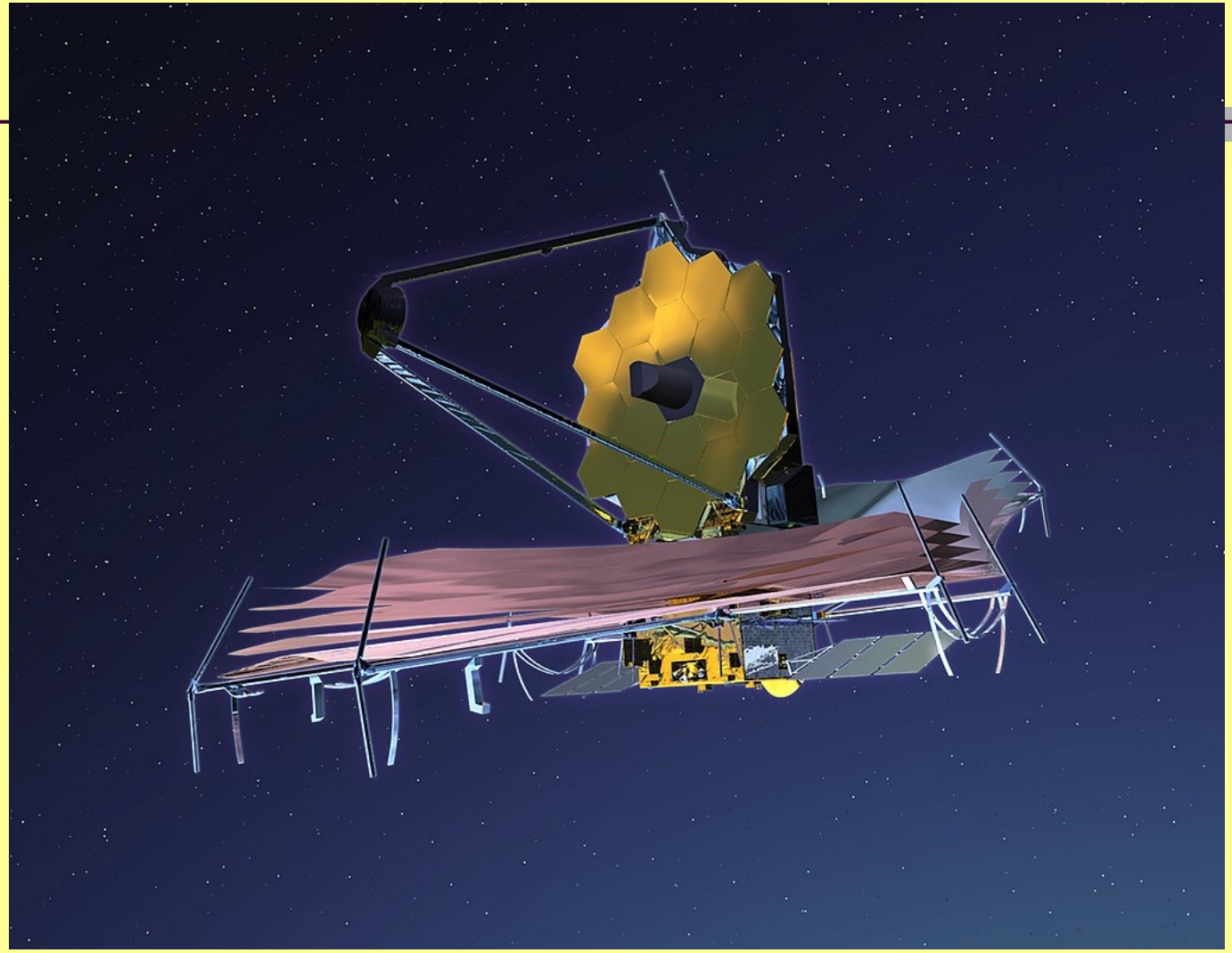
In 6th place, we have a part of the Cone Nebula at 2,5 light years
o parte din Nebula Cone

Una dintre cele mai celebre imagini ale lui Hubble: “Stâlpii Creației" unde se formează stele în **Nebuloasa Vulturului**

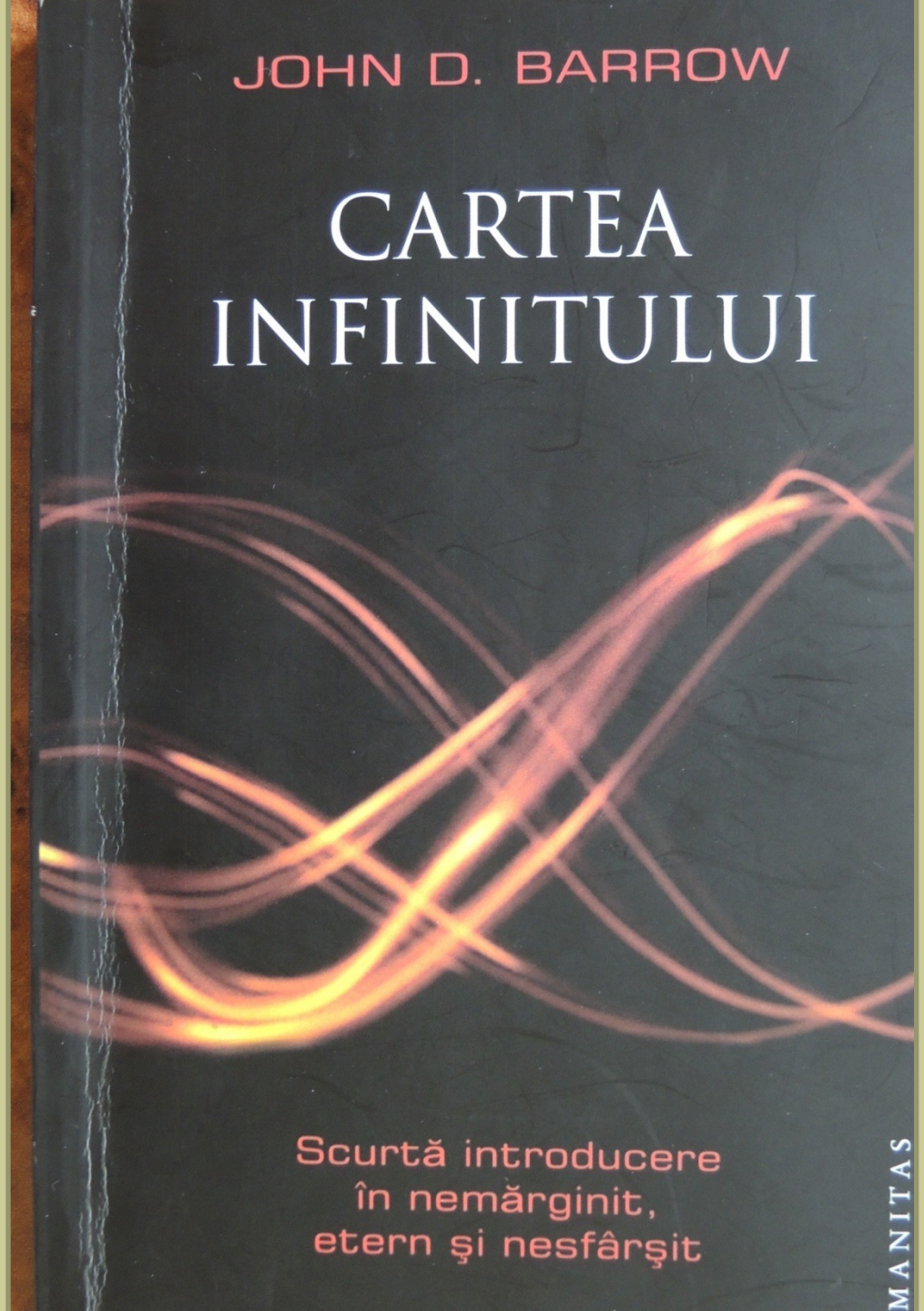
Milky Way (our sun is indicated)
Calea Lactee (100–400 miliarde de stele)

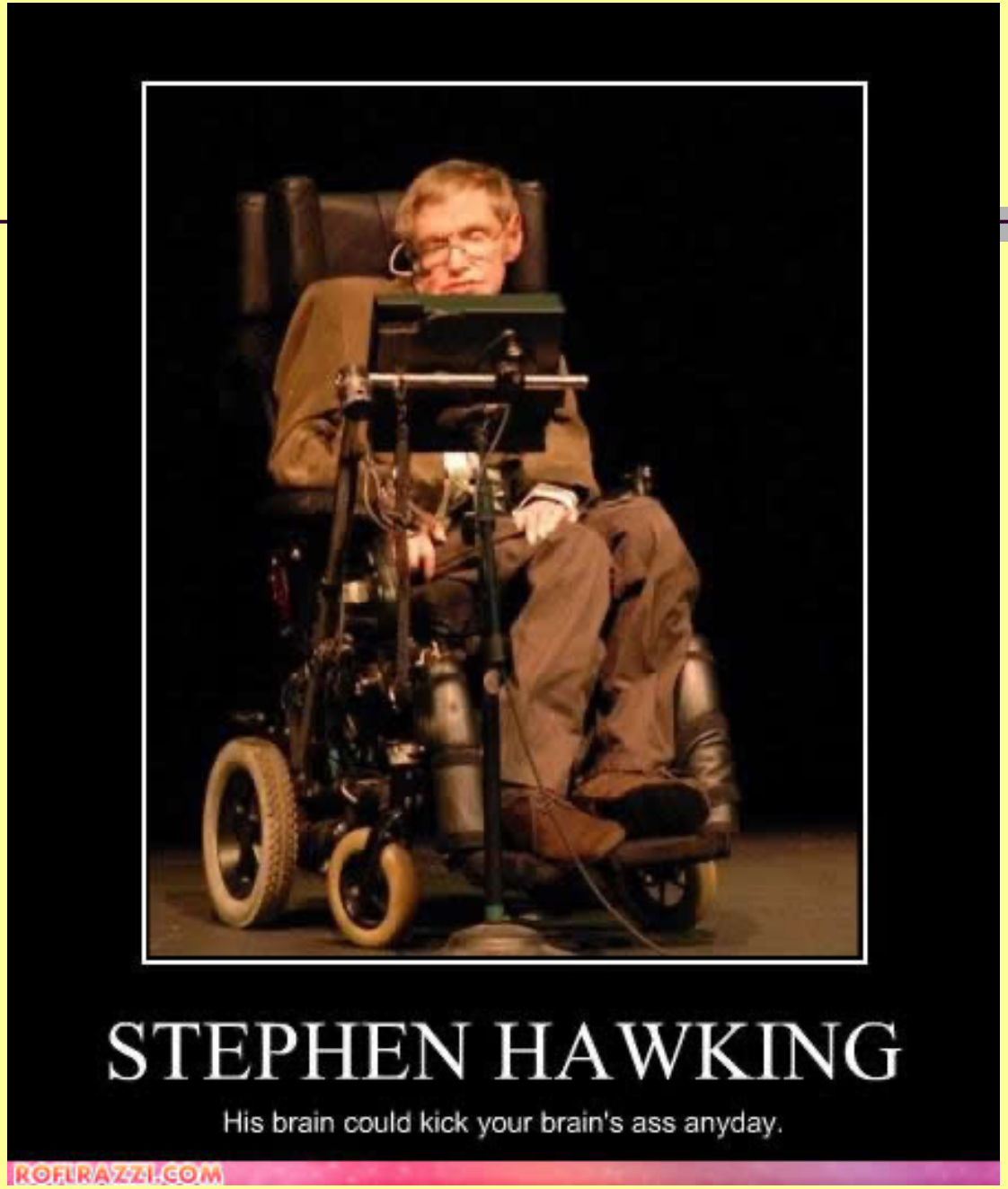
Galaxii îndepărtate (în afara Calei Lactee)

Telescopul spațial James Webb



James E. Webb este administratorul adjunct al NASA.
Telescopul va fi lansat pe data de 30 martie 2021.

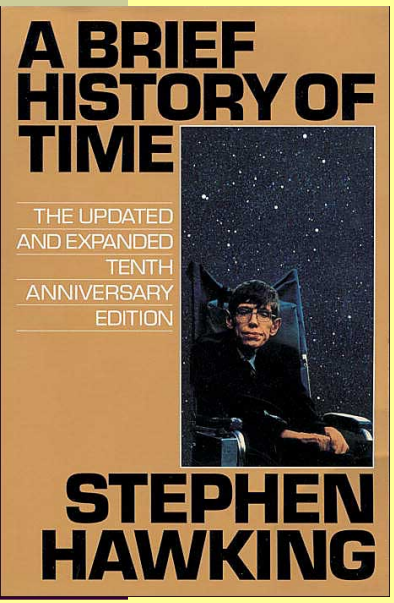

JOHN D. BARROW
CARTEA INFINITULUI
Scurtă introducere în nemărginit, etern şi nesfârşit
HUMANITAS


STEPHEN HAWKING
His brain could kick your brain's ass anyday.
ROFLRAZZI.COM

Stephen Hawking

Born	Stephen William Hawking 8 January 1942 Oxford, England
Died	14 March 2018 (aged 76) Cambridge, England

Stephen Hawking



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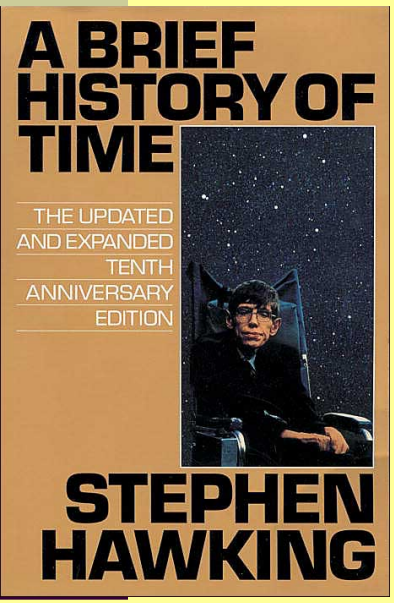

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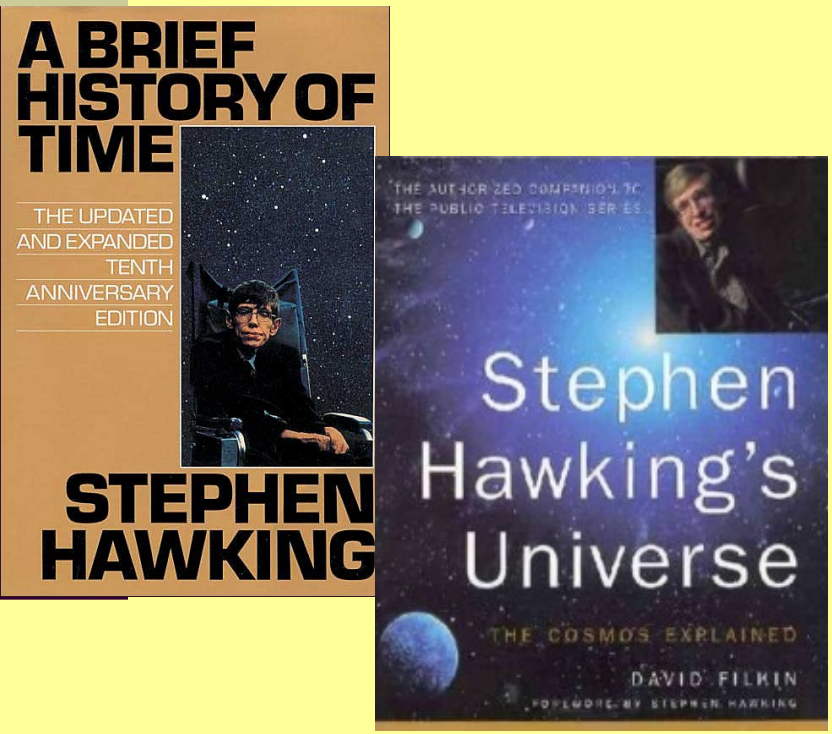

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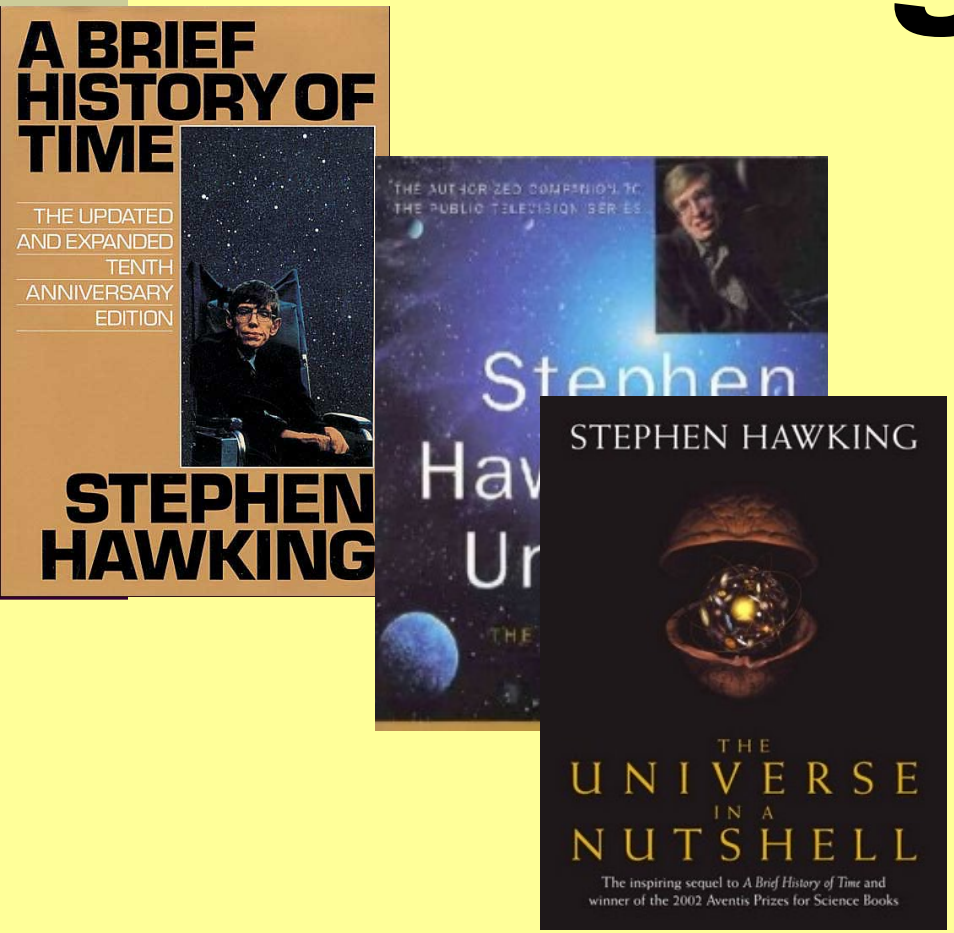

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Teoria întregului

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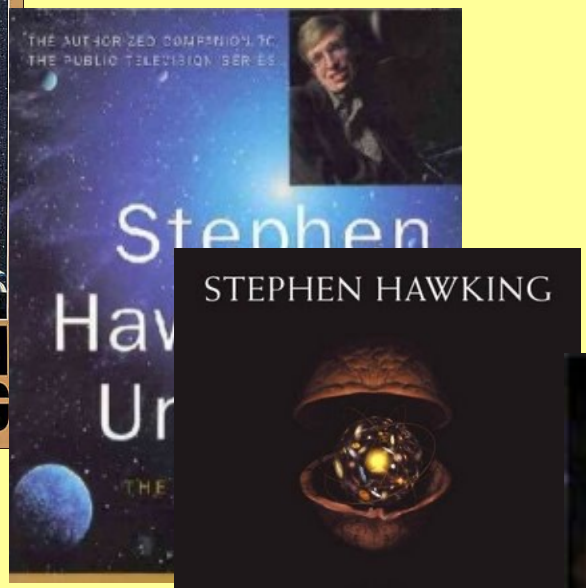

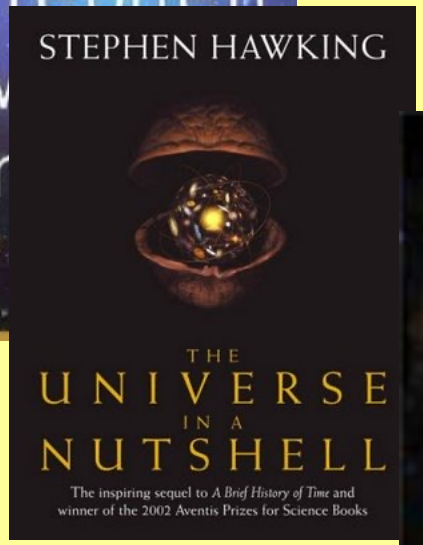

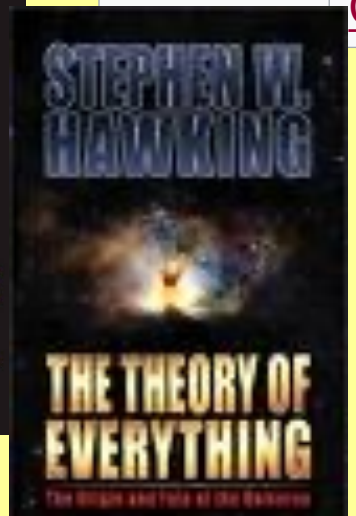

Teoria întregului

Hawking aruncă lumină asupra găurilor negre și Big Bang-ului

Hawking Sheds Light on Black Holes and Big Bang

Stephen Hawking is world-renowned for his discoveries on the nature of space and time and for his authorship of A Brief History of Time*—a science book with sales that broke many publishing records. Hawking's achievements are all the greater in view of his crippling illness that has left him without speech and with movement only in his fingers.*

Hawking was born in Oxford, England, on 8 January 1942, precisely 300 years after the death of Galileo. He says of this remarkable coincidence, "I estimate that about 200,000 other babies were also born that day, and I do not know whether any of them became interested in cosmology."

He is widely regarded as one of the most brilliant theoretical physicists of our time. His early research, partly in collaboration with Roger Penrose of the University of Oxford (see the interview in Science Watch*, 2[7]:3-4, August 1991), showed that space-time must come to an end in singularities that occur in both the Big Bang and in black holes. The singularities range from miniature black holes right up to the entire universe.*

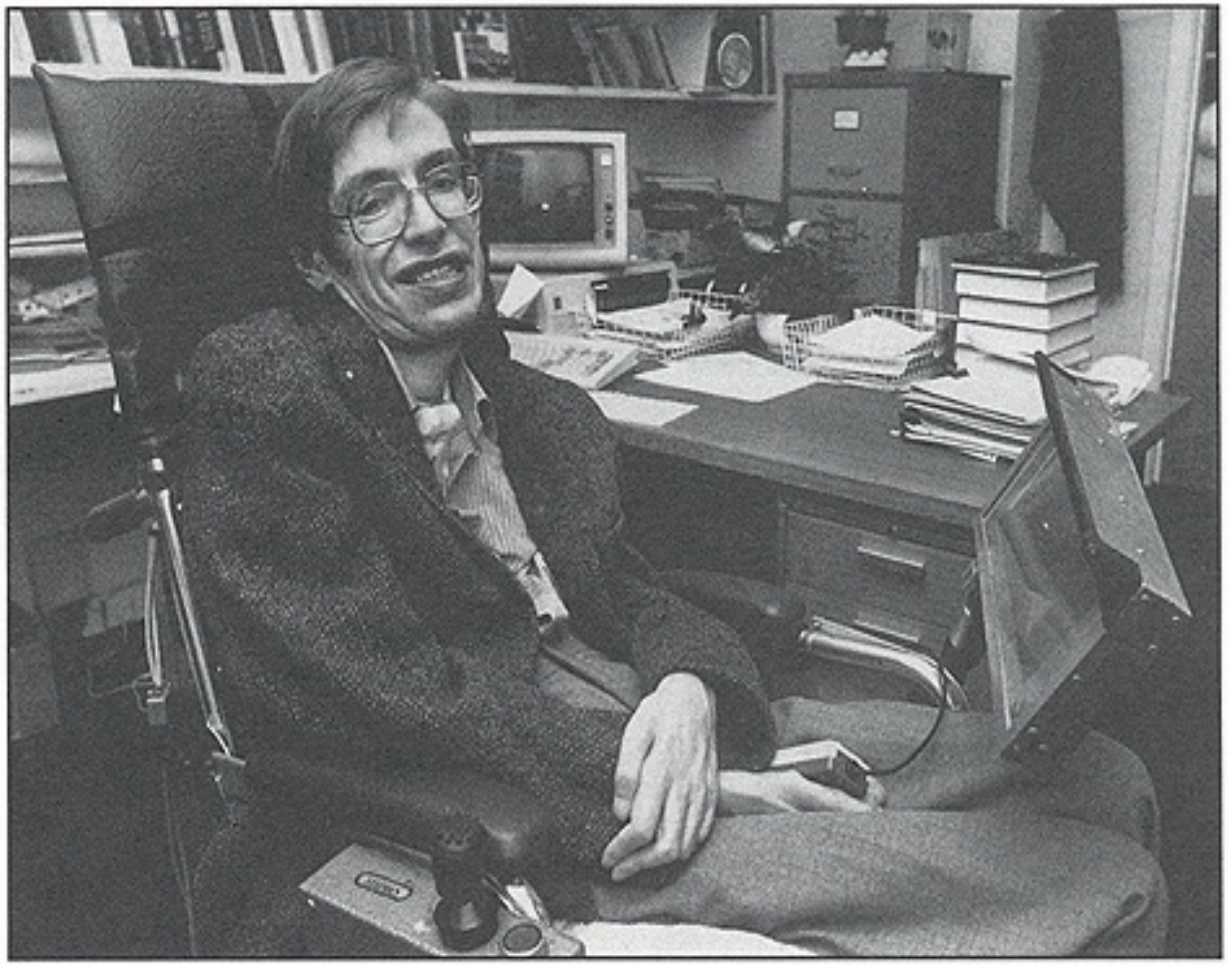

Photo: Mannl Mason's Pictures

Hawking aruncă lumină asupra găurilor negre și Big Bang-ului

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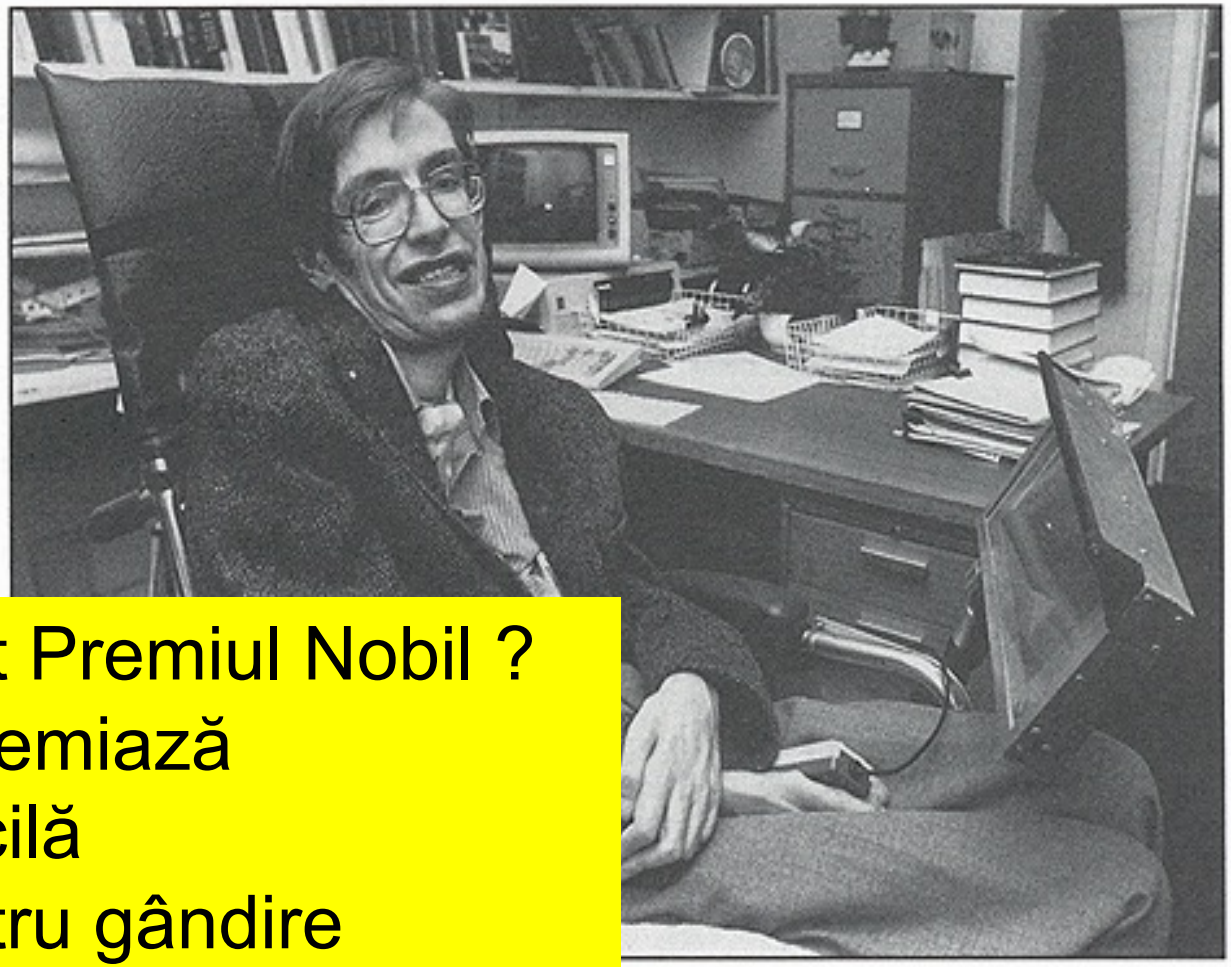


Photo: Mannii Mason's Pictures

Dece nu i s-a oferit Premiul Nobil ?
Concepte nu se premiază
Verificarea est dificilă
CTP – trebuia pentru gândire

Revoluția neuro-științifică

“Instrumentele” neuro-ştiinţifice

“Instrumentele” neuro-ştiinţifice (RMN)

“Instrumentele” neuro-ştiinţifice (RMN)

IRM (Imagerie prin Rezonanță Magnetică)
RMN (Rezonznță magnetică nucleară)

- Principiile RMN se bazeaza pe fenomenele studiate de fizica particulelor.
- Atomii de apa sau de hidrogen constituie aproximativ 66% din greutatea corpului uman
- In momentul in care **asupra atomilor de hidrogen actioneaza un camp magnetic puternic**, acestia **se "aliniaza"** spre o anumita directie.
- Apoi acestia sunt **expusi unor impulsuri de unde radio**. Acest lucru produce o **reorientare**.
- **Timpul de revenire la directia initiala difera de la un tesut la altul**, oferind medicilor o cale de a le deosebi unele de altele, astfel putand sa se deosebeasca structurile anatomice intre ele.
- **Receptorul scanerului IRM detecteaza toate aceste schimbari**, informatiile fiind procesate de catre un computer pentru a fi elaborata o imagine.

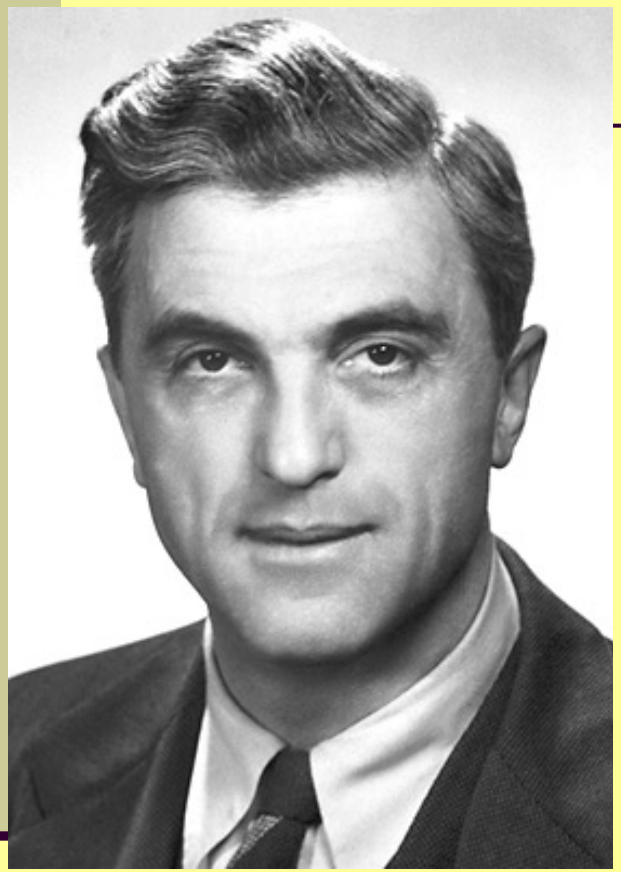
Isidor Isaac Rabi

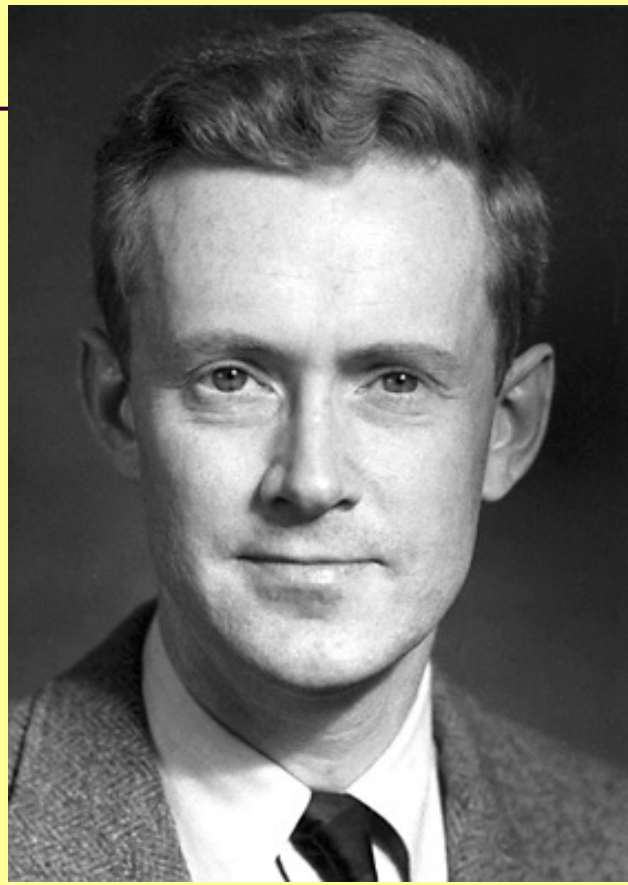
29.07.1898 (Polonia)

11.01.1988 (SUA)

Premiul Nobel pentru Fizică
pentru metoda rezonantă de măsurare a proprietăților magnetice ale nucleelor atomice.
1944

Premiul Nobel pentru Fizică 1952





Felix Bloch

Zurich, Switzerland
23.10.1905, - 10.09.1983

Edward Purcell

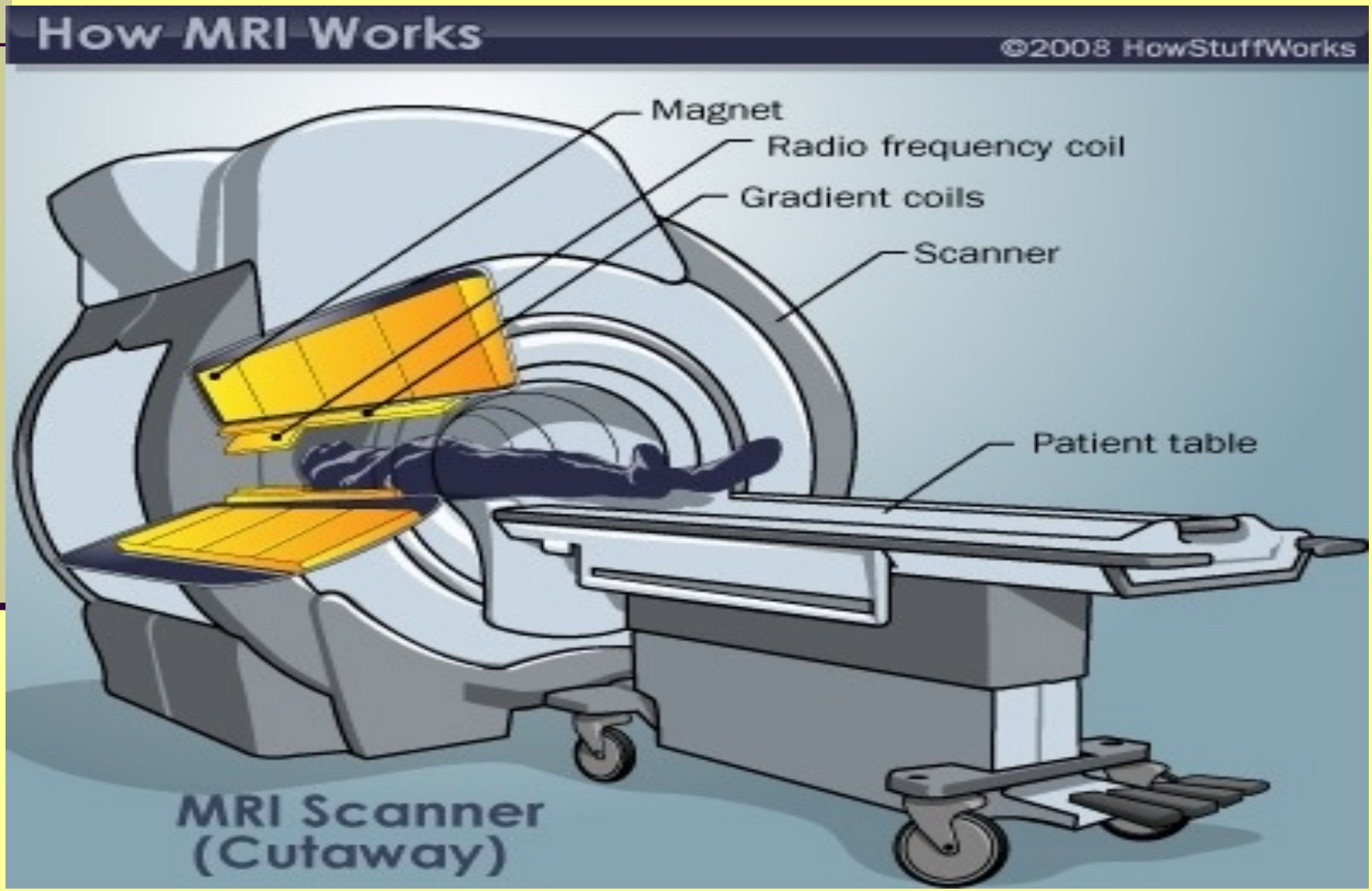
United States
30.08.1912 – 7.03.1997

Debutul utilizării RMN în medicină

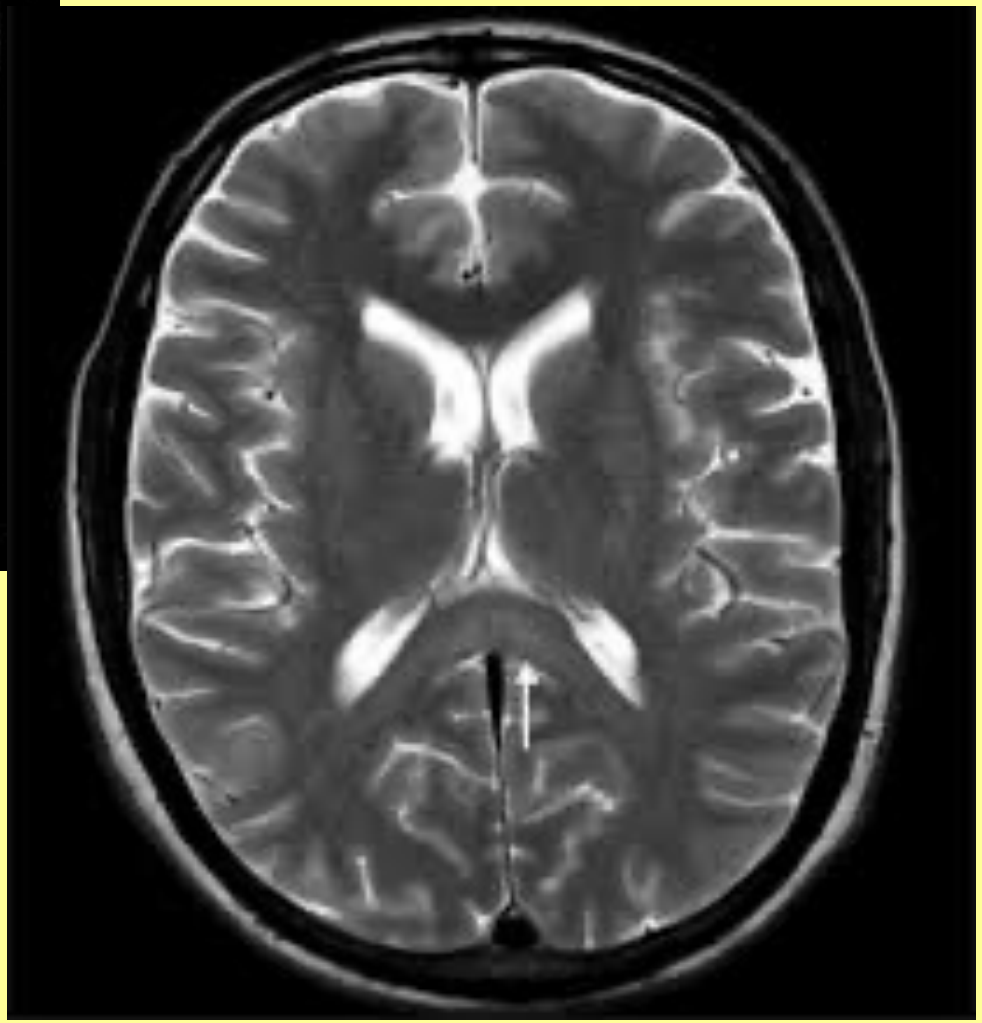
Prima scanare a creierului prin RMN a fost efectuată în UK, Hottingham în 1978. Producerea Imaginei a durat 5 ore

- Prima serie de pacienți neurologici cu utilizarea RMN a fost raportată de la Spitalul Hammersmith în 1982

Aparatul RMN



IRM



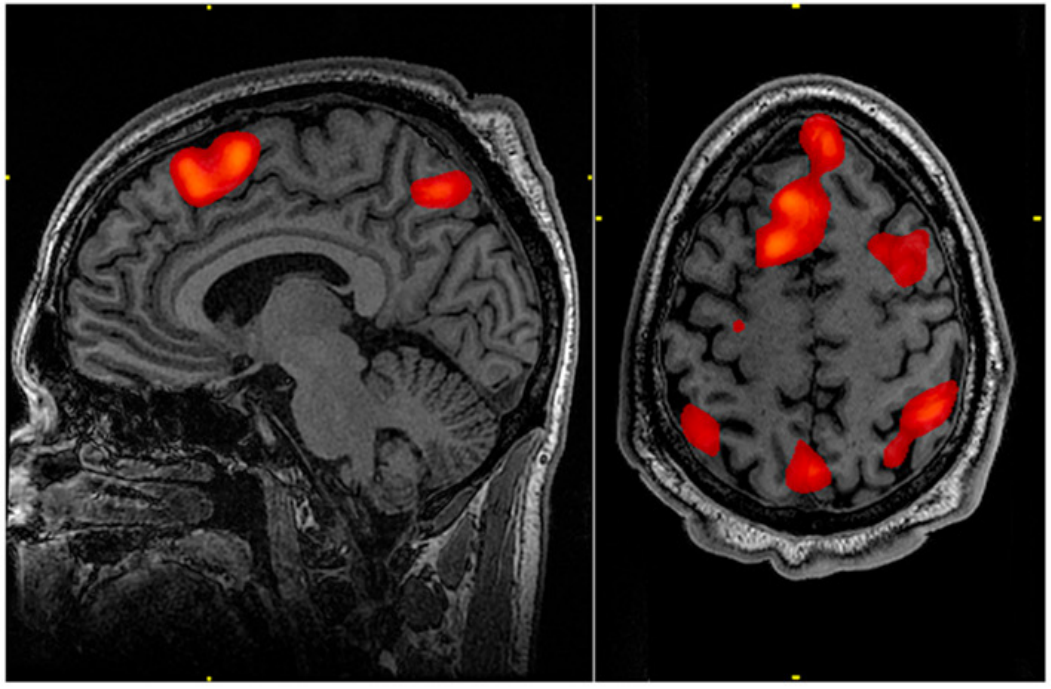
Seiji Ogawa (specialist în biofizică)
IRMf

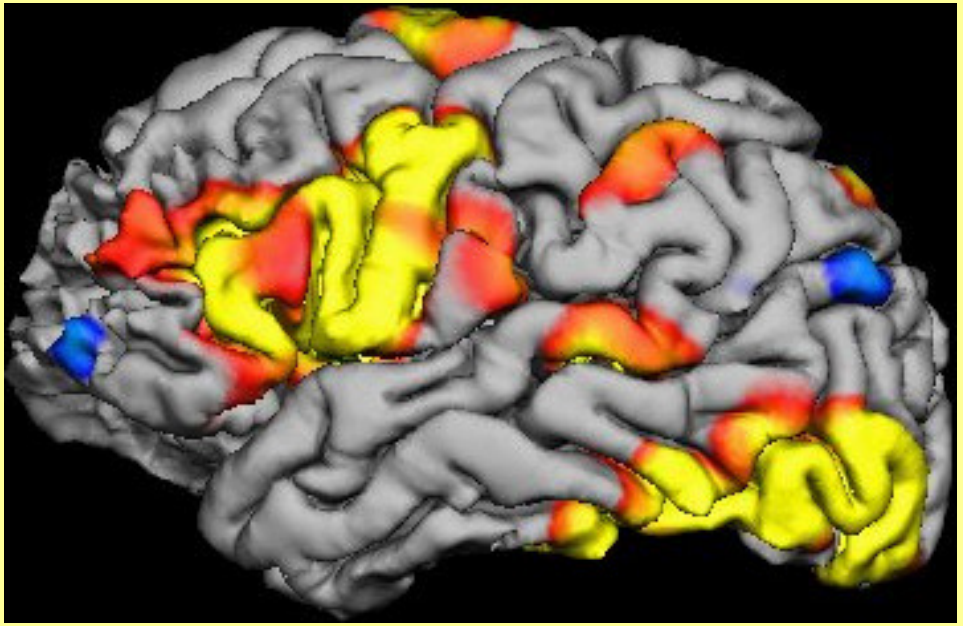
Este primul care a descoperit imagistica de **Rezonanță magnetică funcțională (fMRI)**.

Metoda de fMRI este utilizată pentru vizualizarea regiunilor activate prin stimulare externă în creierul uman viu

Seiji Ogawa
fMRI

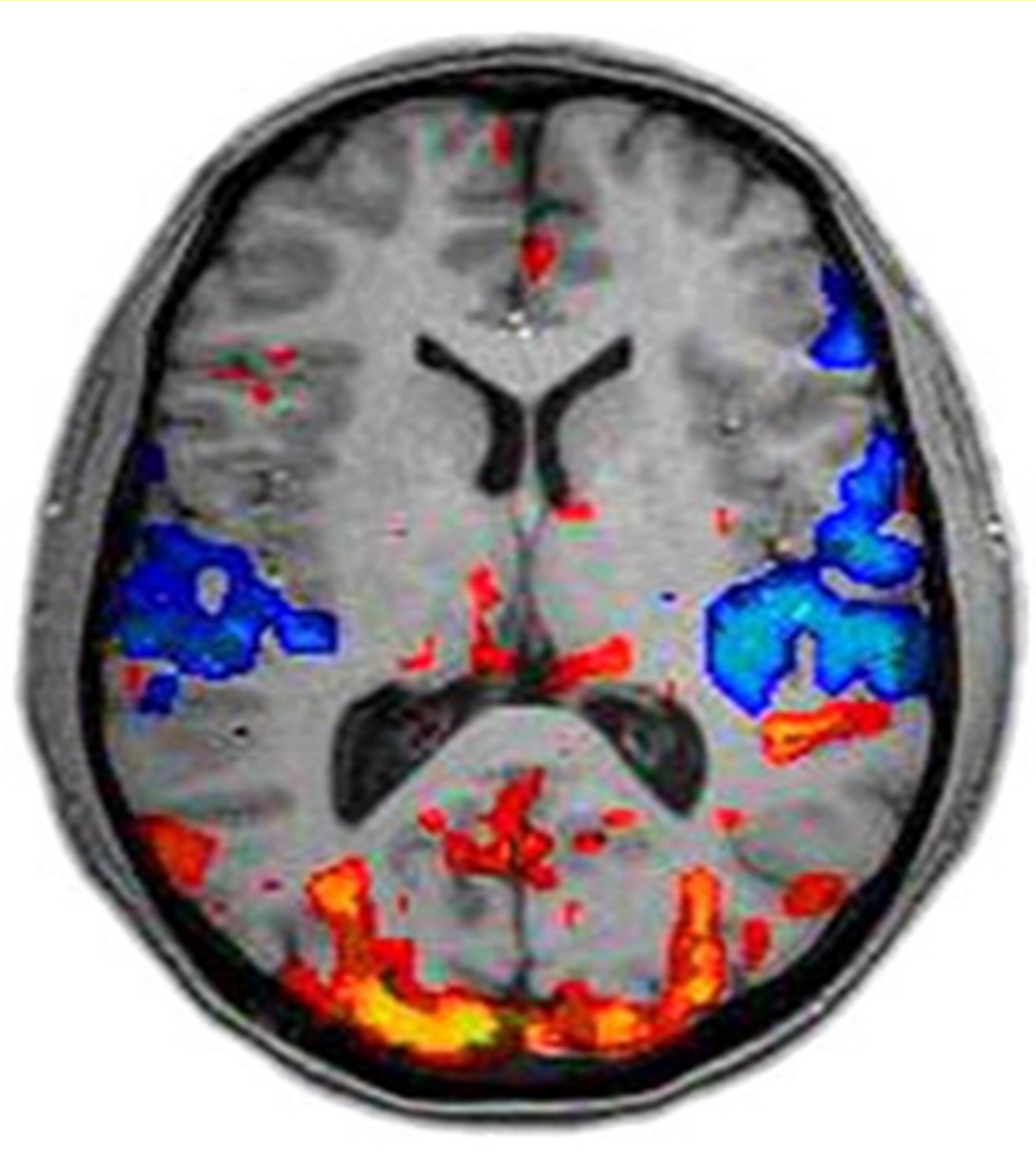
19.01.1934



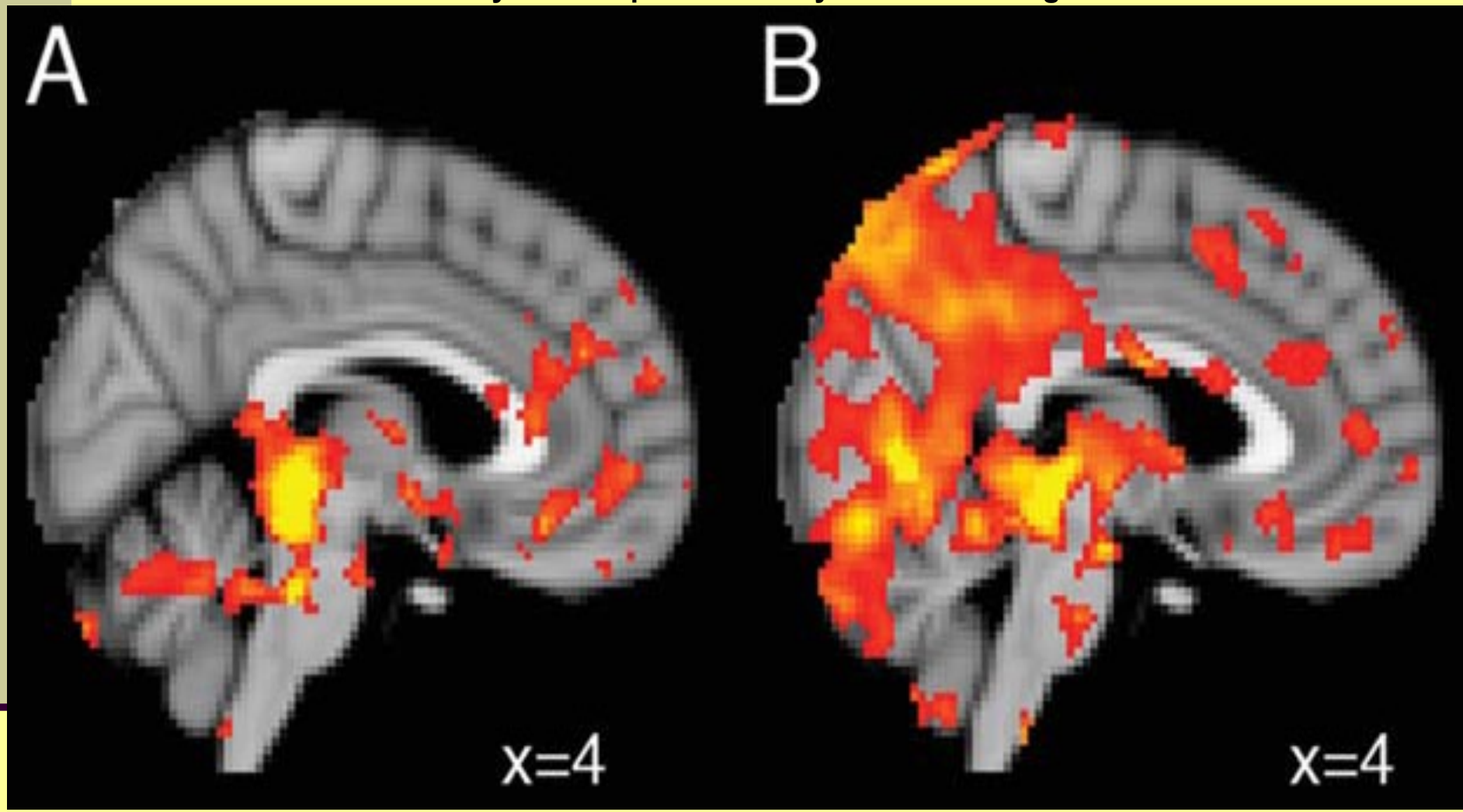


Rezonanţă Magnetică Funcţională (fMRI)

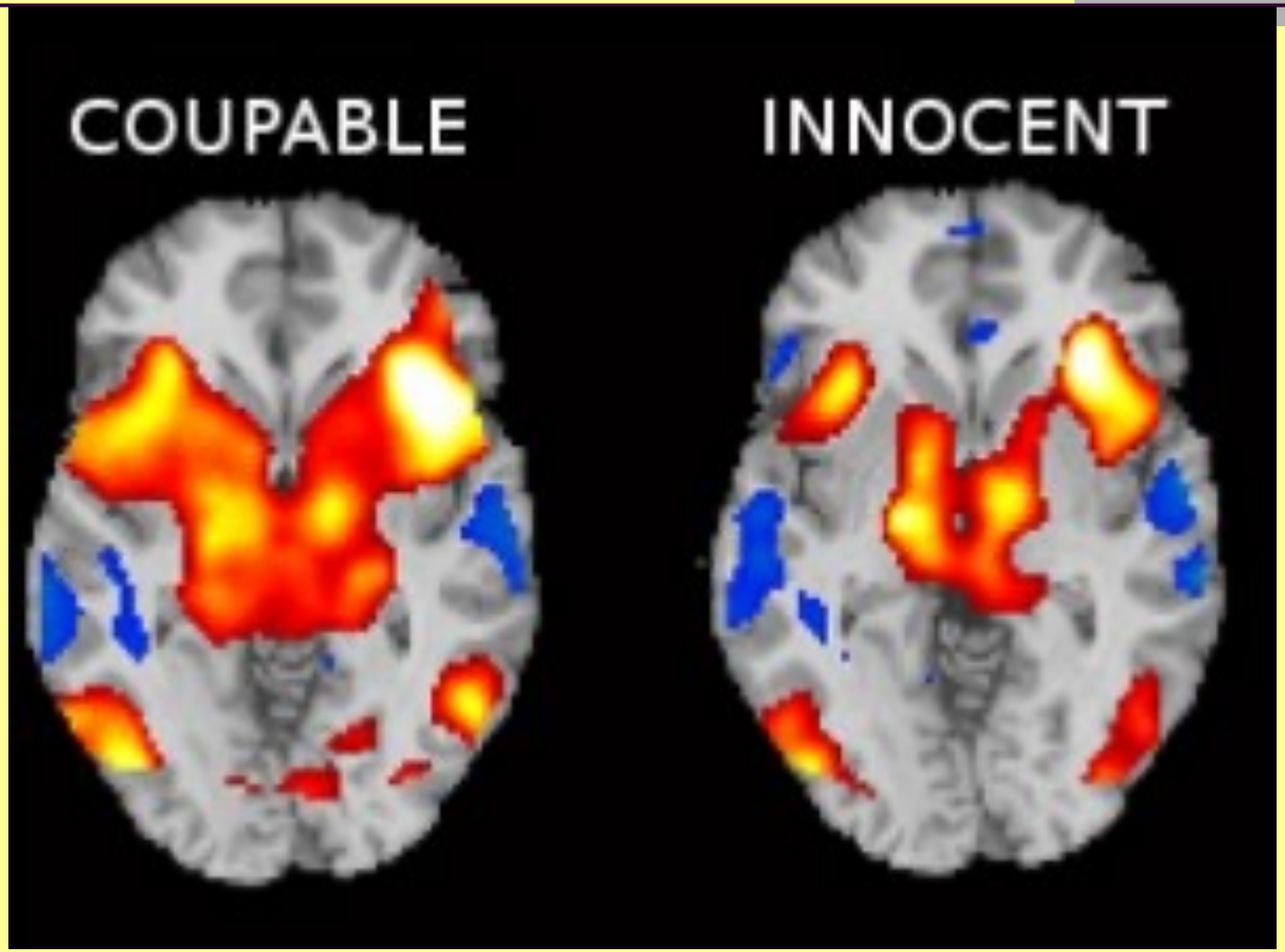
fMRI

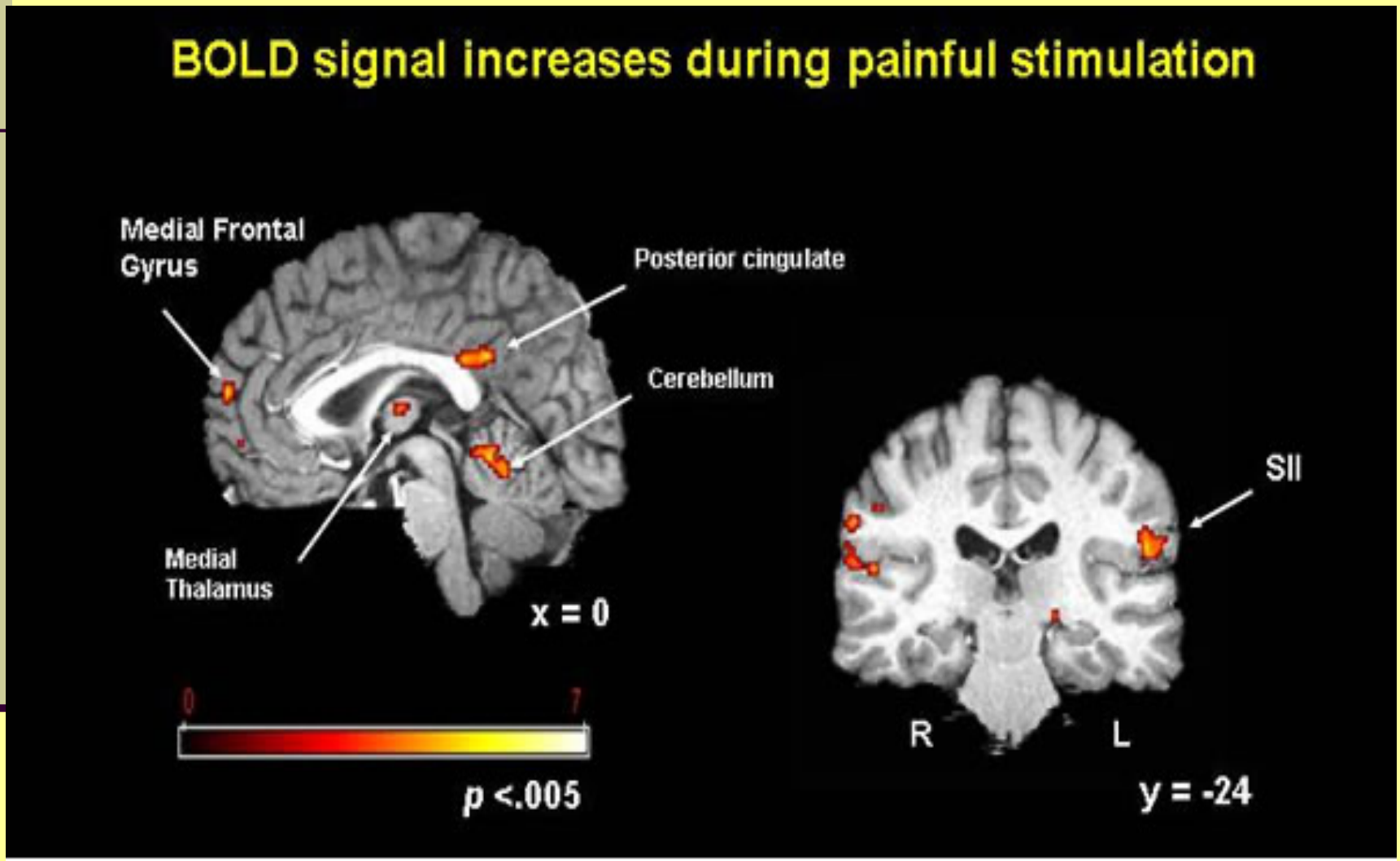


Altered Functional Magnetic Resonance Imaging Resting-State Connectivity in Periaqueductal Gray Networks in Migraine



(A) 17 healthy subjects and
(B) 17 with migraine interictally

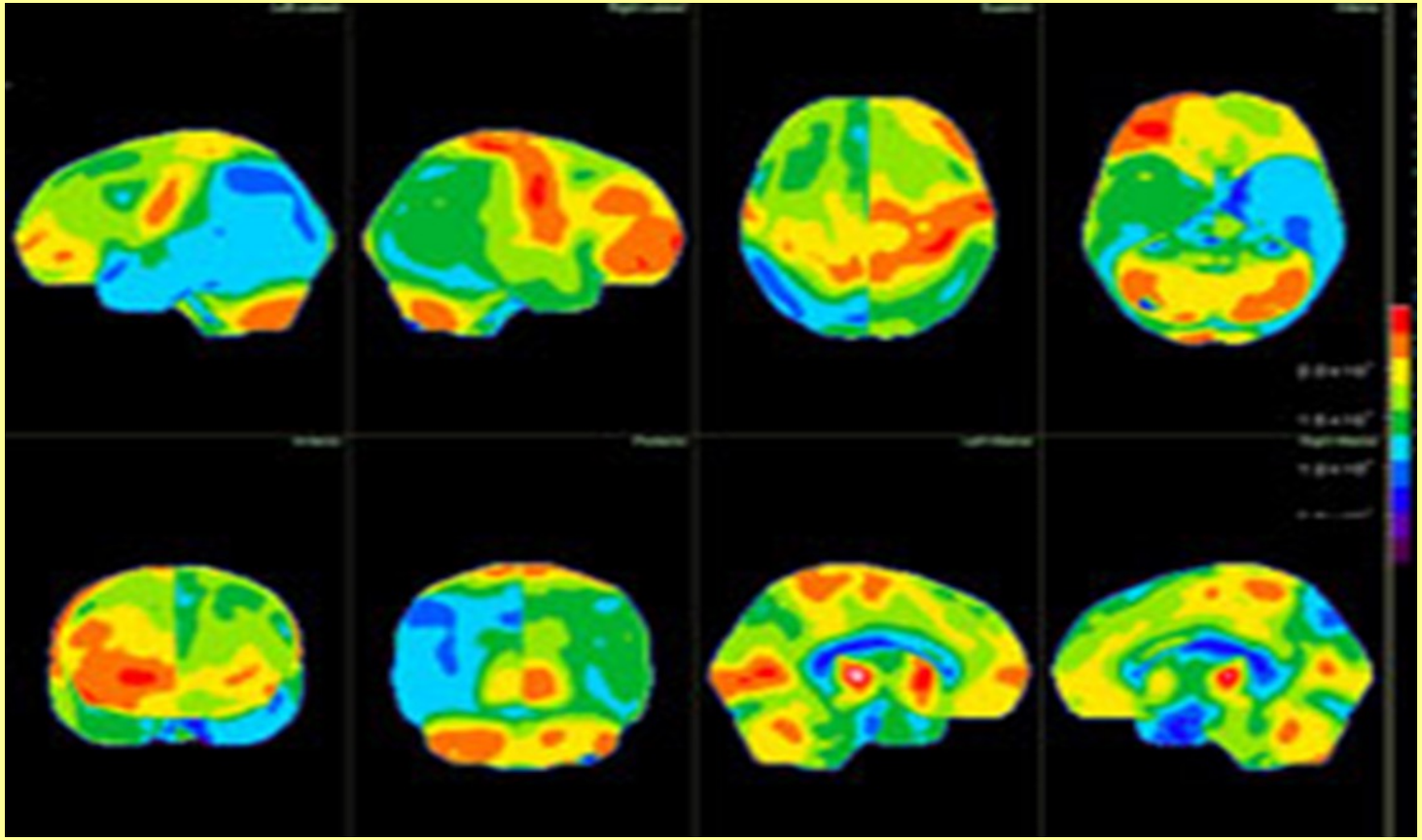

COUPABLE
INNOCENT



fMRI activations during painful stimulus.

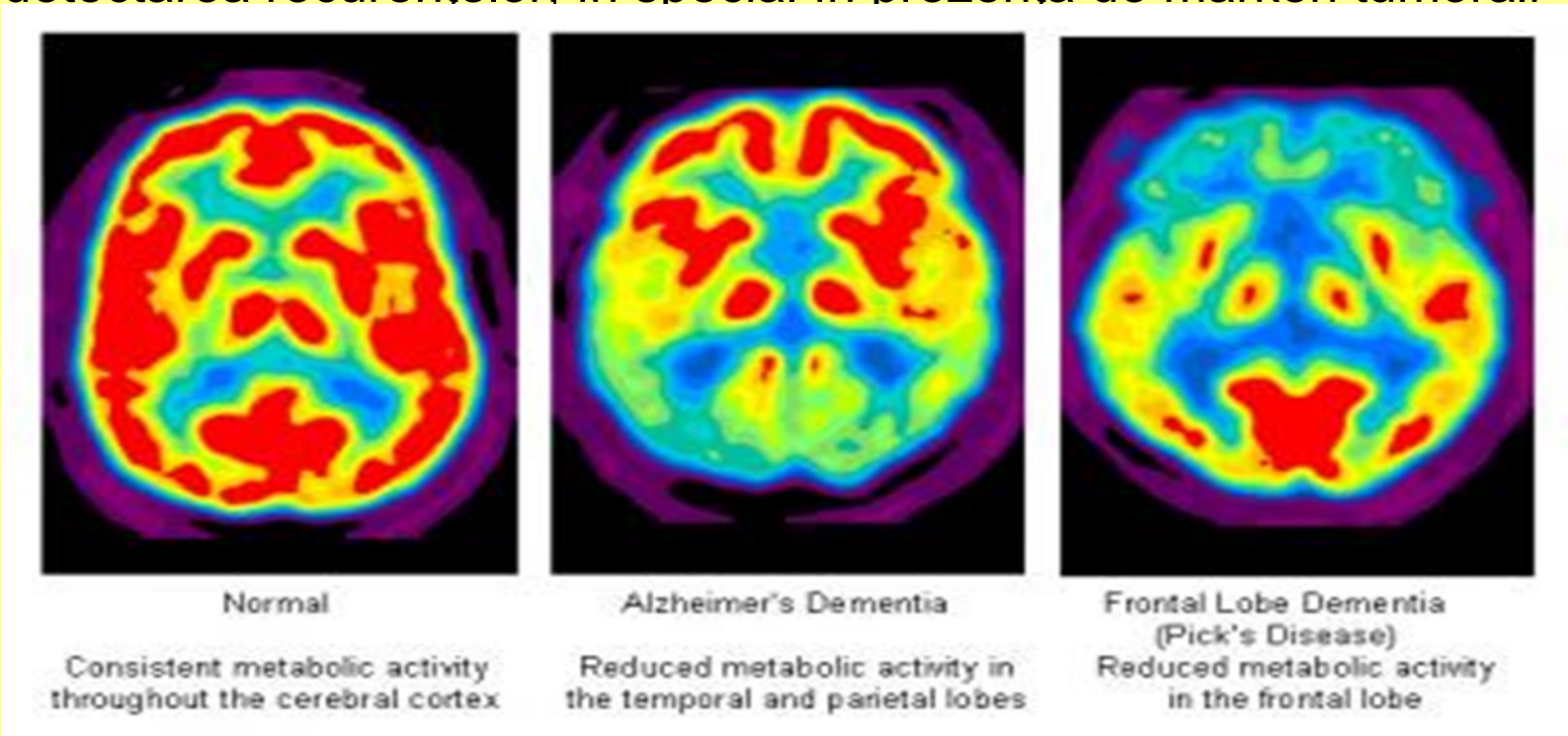
Tomografie cu emisie de pozitroni

Marcarea a diverse substanţe biologice (de ex. glucoză, aminoacizi, ligandoreceptori), cu izotopi ce emit pozitroni (11C, 18F, 13N, 15O). Preparatul radiofarmaceutic (radiofarmocon) este introdus în organismul bolnavului, urmând stabilirea imaginii distribuţiei acestuia



Indicaţiile metodei PET

- ✓ diagnostic precoce a tumorii –recunoaşte transformările maligne prin intermediul metabolismului intensificat,înainte ca schimbările morfologice să poată fi depistate.
- ✓ estimarea neinvazivă a malignităţii tumorii;
- ✓ detectarea recurenţelor, în special în prezenţa de markeri tumorali



Introducere în Neuropsihologie

Apariția termenului de neuropsihologie

Sir William Osler (1849-1919)

1913 - Apariția cuvântului **„neuropsihologie”** pentru a desemna știința care studiază relațiile dintre tulburările cognitive, emoționale, tulburările de personalitate și relațiile lor cu leziuniunile cerebrale

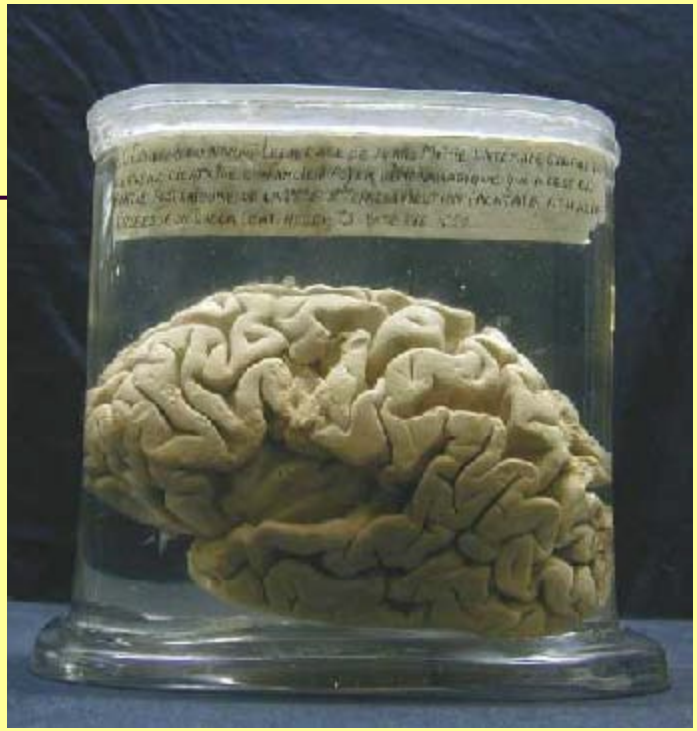
(Relația Psihic – Creier)

Nașterea și dezvoltarea Neuropsihologiei

Descoperirea localizării facultăților verbale în creier

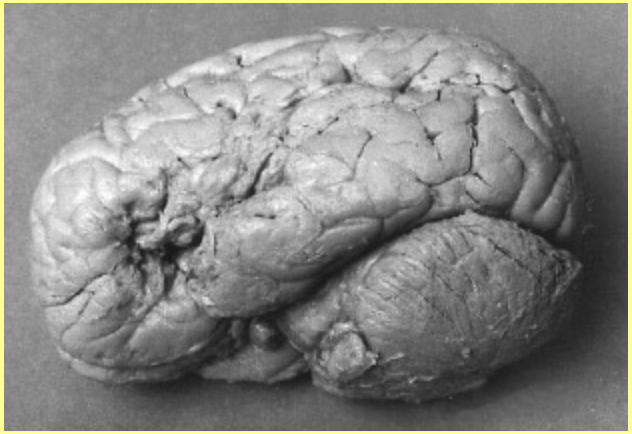
Afazia Broca

18 aprilie 1861 a prezentat cazul Leborgne, cunoscut sub numele de "Tan" sau "Tantan"



Paul Broca
(1824-1880)

Corelații clinico-anatomice



Afazia Broca

- S-a constatat o leziune majoră în cortexul frontal inferior stâng.

- Broca a studiat apoi 8 pacienți cu deficite similare, toți având leziuni în emisfera frontală stângă.

- Acest lucru îl determină să declare faimoasa să „Vorbim cu emisfera stângă”

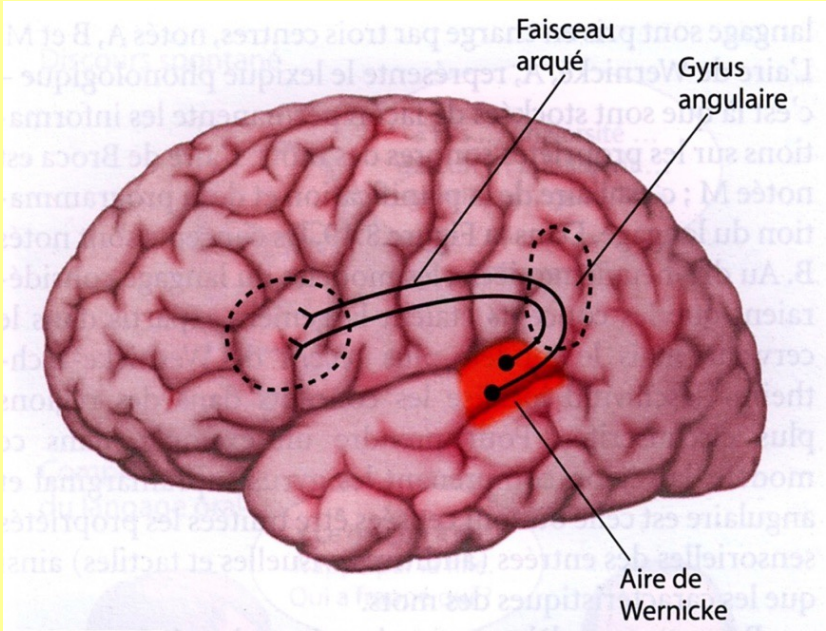
- S-a identificat pentru prima dată existența unui „centru de limbaj” în partea posterioară a lobului frontal al acestei emisfere.

- De fapt, zona Broca a fost prima regiune a creierului asociată cu o funcție specifică, în acest caz limbajul

Afazia Wernike

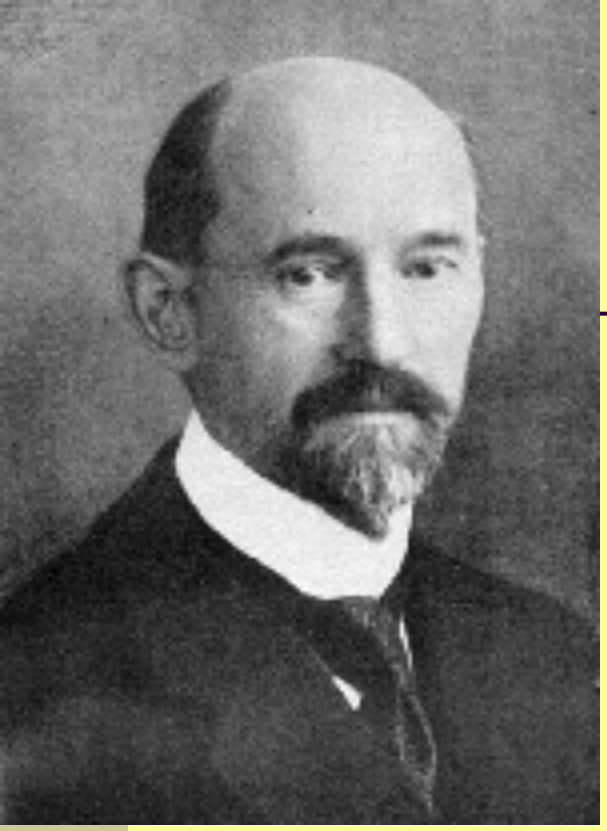
Leziunea unei zone situate pe lob temporalul stâng este însoțit de a tulburare de limbaj foarte diferită de cea descrisă de Broca: afazie fluentă cu afectarea înțelegerii și producție de limbăj (jargon)

Karl Wernicke (1848-1905)



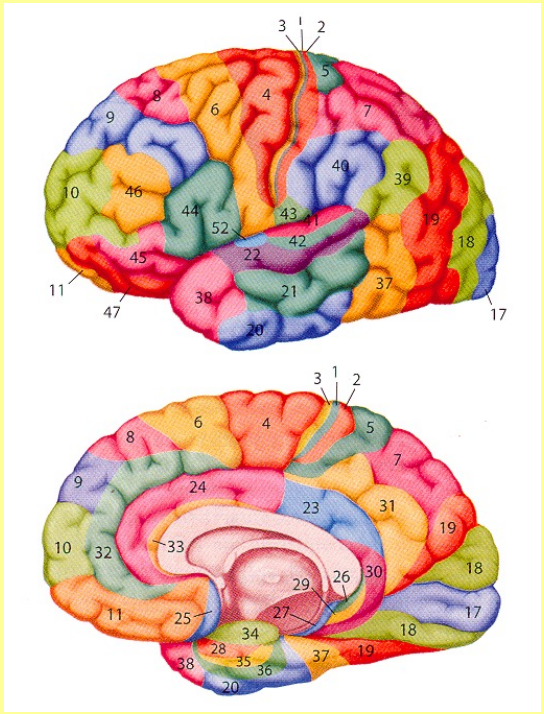
Două descoperiri importante în prima jumătate a secolului XX

- Zonele lui Brodmann
- Homunculusul lui Penfield

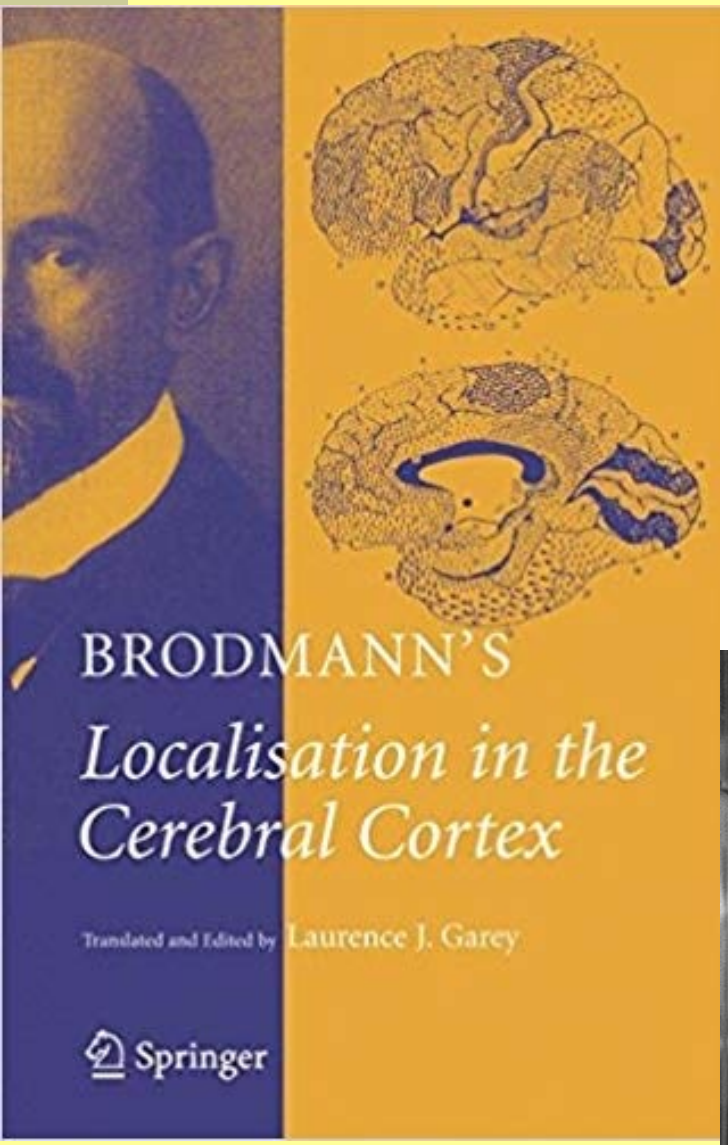


Zonele lui Brodmann

1909 - cortexul este împărțit în 52 de zone

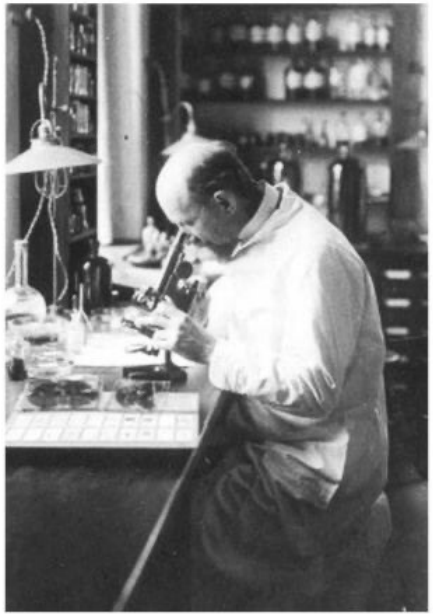


Brodmann, Korbinian
(1868-1918)

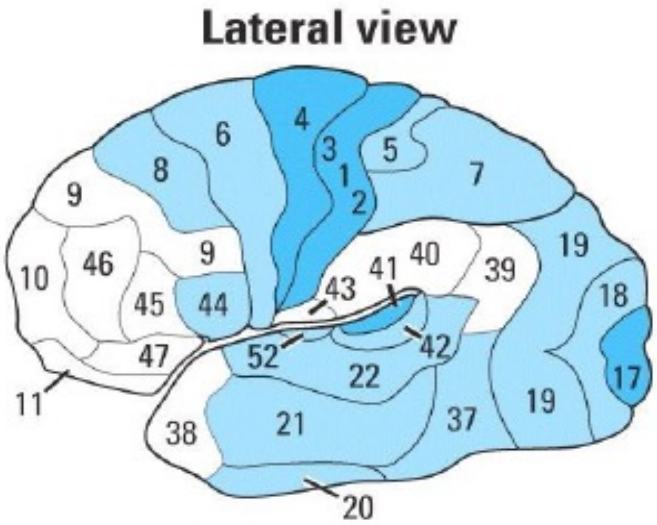


K. Brodmann

1868—1918

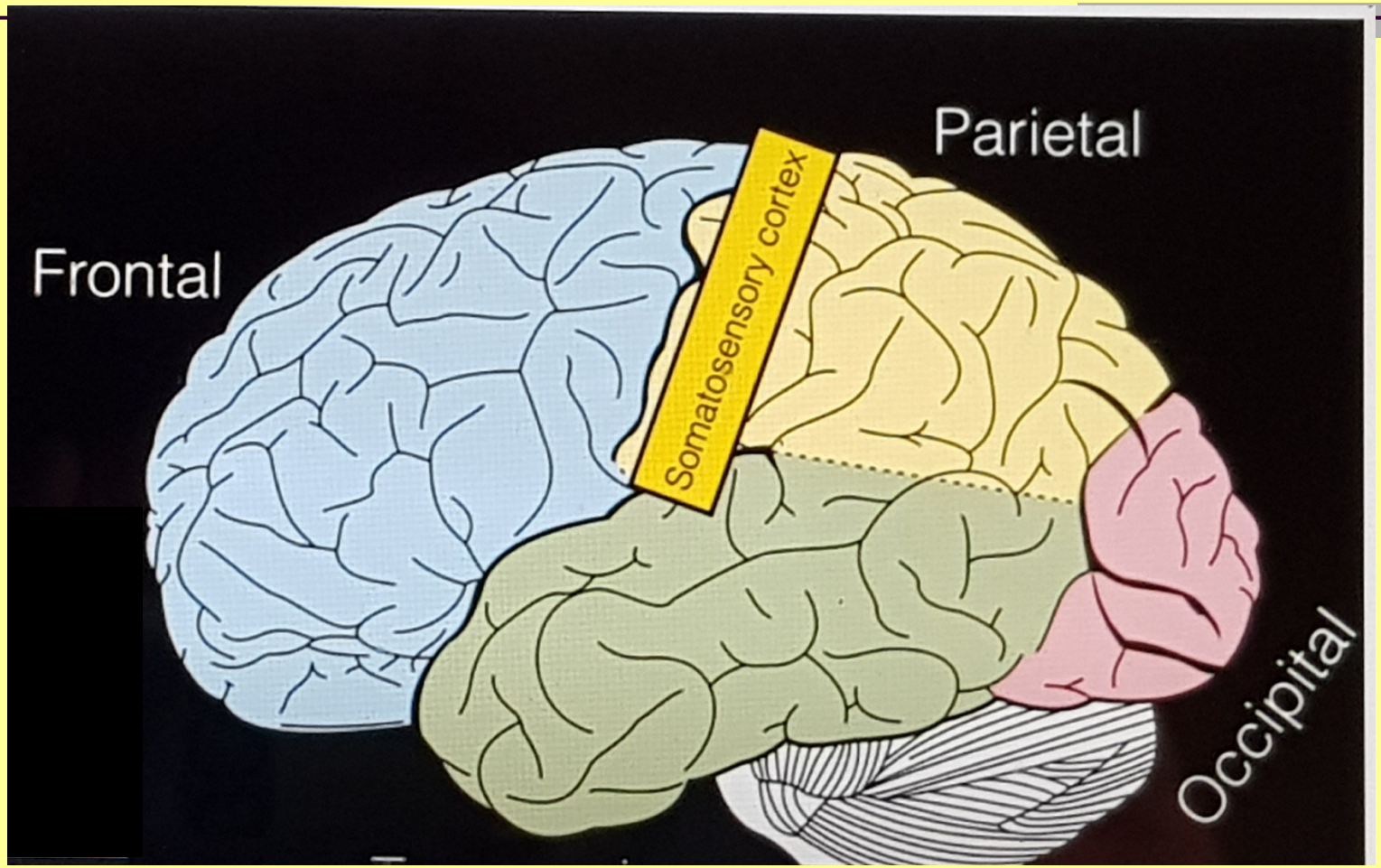


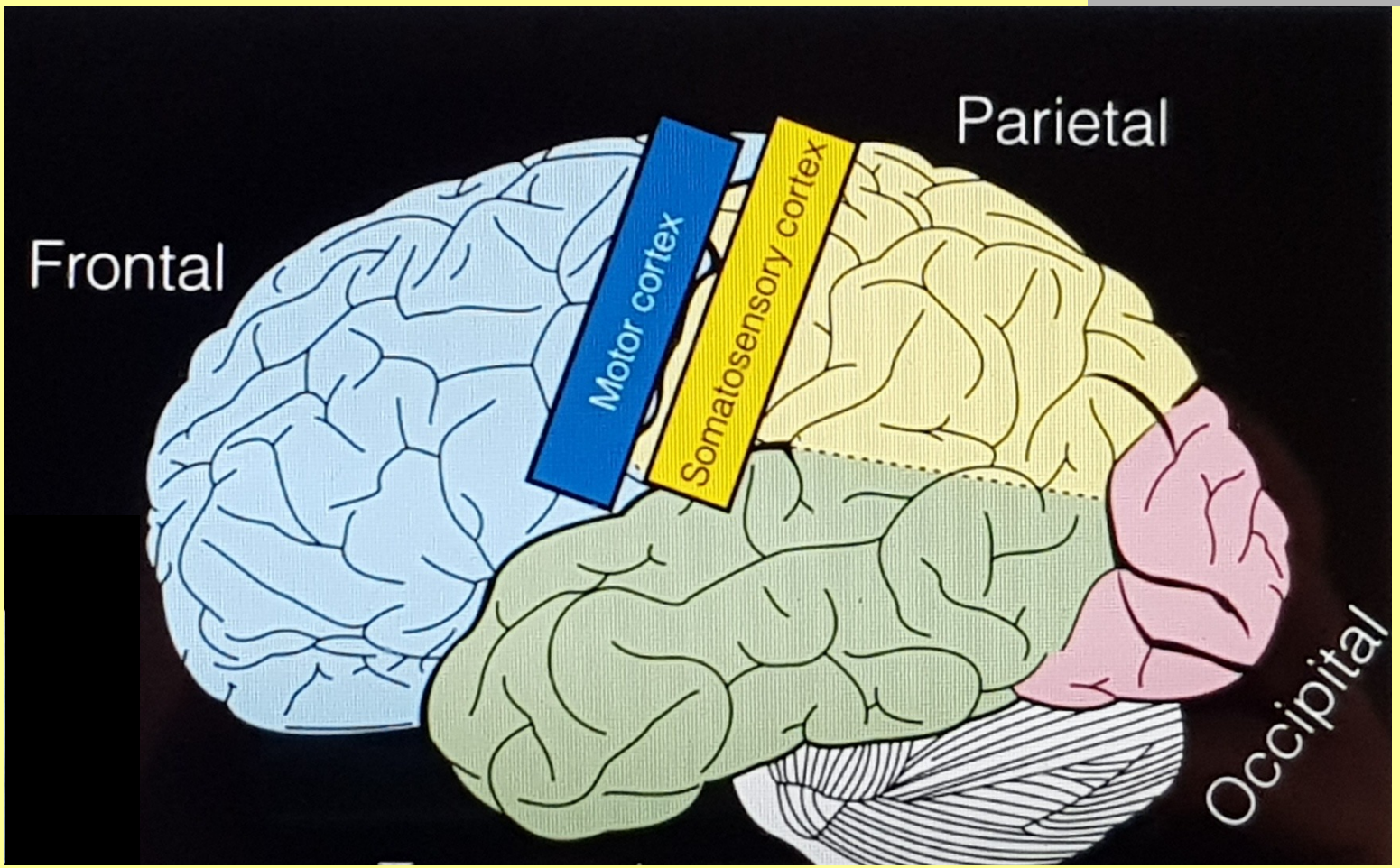
Zonele lui Brodmann

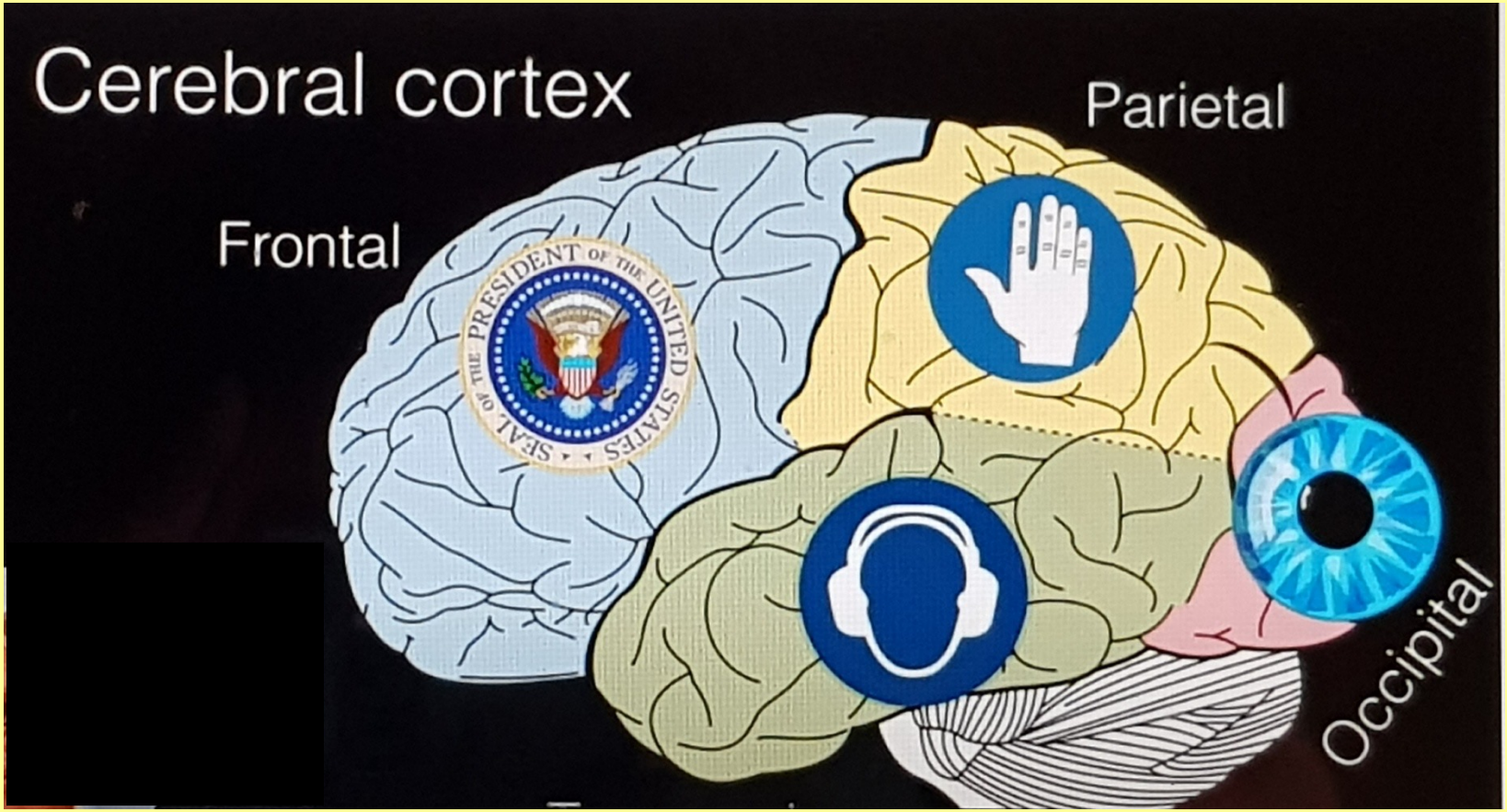


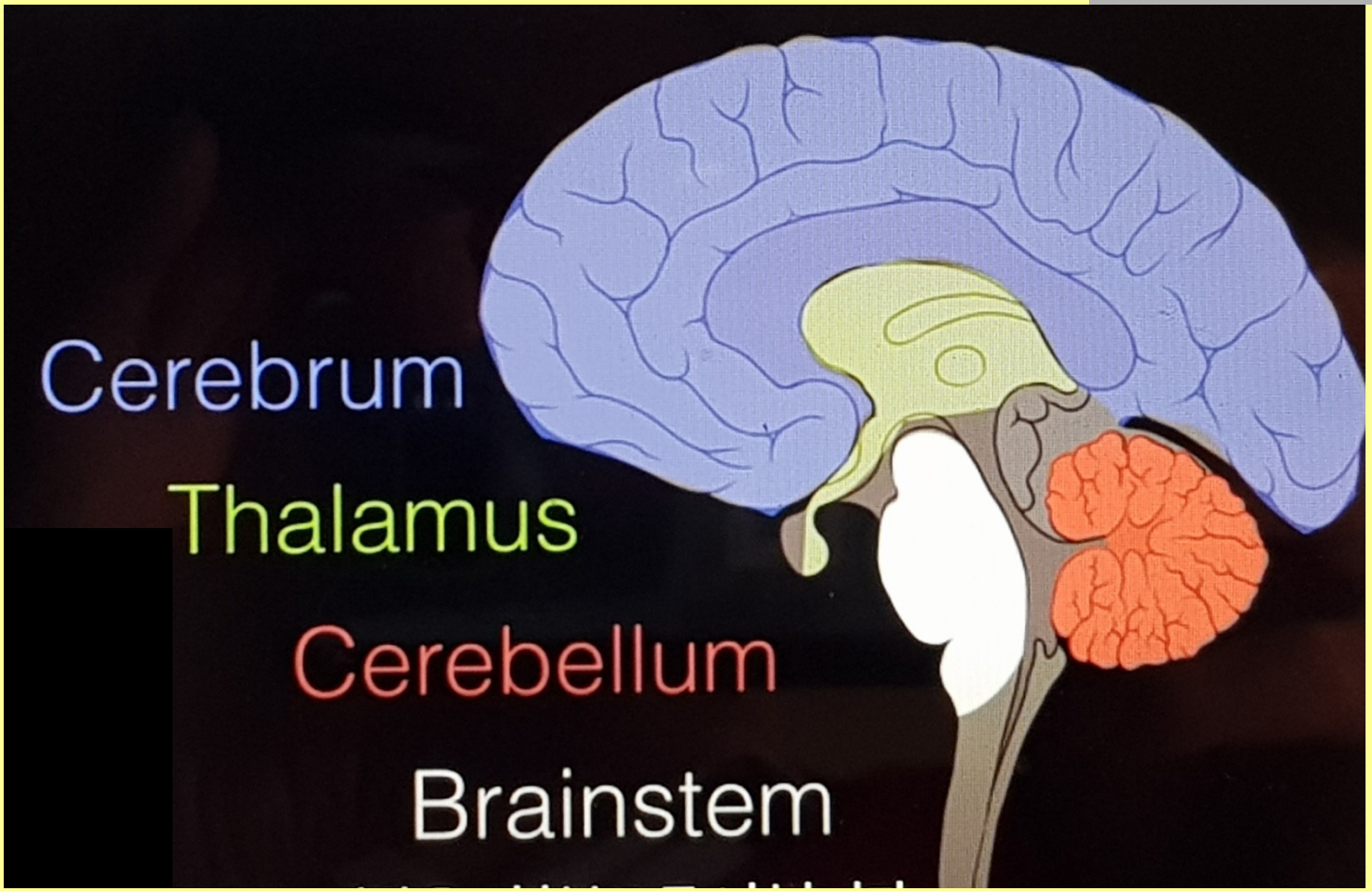
Function	Map code	Brodmann area
Vision		
primary		17
secondary		18, 19, 20, 21, 37
Auditory		
primary		41
secondary		22, 42 (Wernicke's area, 22)
Body senses		
primary		1, 2, 3
secondary		5, 7
Sensory, tertiary		7, 22, 37, 39, 40
Motor		
primary		4
secondary		6
eye movement		8
speech		44 (Broca's area)
Motor, tertiary		9, 10, 11, 45, 46, 47

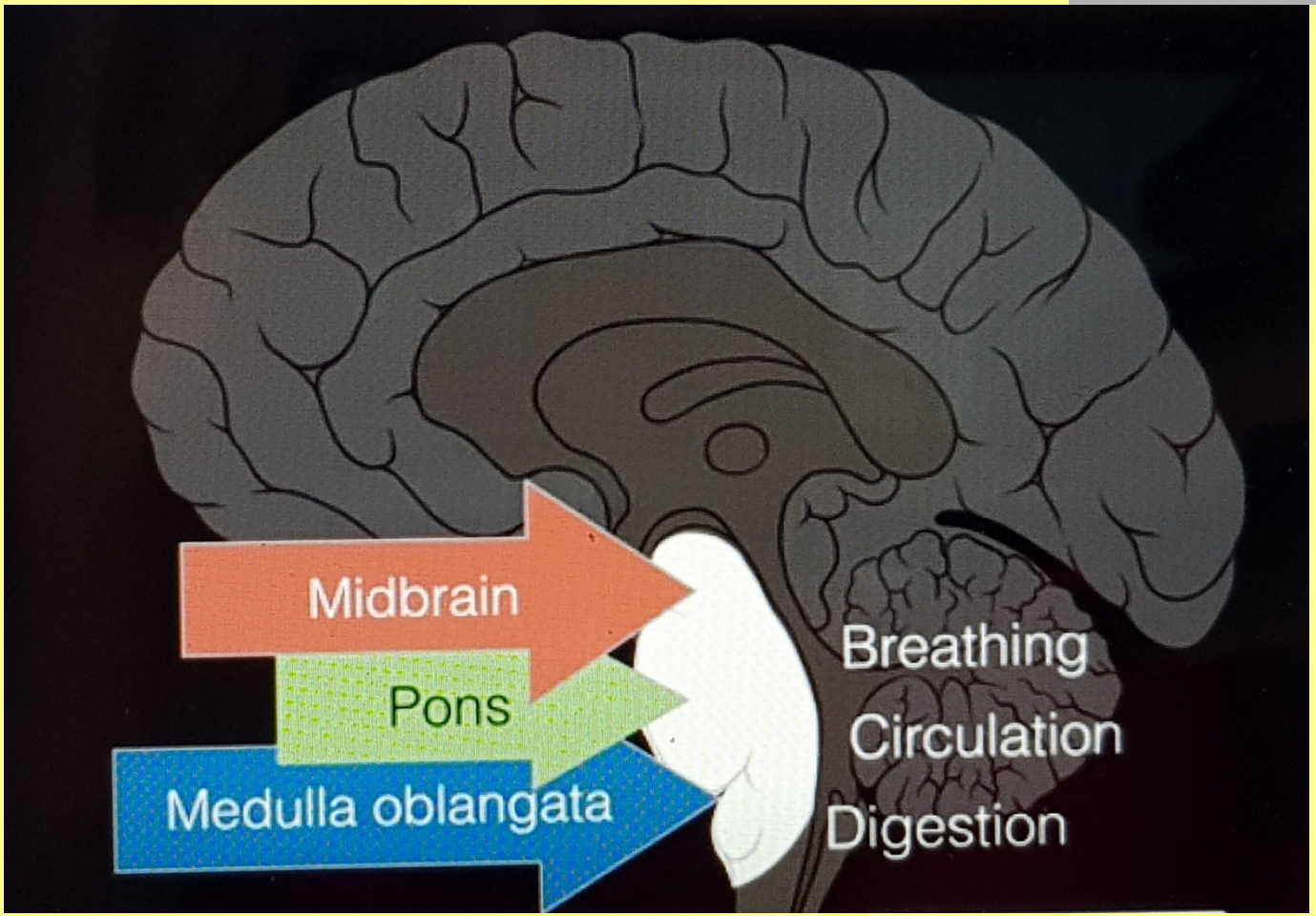
Aire 4 : aire motrice primaire
Aires 1, 2, 3 : aires somatosensorielles primaires

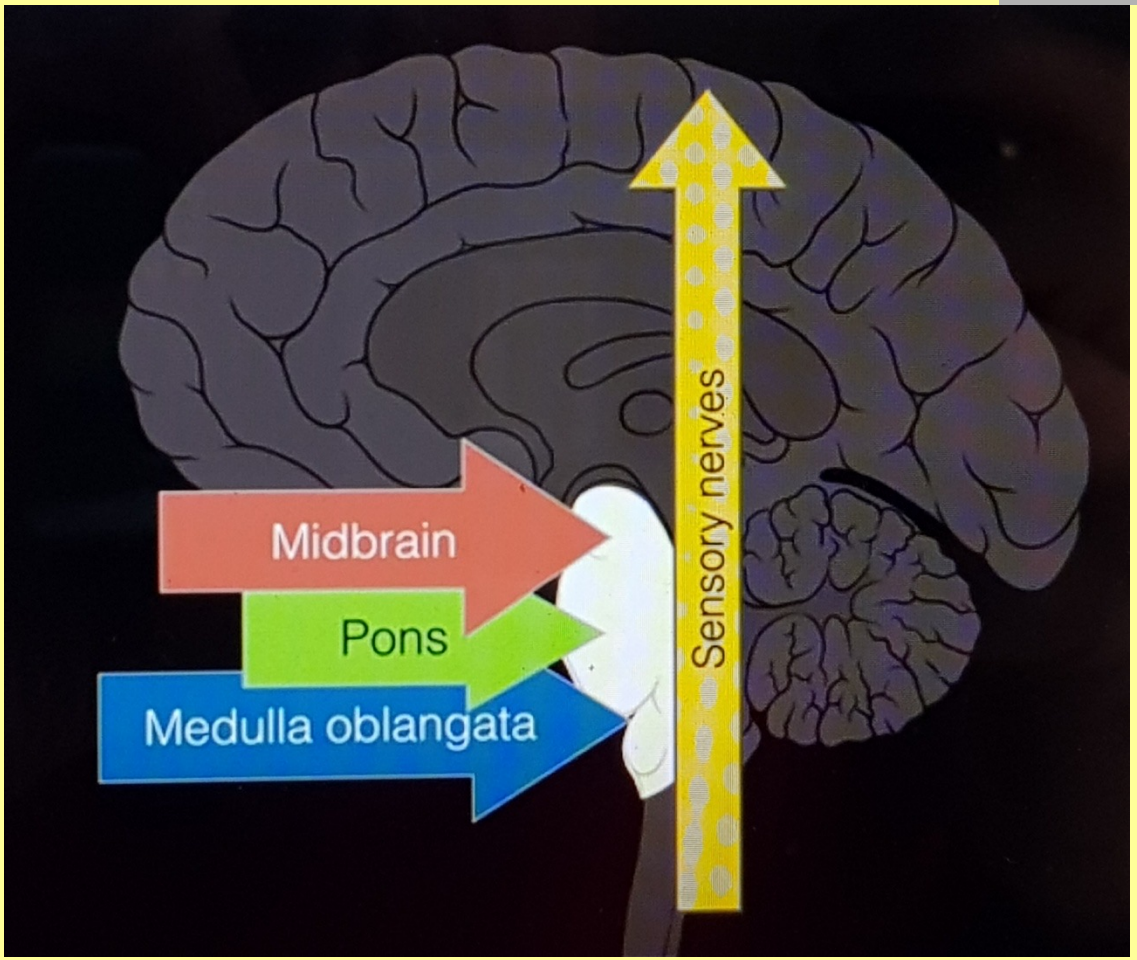

Parietal
Frontal
Somatosensory cortex
Occipital

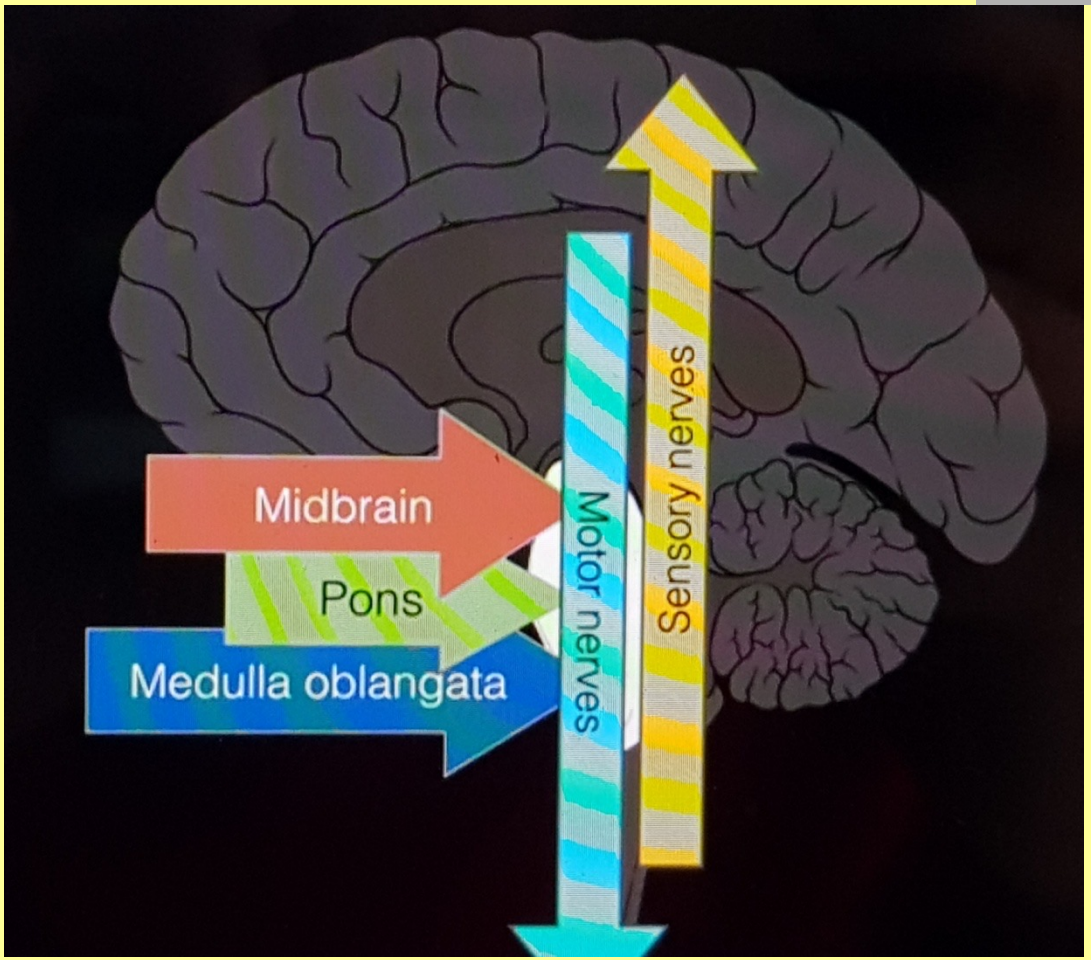

Frontal
Parietal
Motor cortex
Somatosensory cortex
Occipital

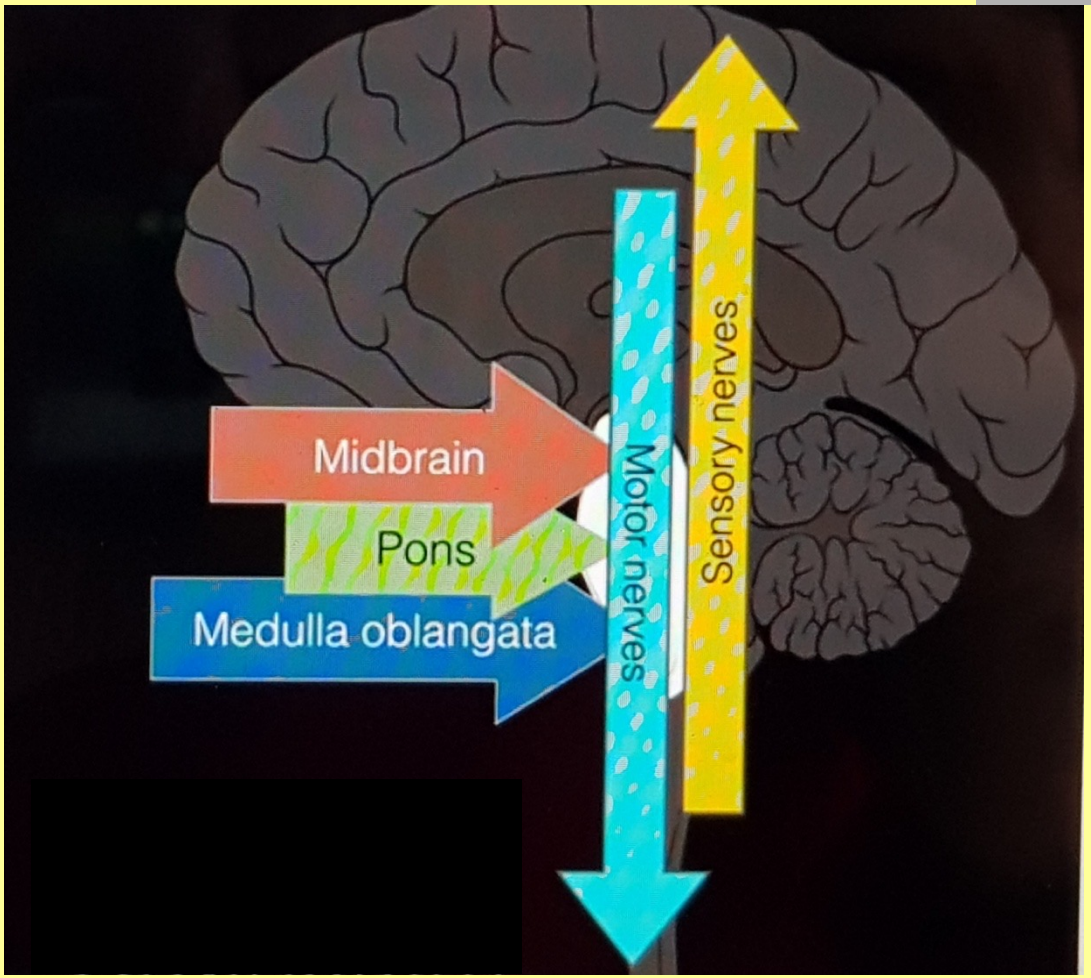

Cerebral cortex
Parietal
Frontal
Occipital

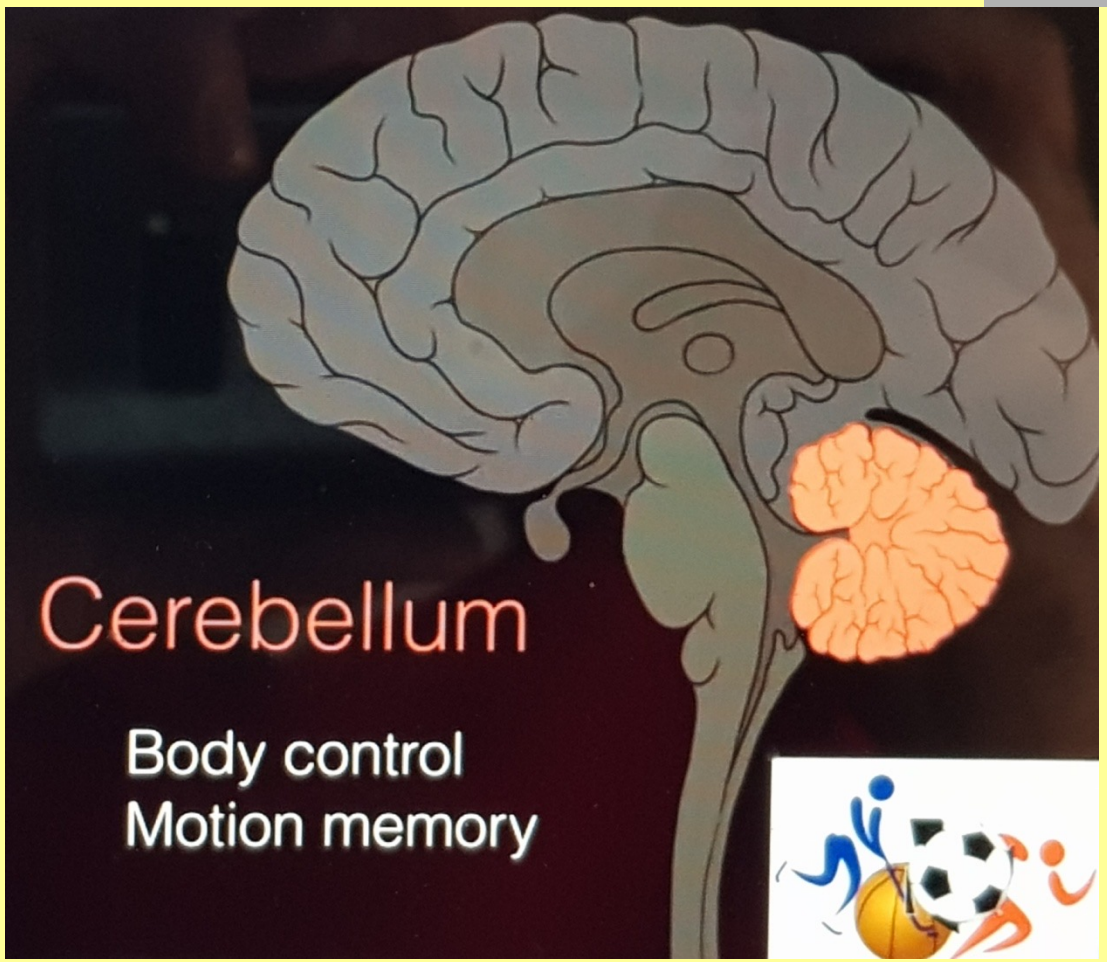

Cerebrum
Thalamus
Cerebellum
Brainstem

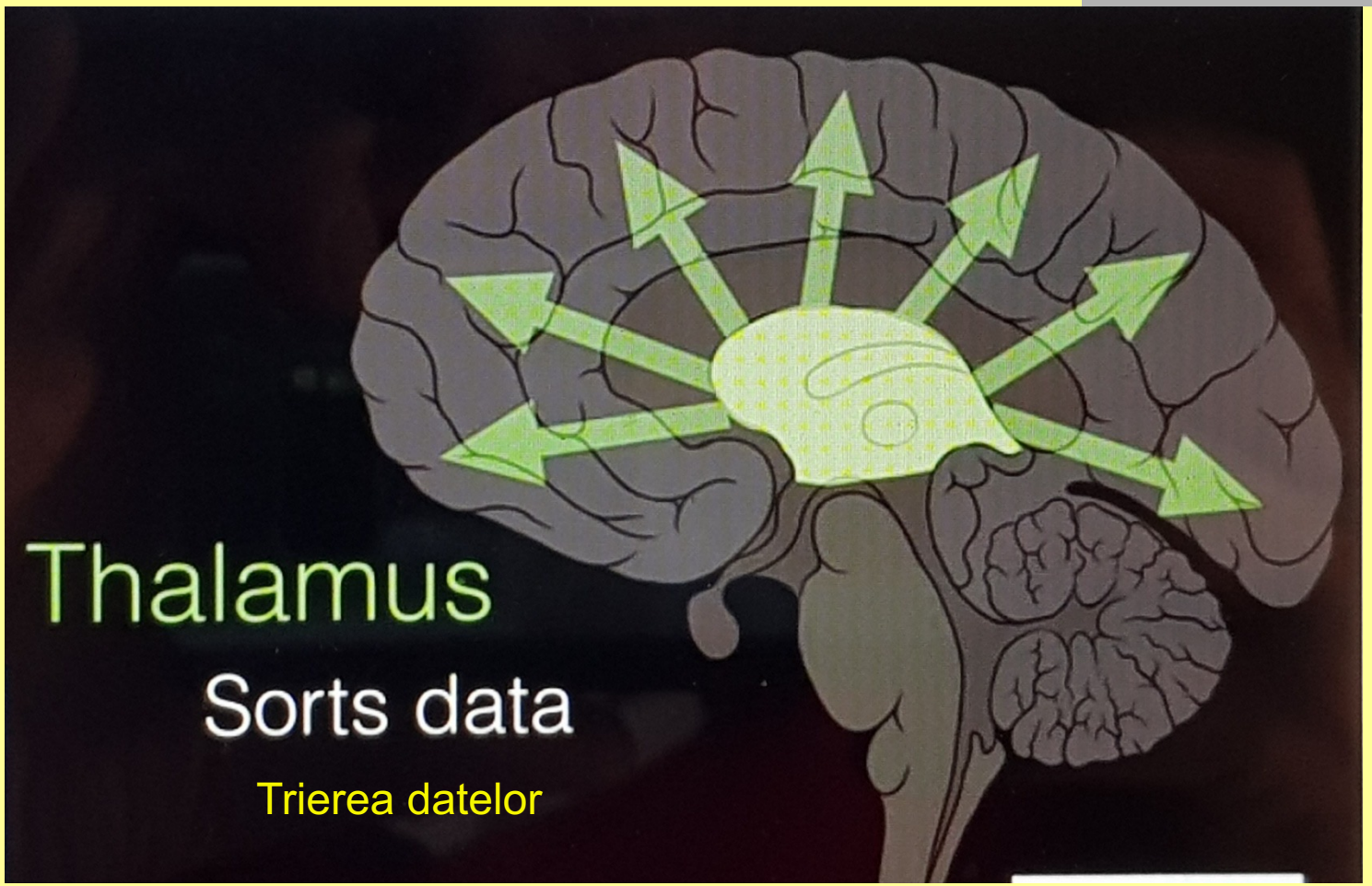

Midbrain
Pons
Medulla oblangata
Breathing
Circulation
Digestion

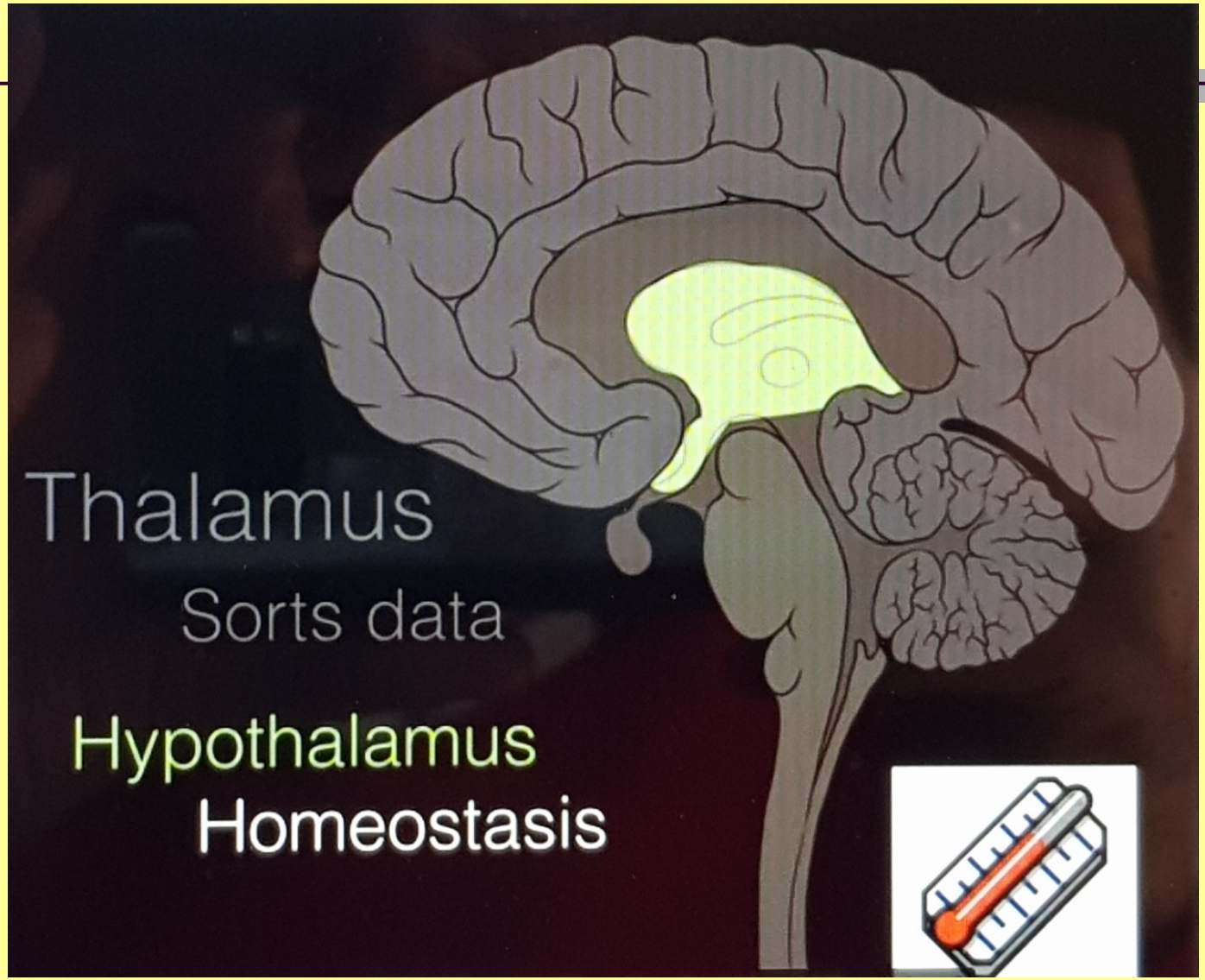

Midbrain
Pons
Medulla oblangata
Sensory nerves


Midbrain
Pons
Medulla oblangata
Motor nerves
Sensory nerves


Midbrain
Pons
Medulla oblangata
Motor nerves
Sensory nerves


Cerebellum
Body control
Motion memory

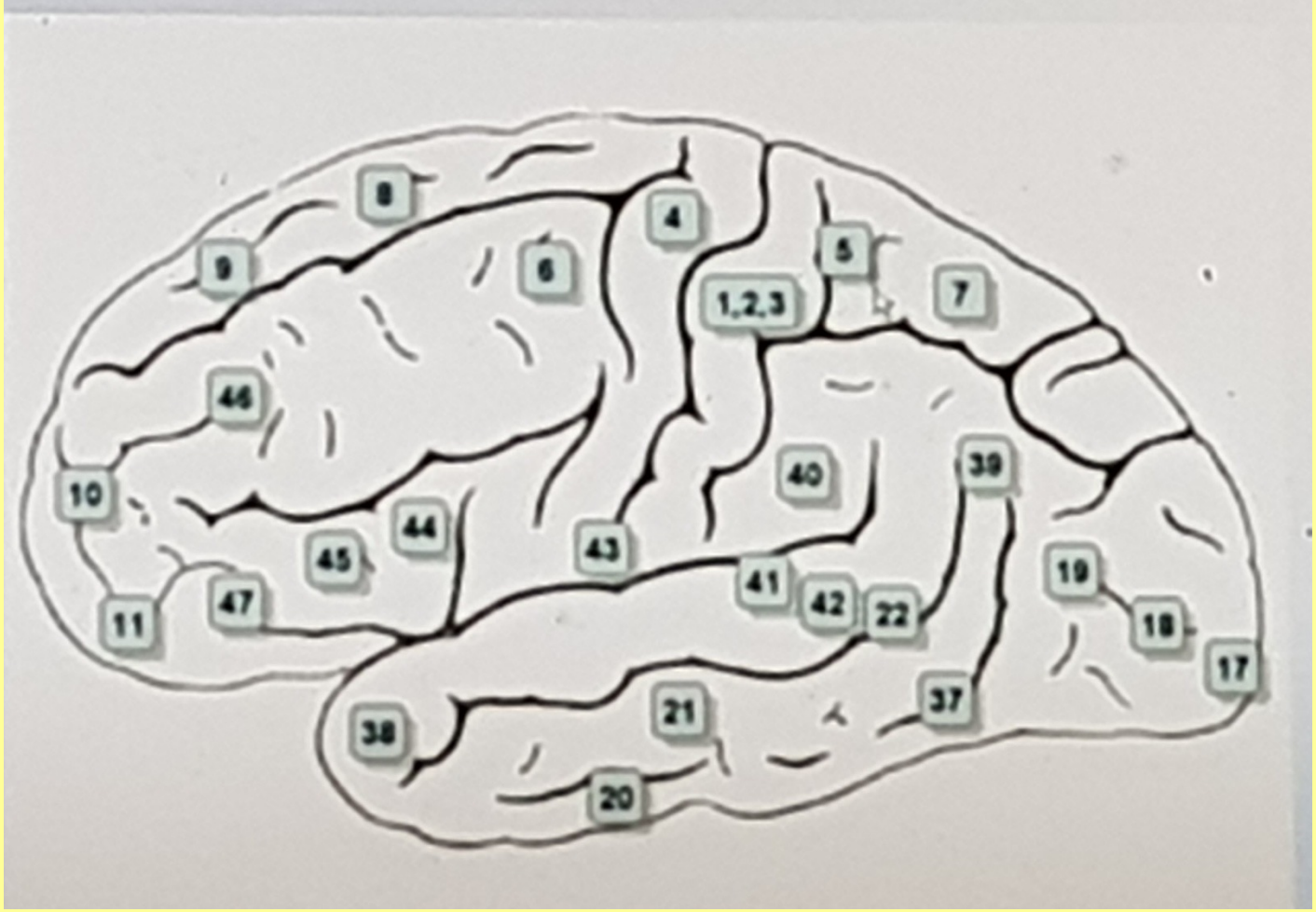

Thalamus
Sorts data
Trierea datelor

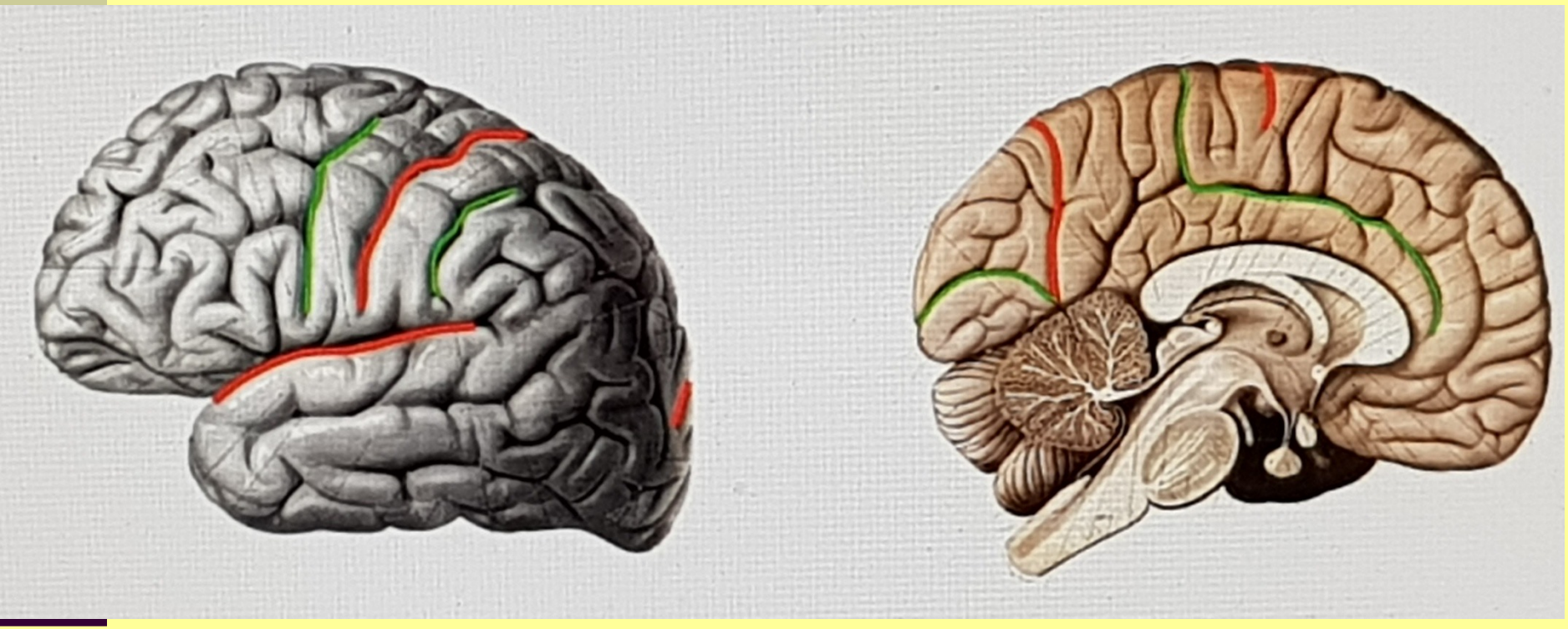

Thalamus
Sorts data
Hypothalamus
Homeostasis

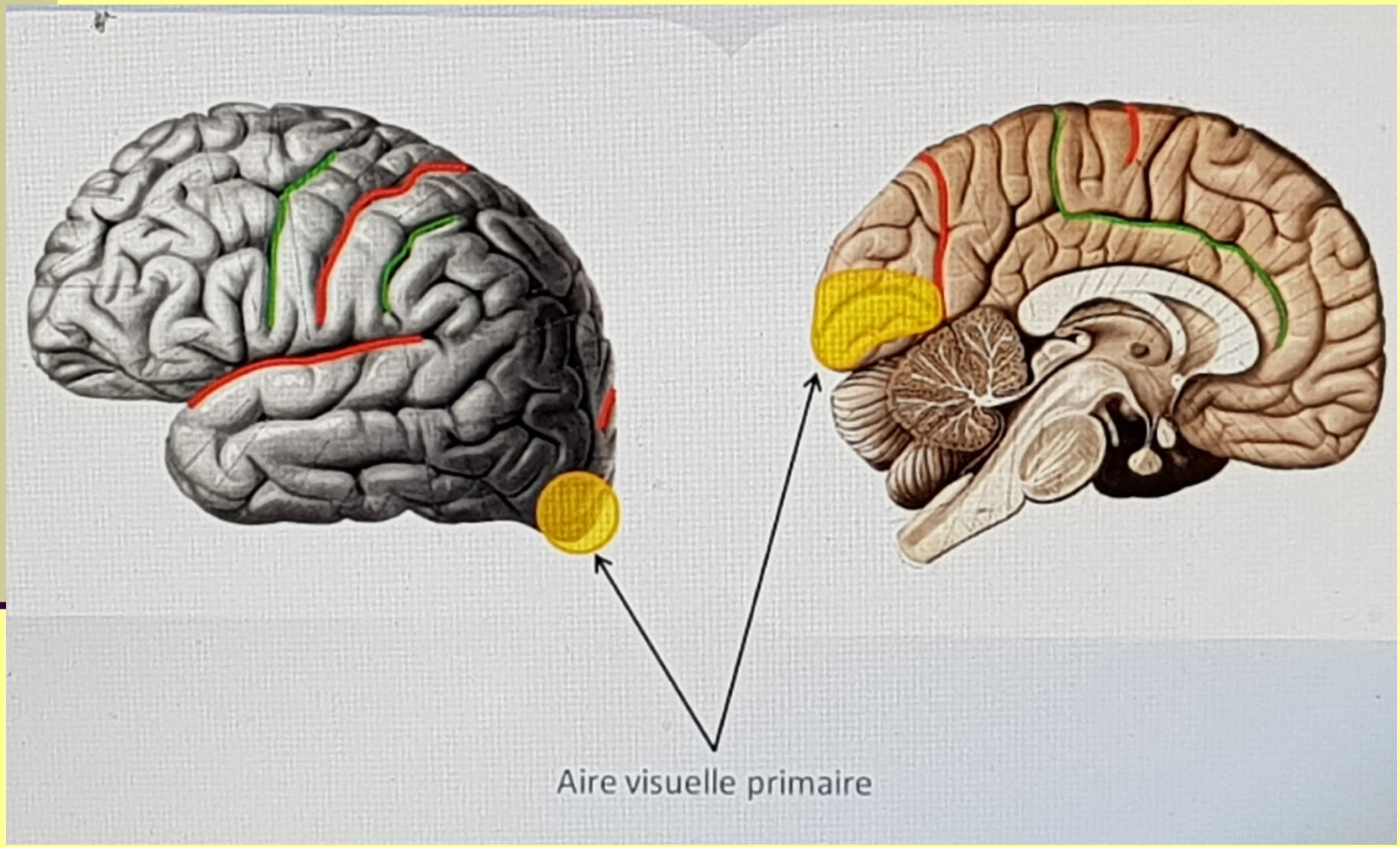
Câteva arii funcționale ale creierului

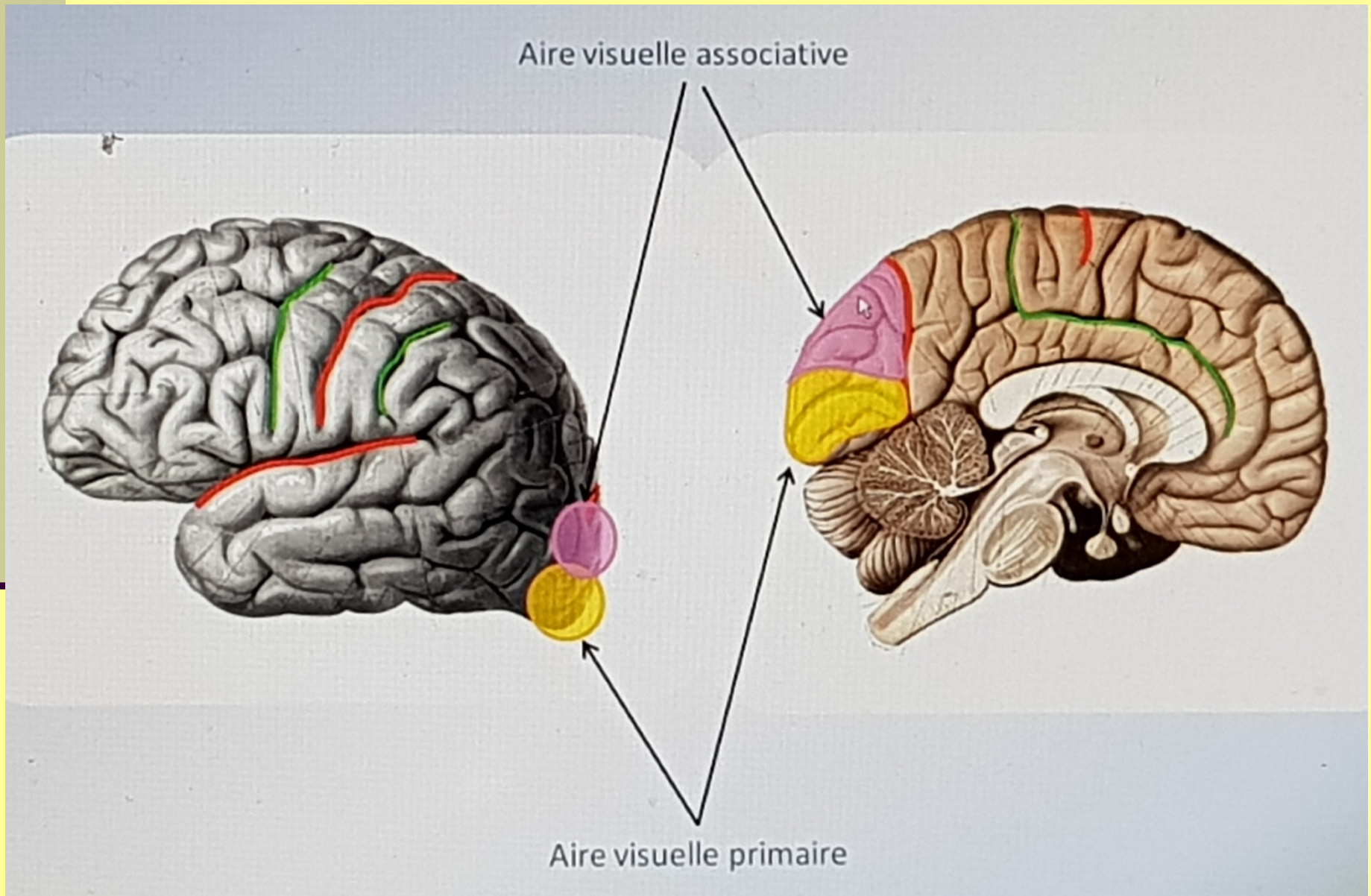
Aires de Brodmann

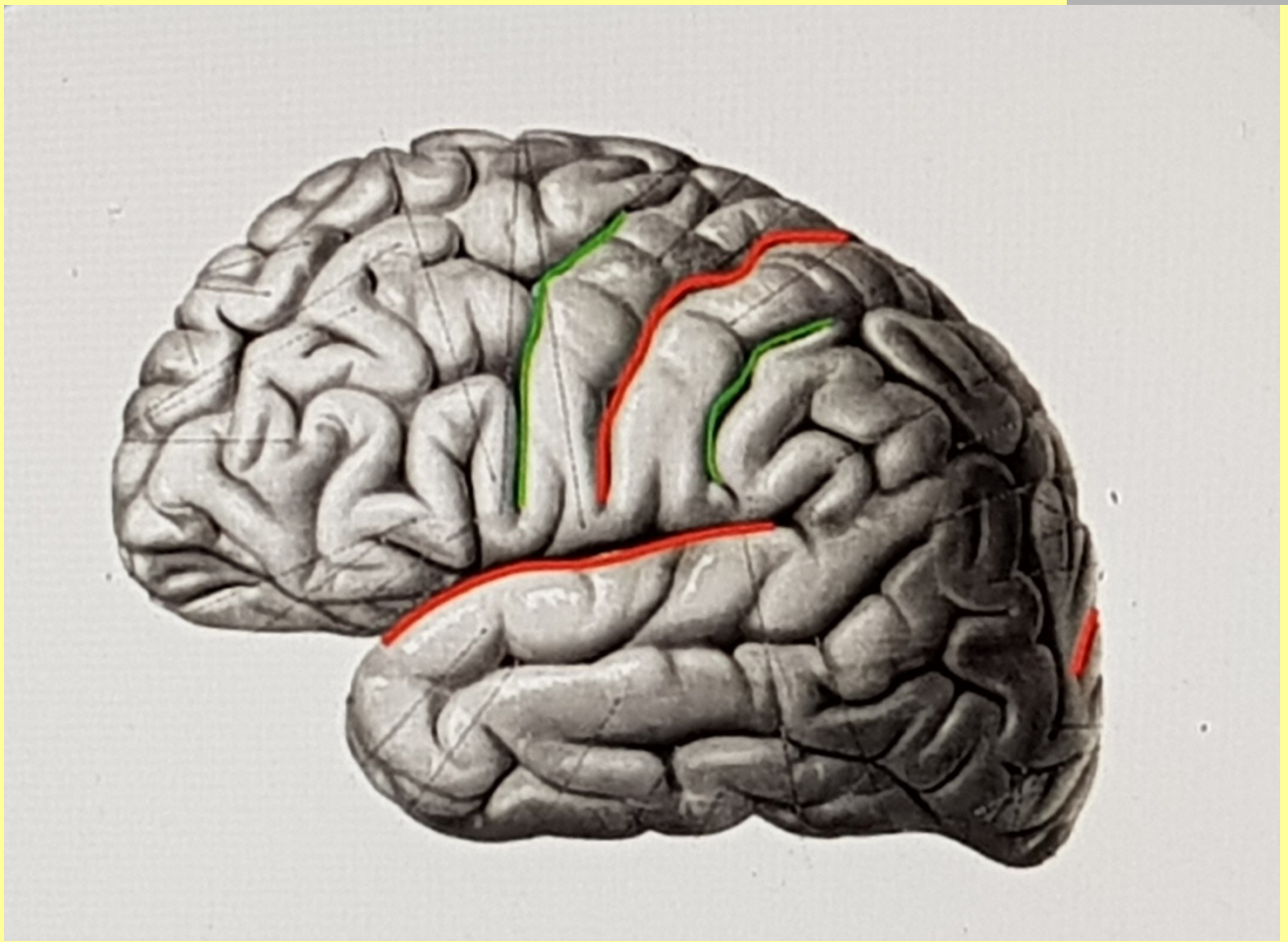
(version simplifiée)

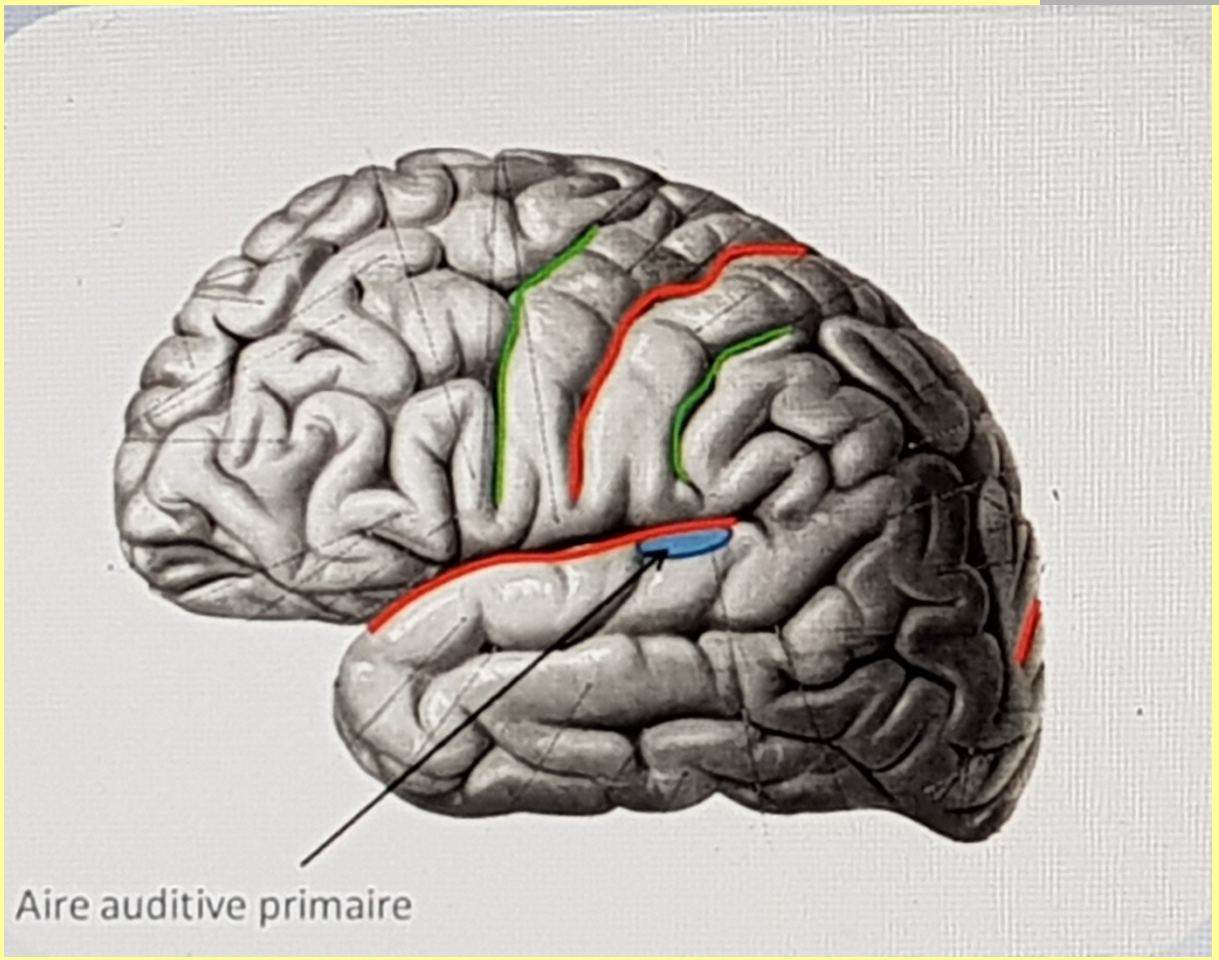


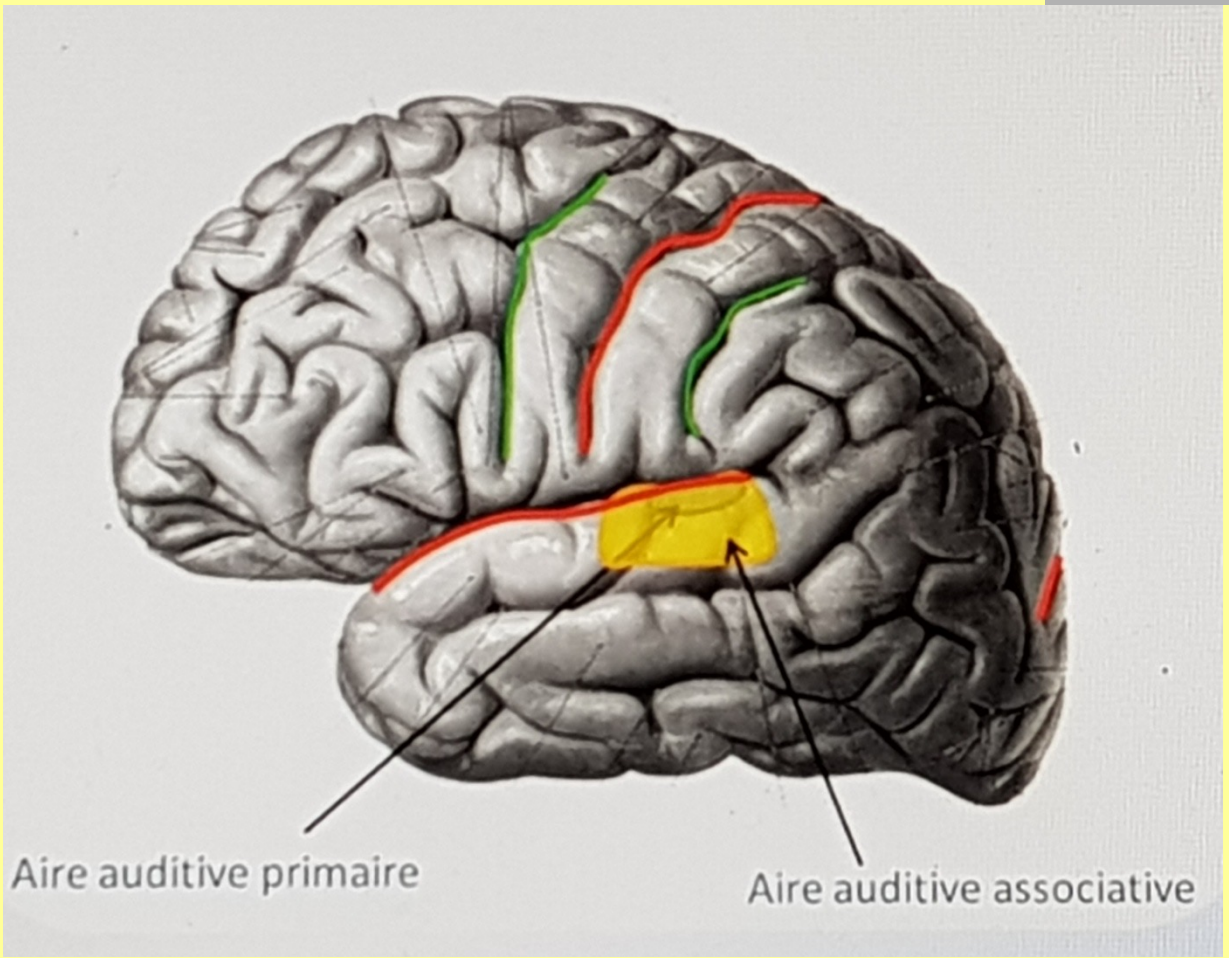


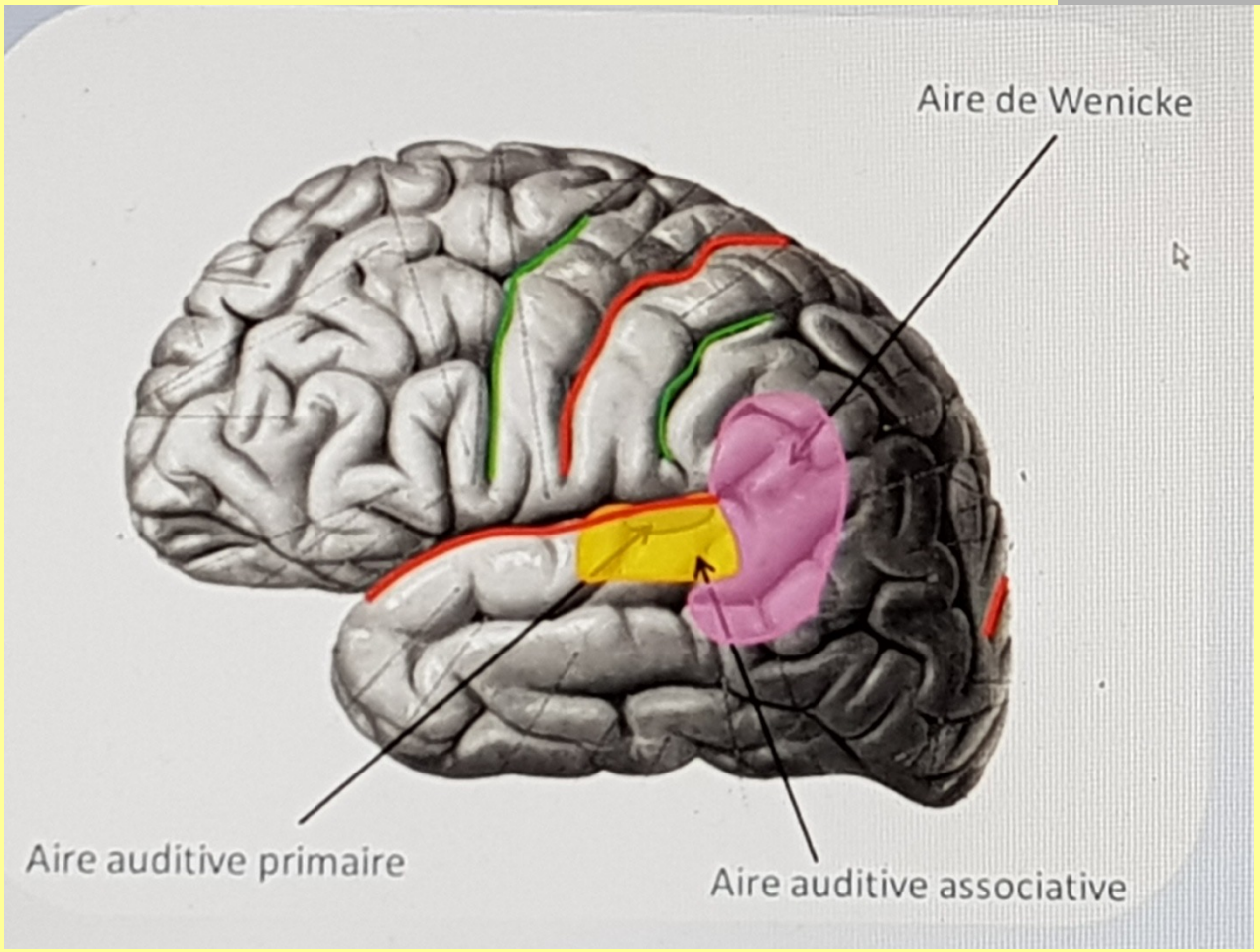

Aire visuelle primaire

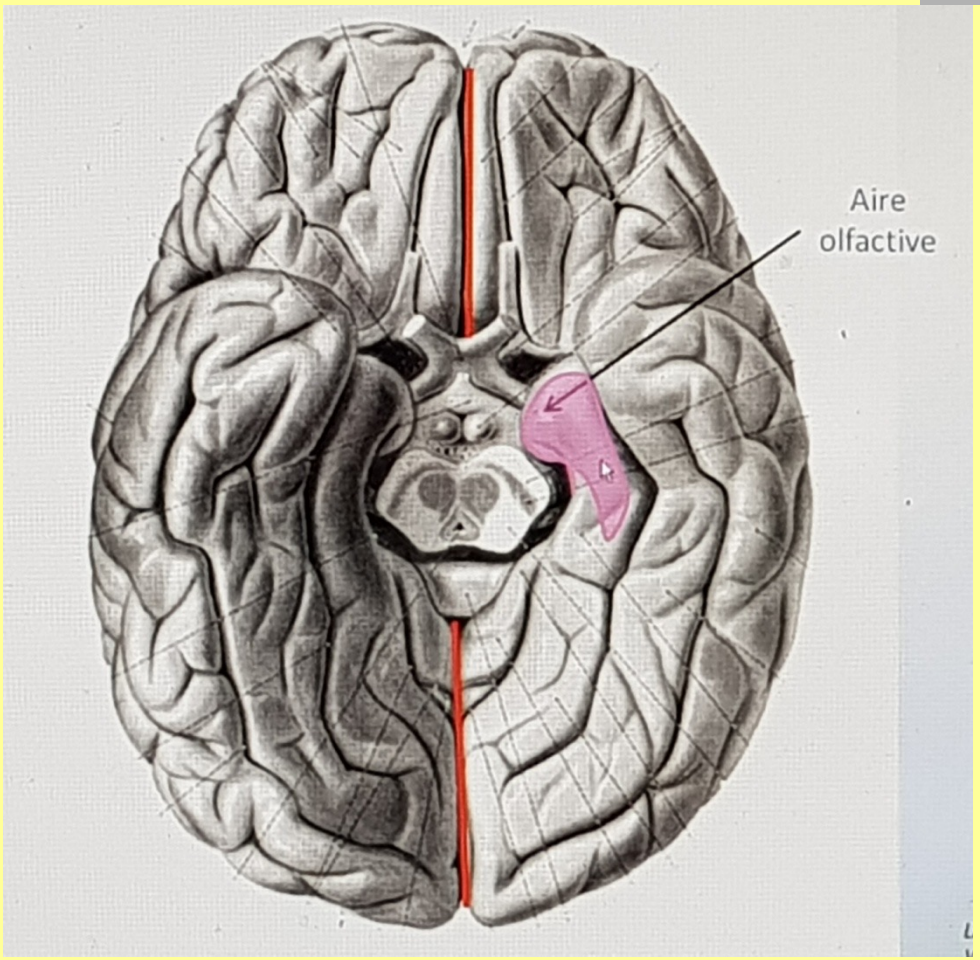

Aire visuelle associative
Aire visuelle primaire




Aire auditive primaire


Aire auditive primaire
Aire auditive associative


Aire de Wenicke
Aire auditive primaire
Aire auditive associative


Aire
olfactive