

Nervous system

- Sensation vs perception
- motor commands
- superior activities



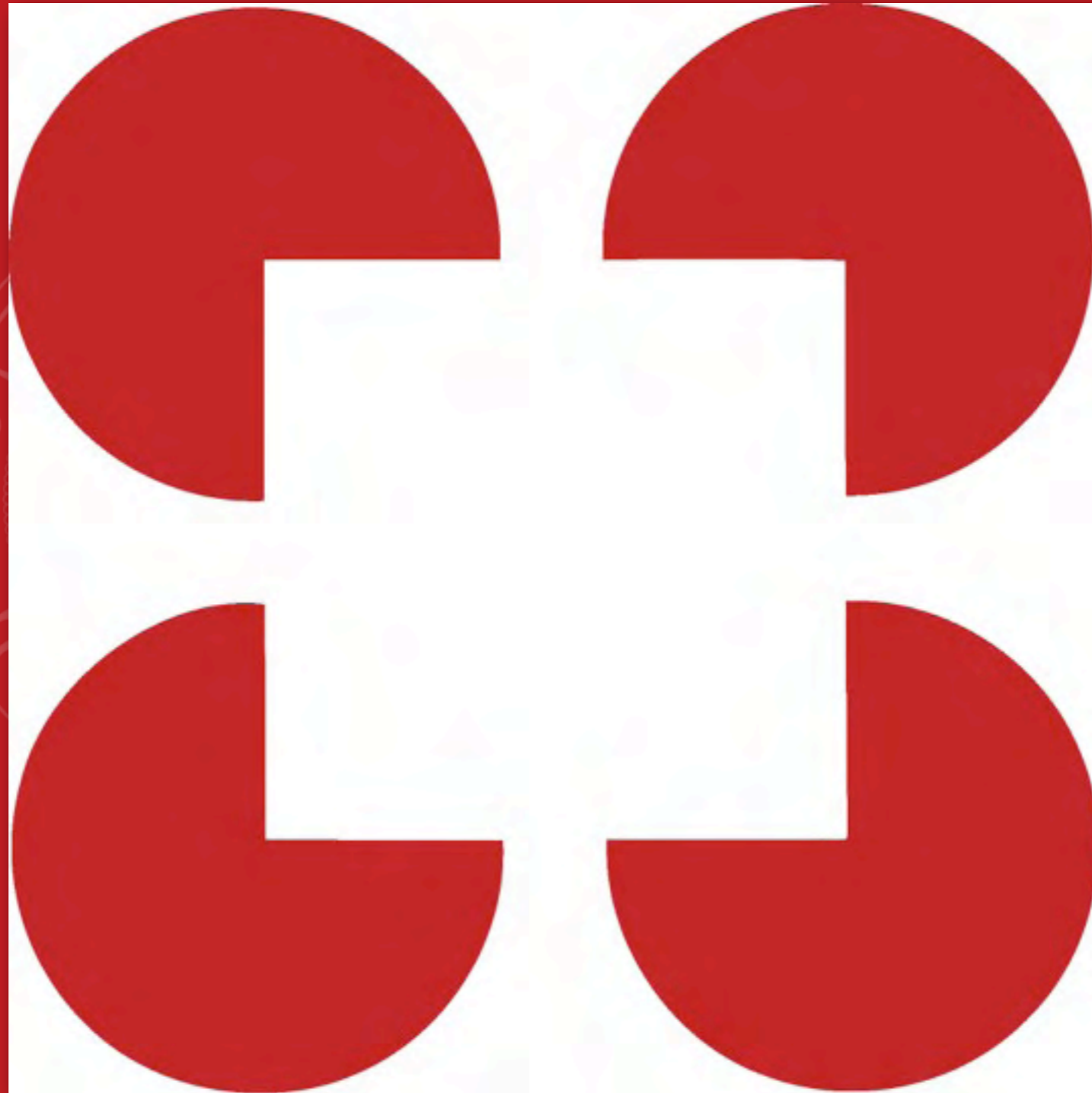
SENSAZIONE
E
PERCEZIONE

SENSAZIONE

- CAPACITA' DI RICEVERE DEGLI STIMOLI SENSORIALI ESTERNI O INTERNI
- AD ES. LA CAPACITA' DI VEDERE, SENTIRE UN SUONO, SENTIRE UN ODORE.....

PERCEZIONE

- ELABORAZIONE COSCIENTE DEGLI STIMOLI SENSORIALI
- AD ES. UN'IMMAGINE VIENE RICONOSCIUTA COME OGGETTO
- SINTESIA: L'INTEGRAZIONE DI PIU' STIMOLI SENSORIALI A COSTRUIRE UNA PERCEZIONE COMPLESSA: AD ES. IMMAGINE-FACCIA-SUONO-VOCE DELLA MAMMA-IMMAGINE E SUONO-FACCIA DELLA MAMMA





TÀ
UDI
A

Condizionamento classico

- L'apparato di Pavlov. Un tubicino preleva la saliva dalla bocca del cane
- ad un recipiente collegato con un sistema di registrazione. Durante il condizionamento,
- differenti stimoli sono associati al cibo posto di fronte al cane.



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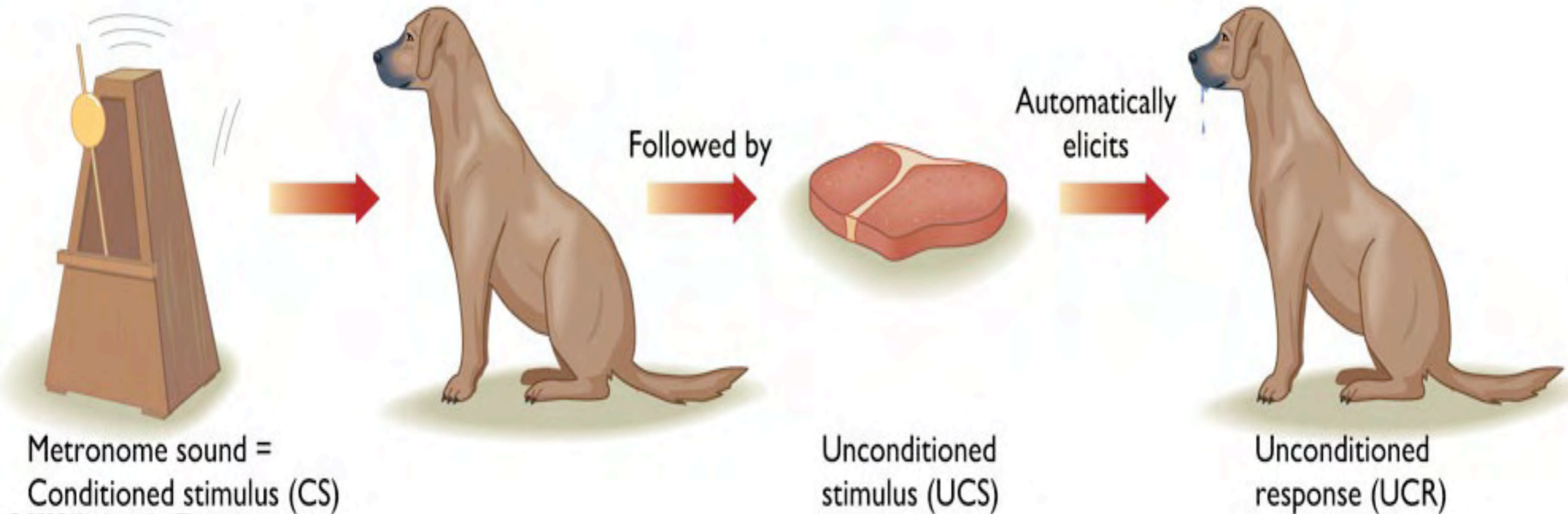
Pavlov associava il rumore del metronomo con il cibo

FLY NEUROBIOLOGY LAB

Rumore → Cibo (non ha mai usato un campanello)

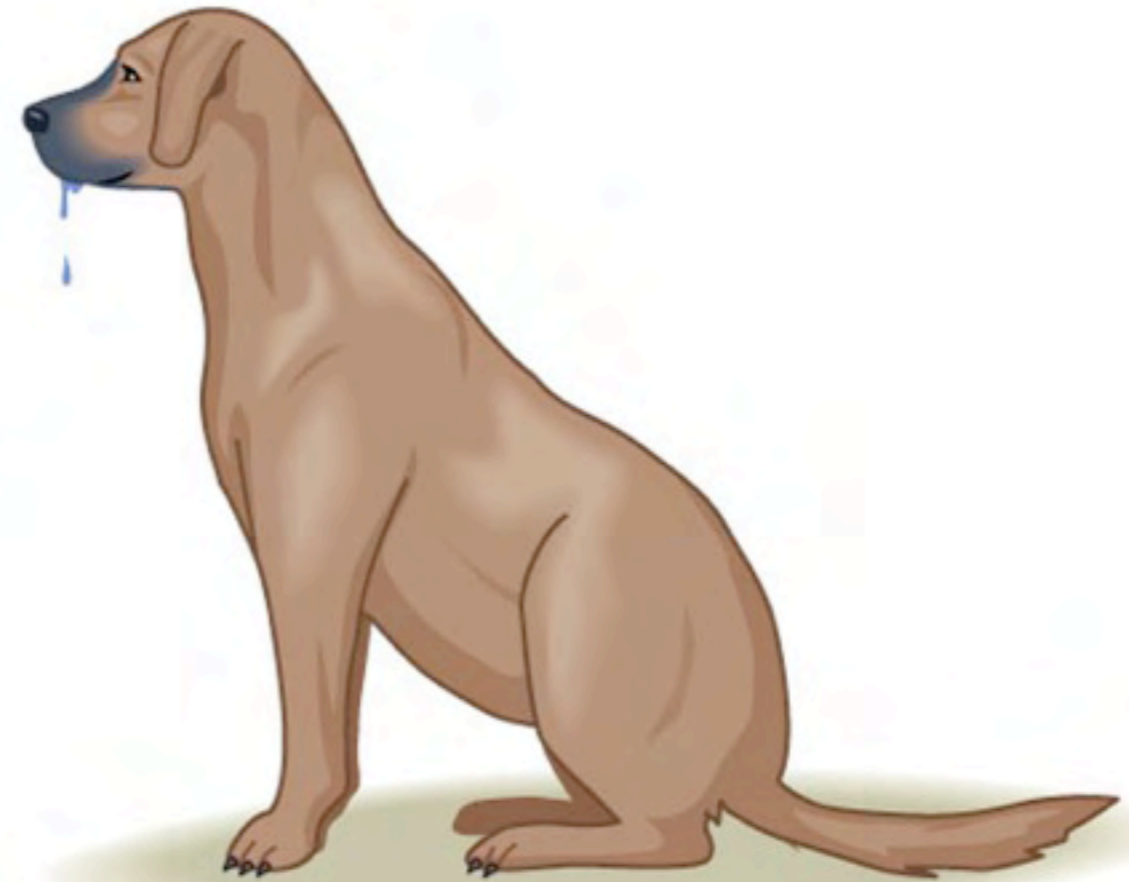
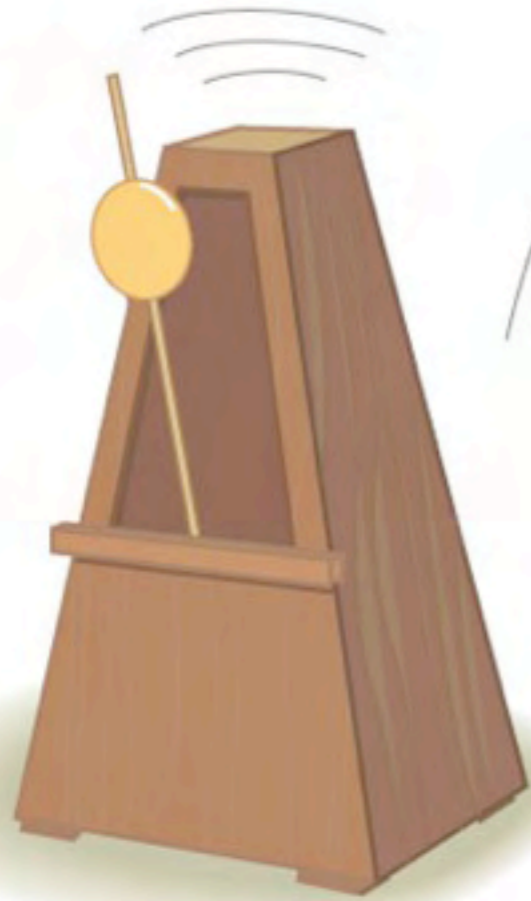
Il cane normalmente salivava con il cibo, ma non con il metronomo

During training,



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After some number of repetitions,



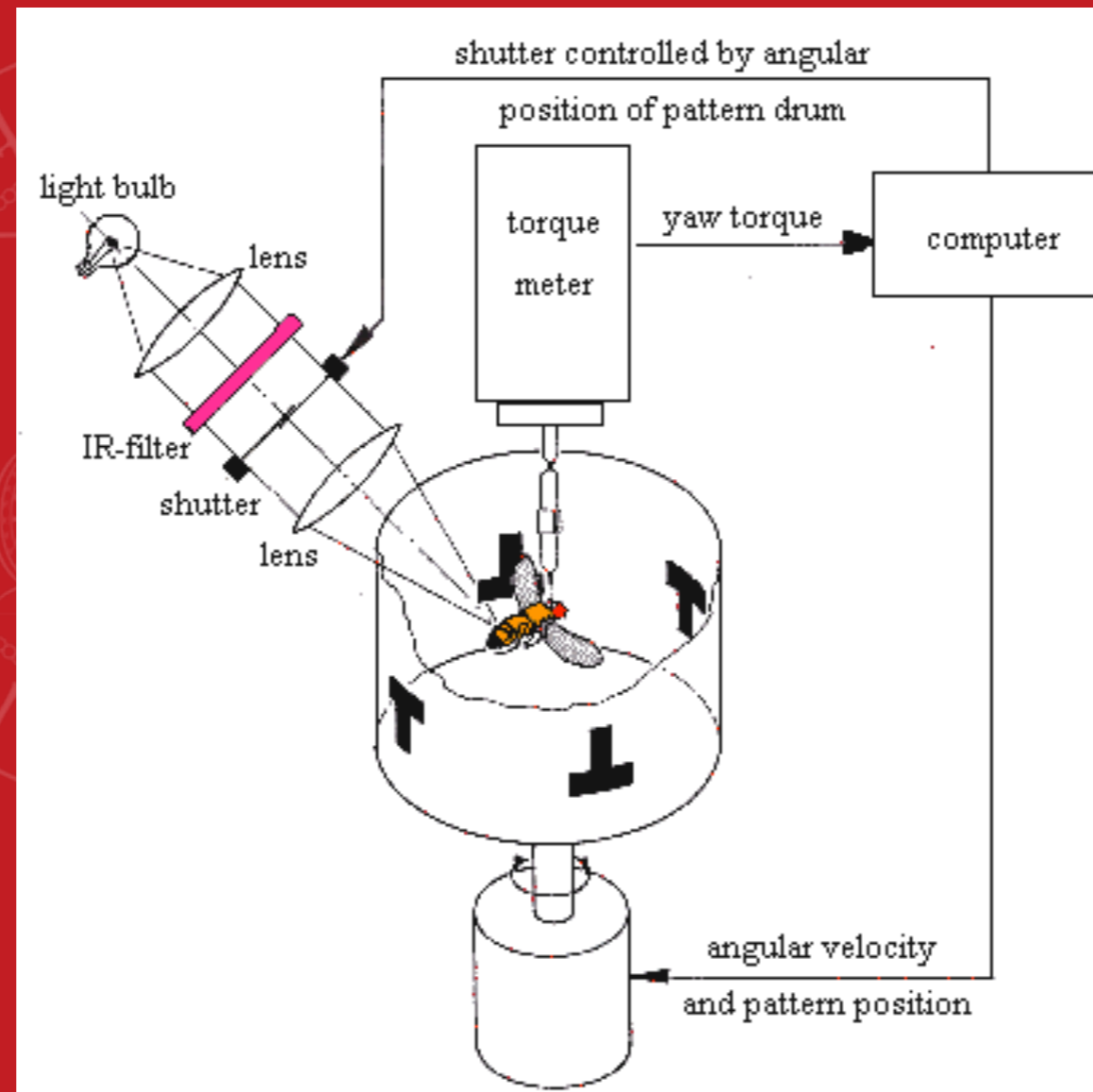
Metronome sound =
Conditioned stimulus (CS)

Conditioned
response (CR)

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Dopo un certo numero di associazioni, il cane salivava quando il metronomo suonava.

Condizionamento operante





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DI PADOVA
DIPARTIMENTO DI SCIENZE
STUDI AVANZATI
IN SCIENZE INTEGRATE
E OVA

H.M. e MEMORIA

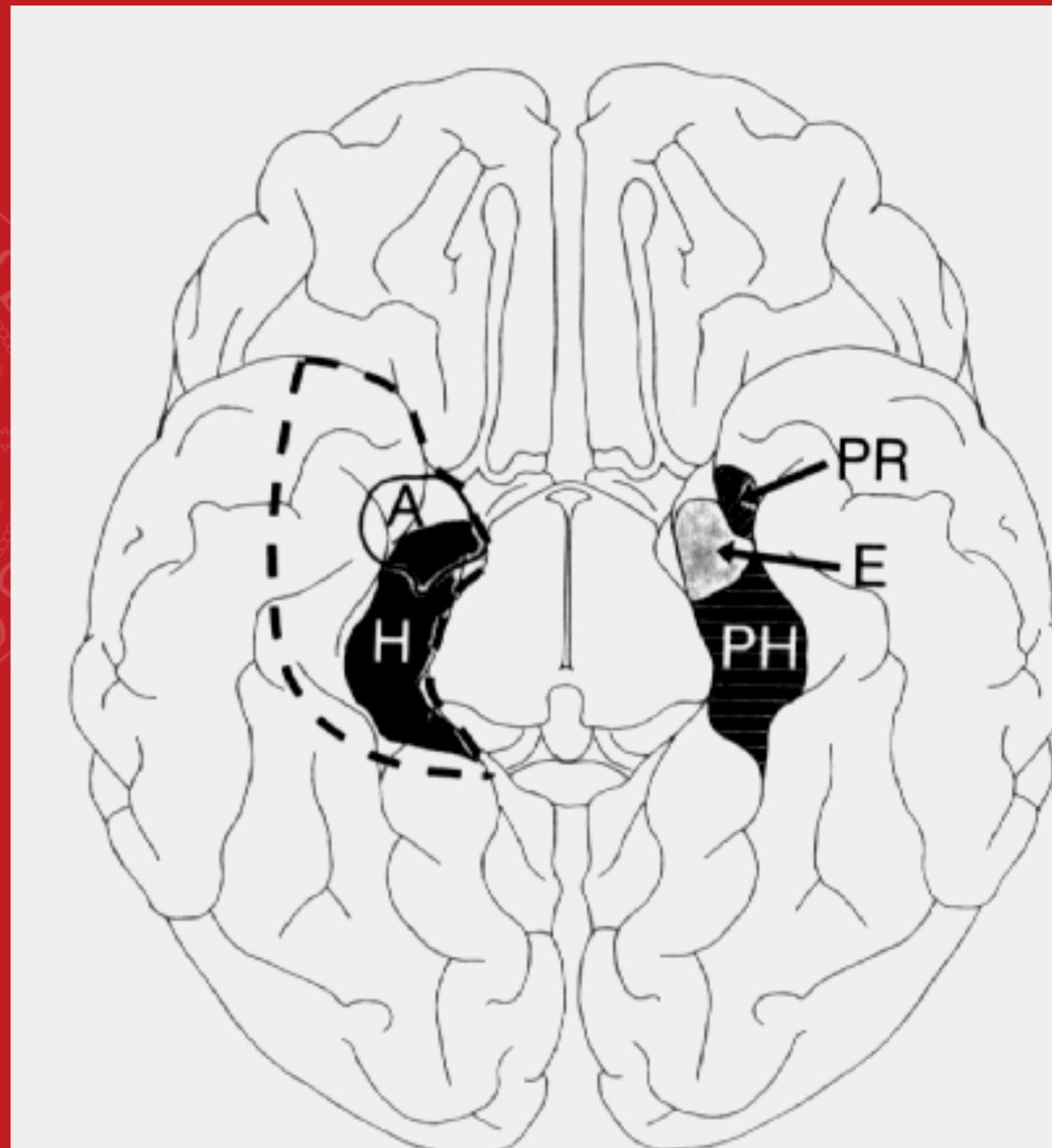
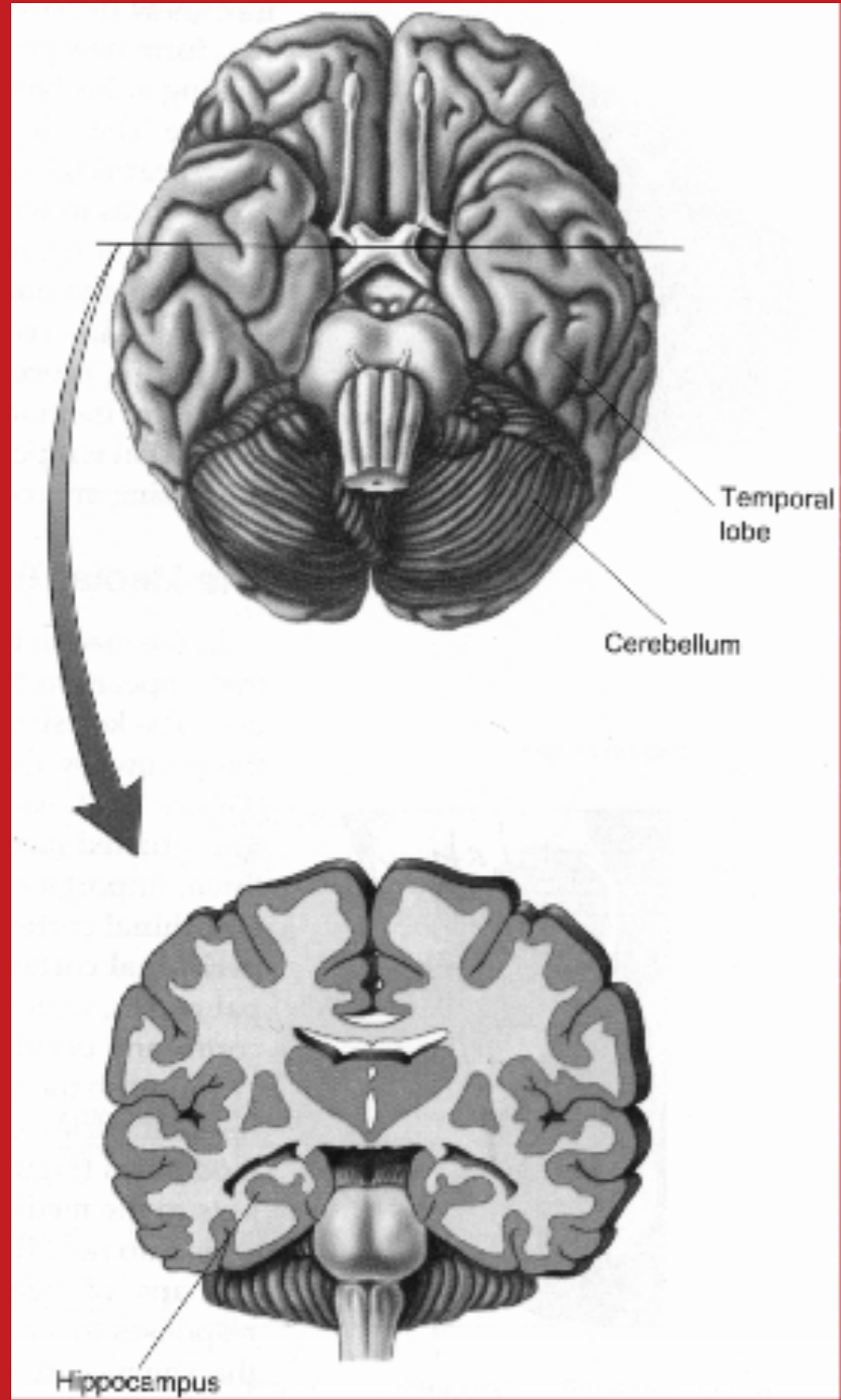


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DI PADOVA

H.M.

- Epilessia progressiva ed incontrollata sin dall'età di ~10 anni
- A 27 anni (1953) rimozione chirurgica dei lobi temporali per controllare gli attacchi epilettici.
- L'intervento ebbe successo, ma determinò una profonda amnesia.

H.M.



H.M.

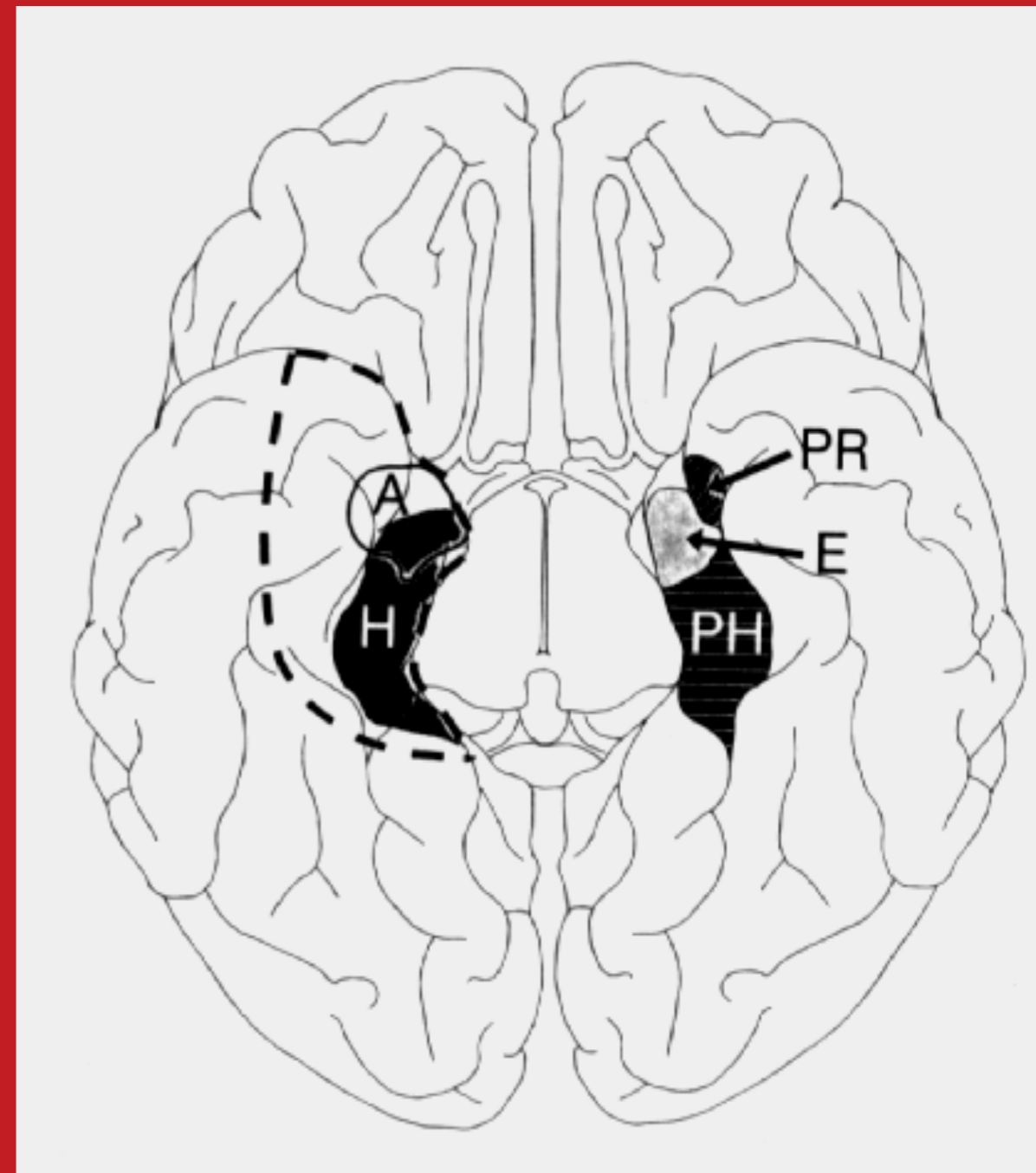
- Poteva ricordare eventi/fatti del suo passato remoto
- Non poteva ricordare eventi/fatti nell'anno(i) precedente l'intervento
- Non poteva apprendere nuovi eventi/fatti o ricordare eventi dal momento dell'intervento in poi
- QI normale
- Short term memory normale (memory span)
- Poteva formare nuove memorie *implicite*

H.M.

- MTL è importante per la memoria esplicita, ma non per quella implicita
- MTL non è il sito di stoccaggio della memoria
- MTL gioca un ruolo nel “consolidamento” della memoria esplicita
- Il “consolidamento” non è immediato, ma richiede mesi o anni (amnesia retrograda graduale)

H.M.

- Quali strutture del MTL sono importanti nella memoria
 - amigdala
 - giro paraippocampale
 - corteccia entorinale
 - corteccia peririnale



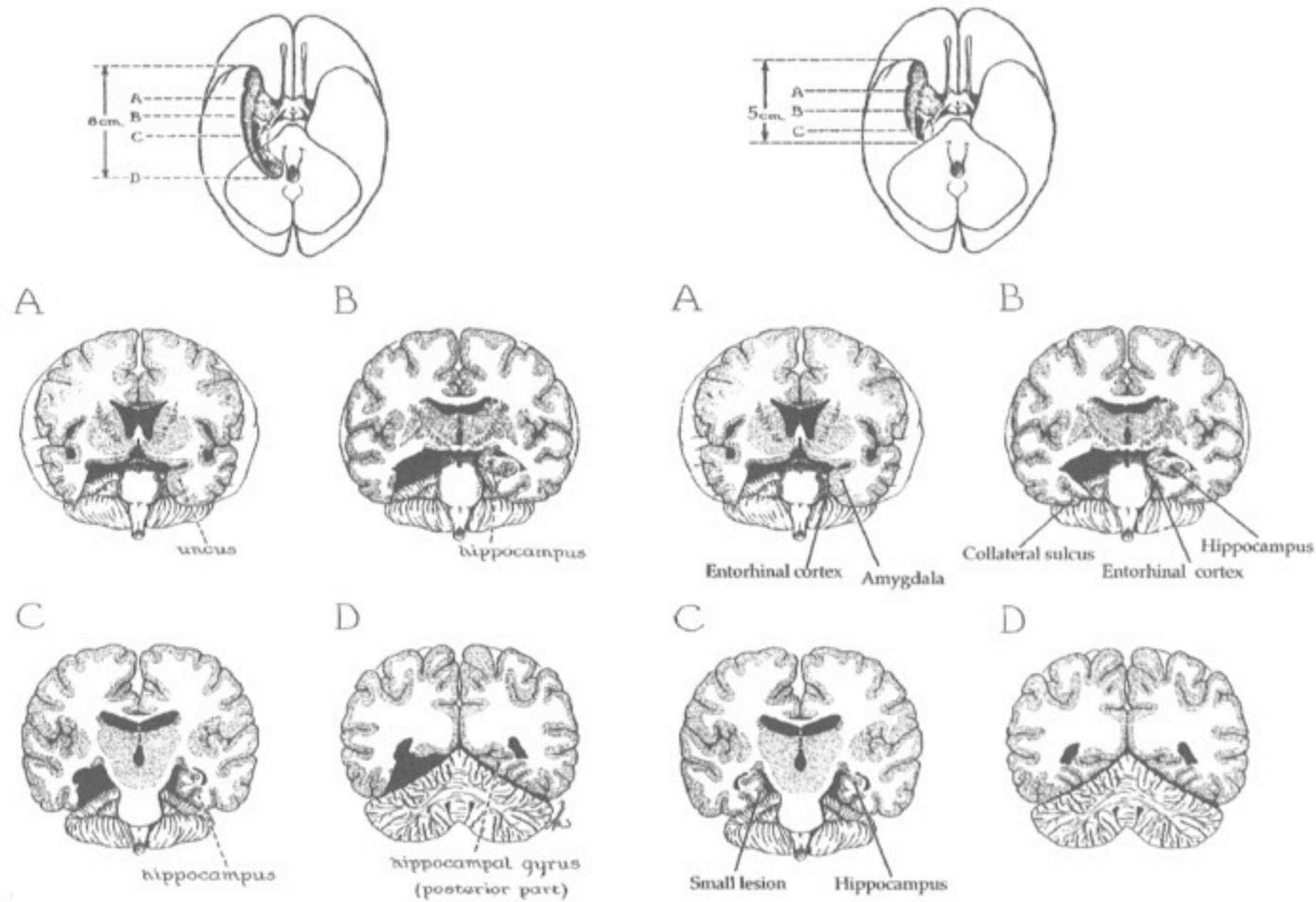


Figure 1. Left, Diagram showing the surgeon's estimate of H. M.'s medial temporal lobe resection (Scoville and Milner, 1957, their Fig. 2, p 13). The inset at the top is a ventral view of the human brain showing the predicted rostrocaudal extent of the ablation. A through D are drawings of coronal sections, arranged from rostral (A) to caudal (D), showing the predicted extent of the lesion. Note that although the lesion was made bilaterally, the right side is shown intact to illustrate structures that were removed. Right, An amended version of the original diagram indicating the extent of the ablation based on the MRI studies reported here. The rostrocaudal extent of the lesion is 5 cm rather than 8 cm, and the lesion does not extend as far laterally as initially pictured.

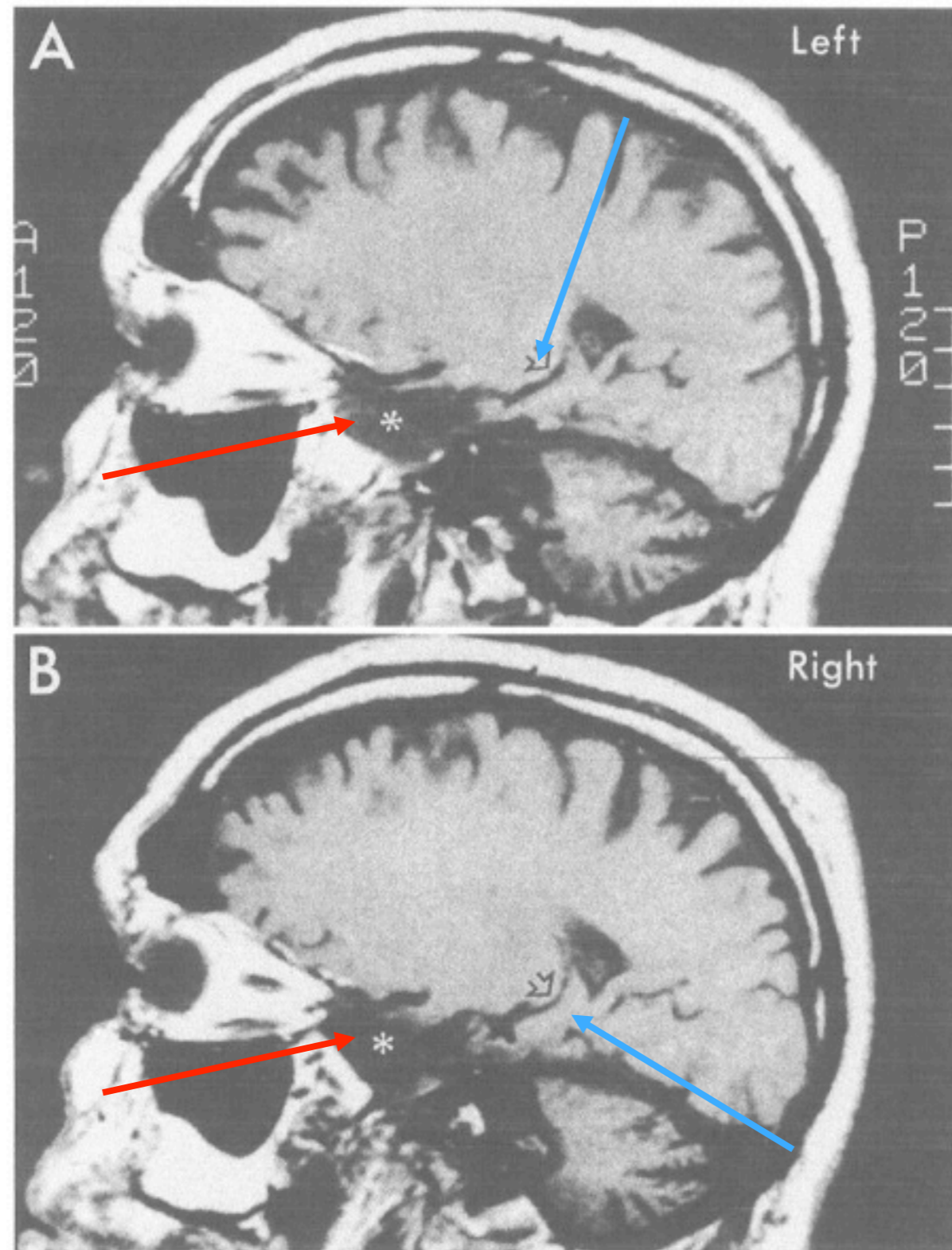
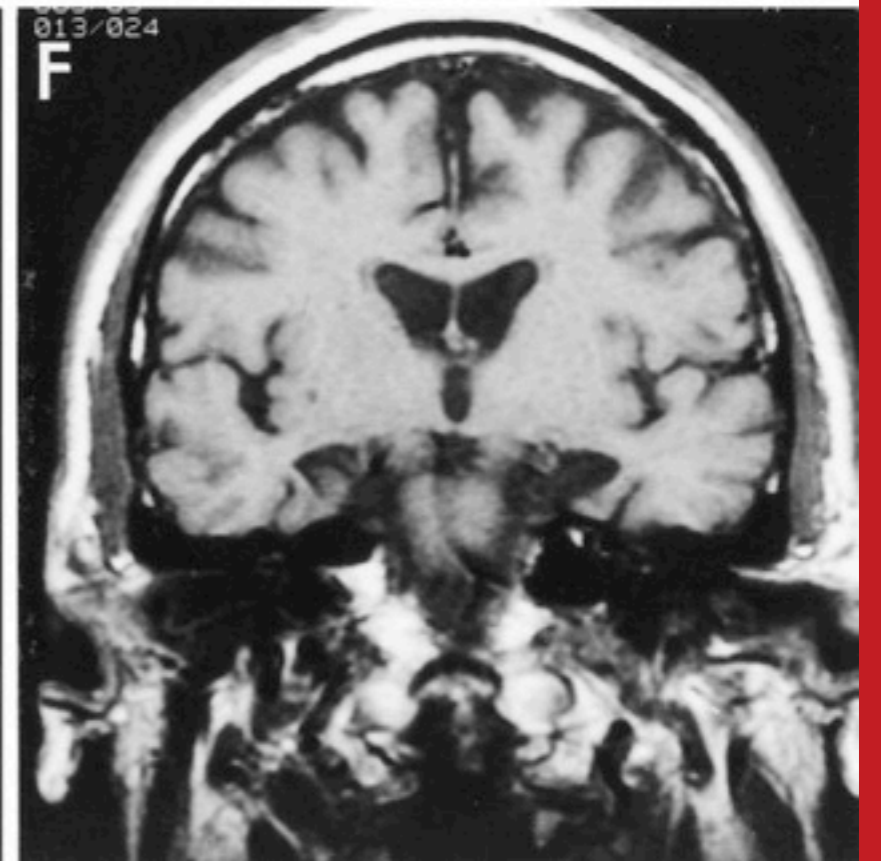
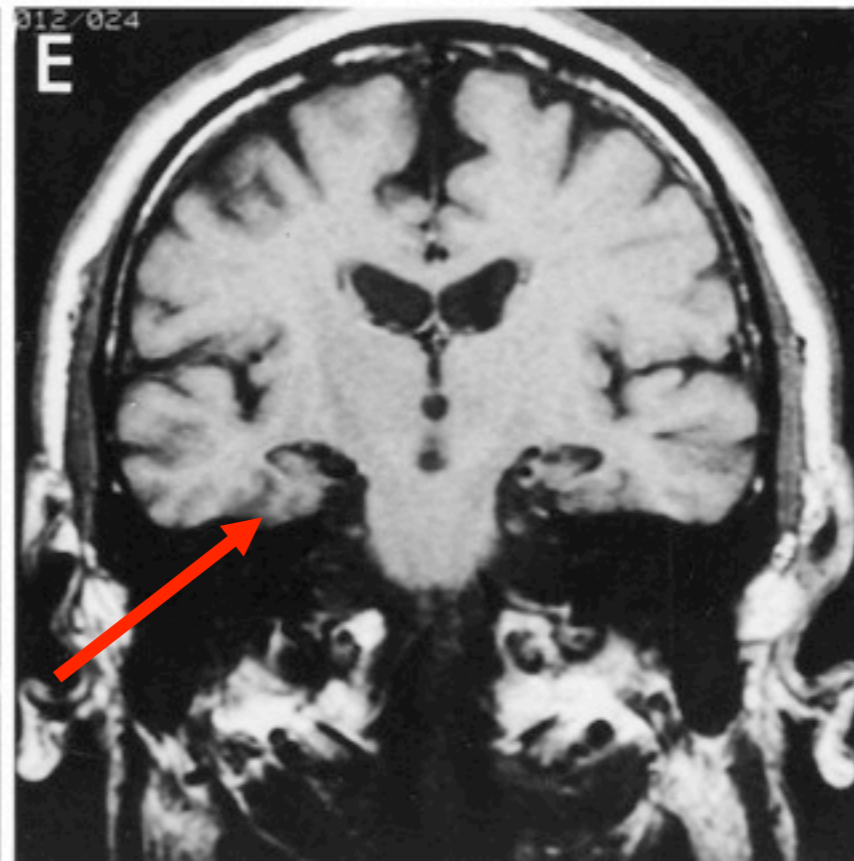
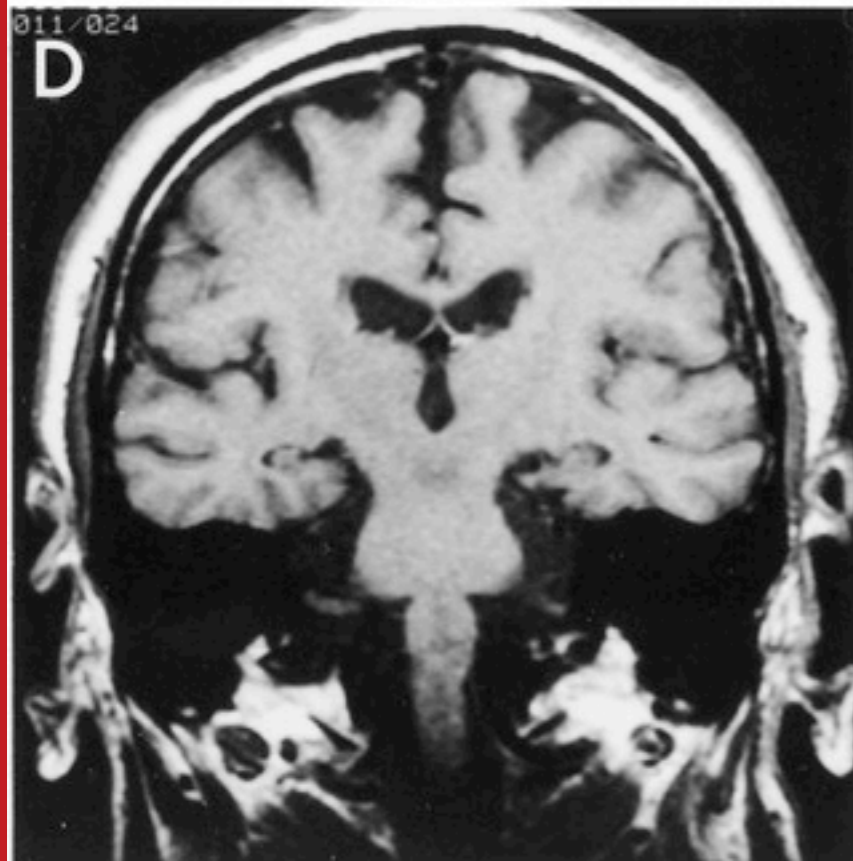
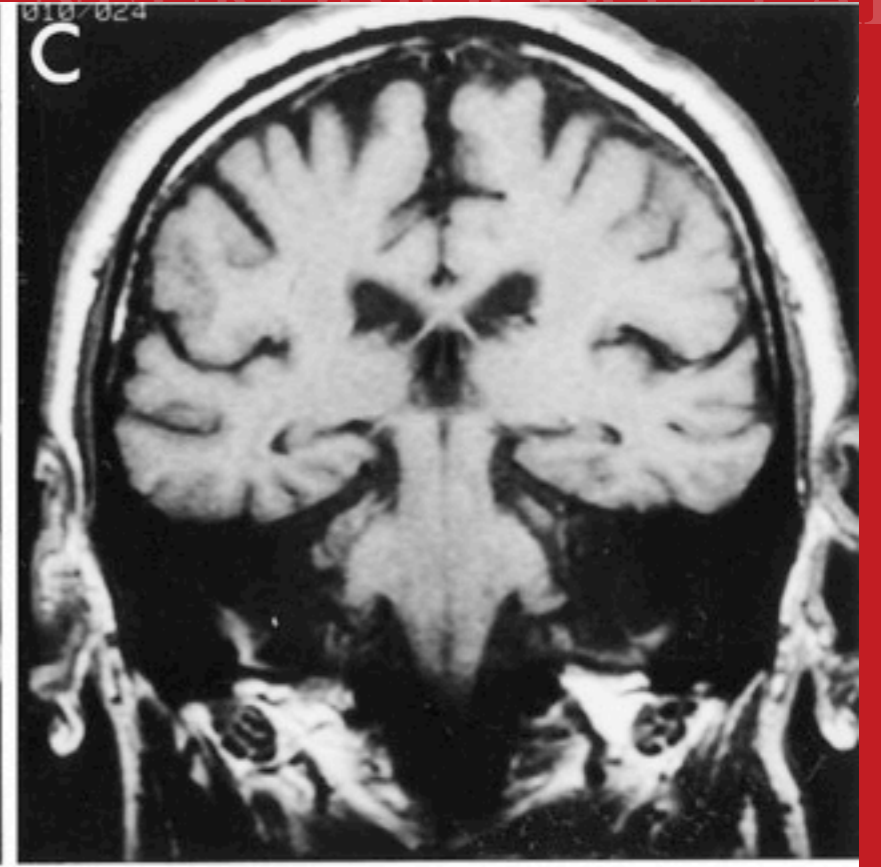
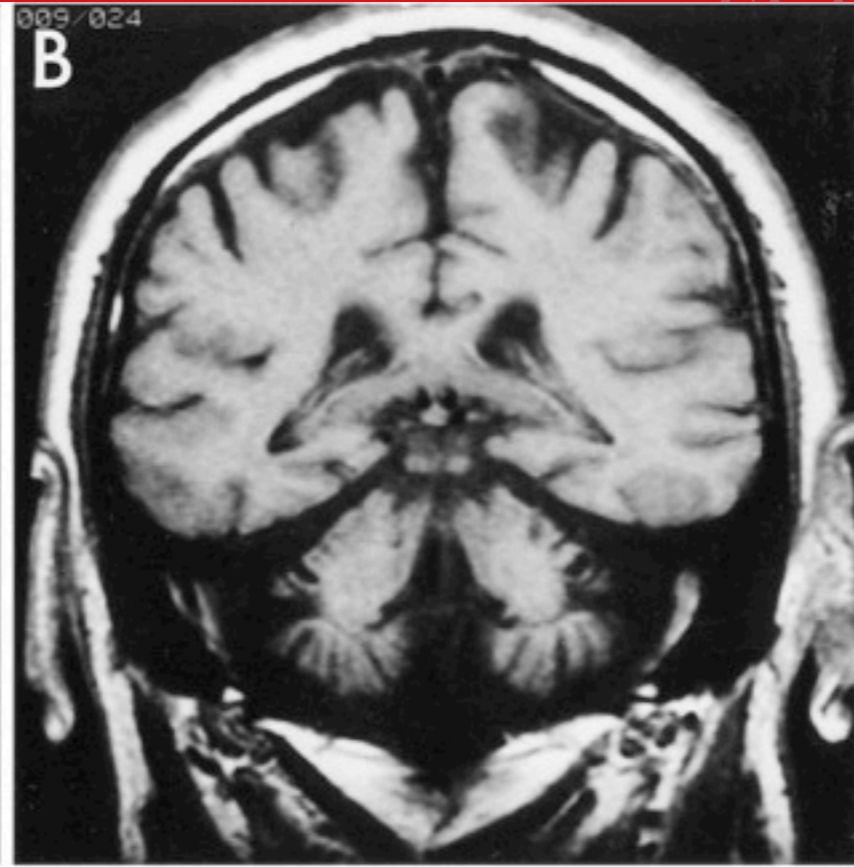
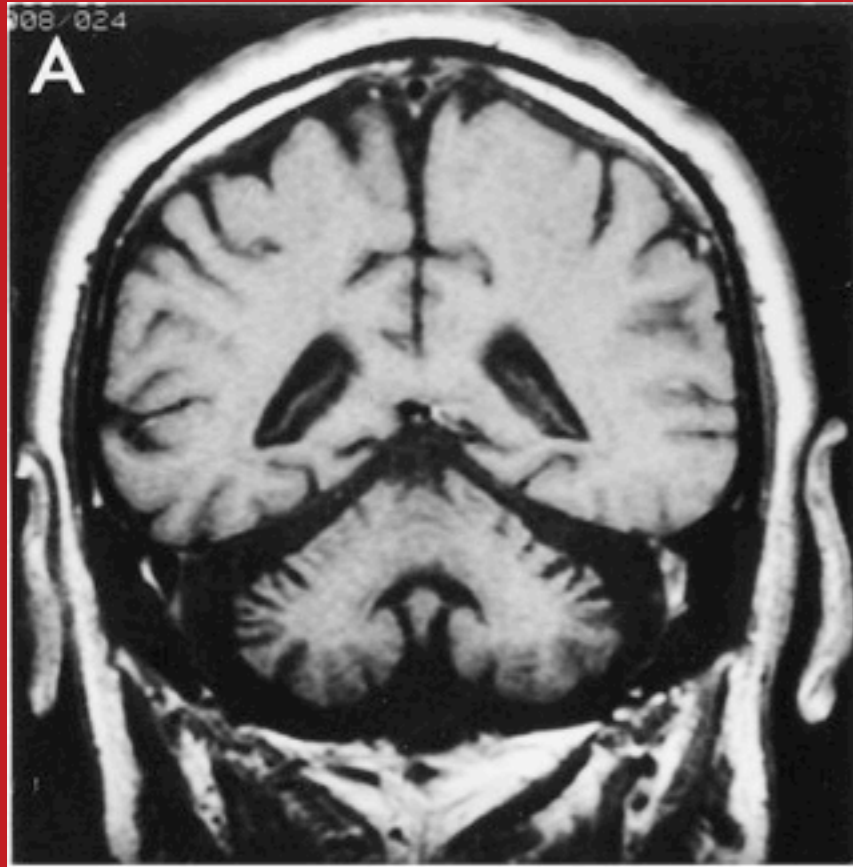


Figure 3. T1-weighted parasagittal sections from the left (*A*) and right (*B*) sides of H. M.'s brain. The resected portion of the anterior temporal lobes is indicated bilaterally with an asterisk. The remaining portion of the intraventricular portion of the hippocampal formation is indicated with an open arrow. Scale bar (right of *A*), 5 cm in 1 cm increments. Approximately 2 cm of preserved hippocampal formation is visible bilaterally. Note also the substantial cerebellar degeneration obvious as enlarged folial spaces.



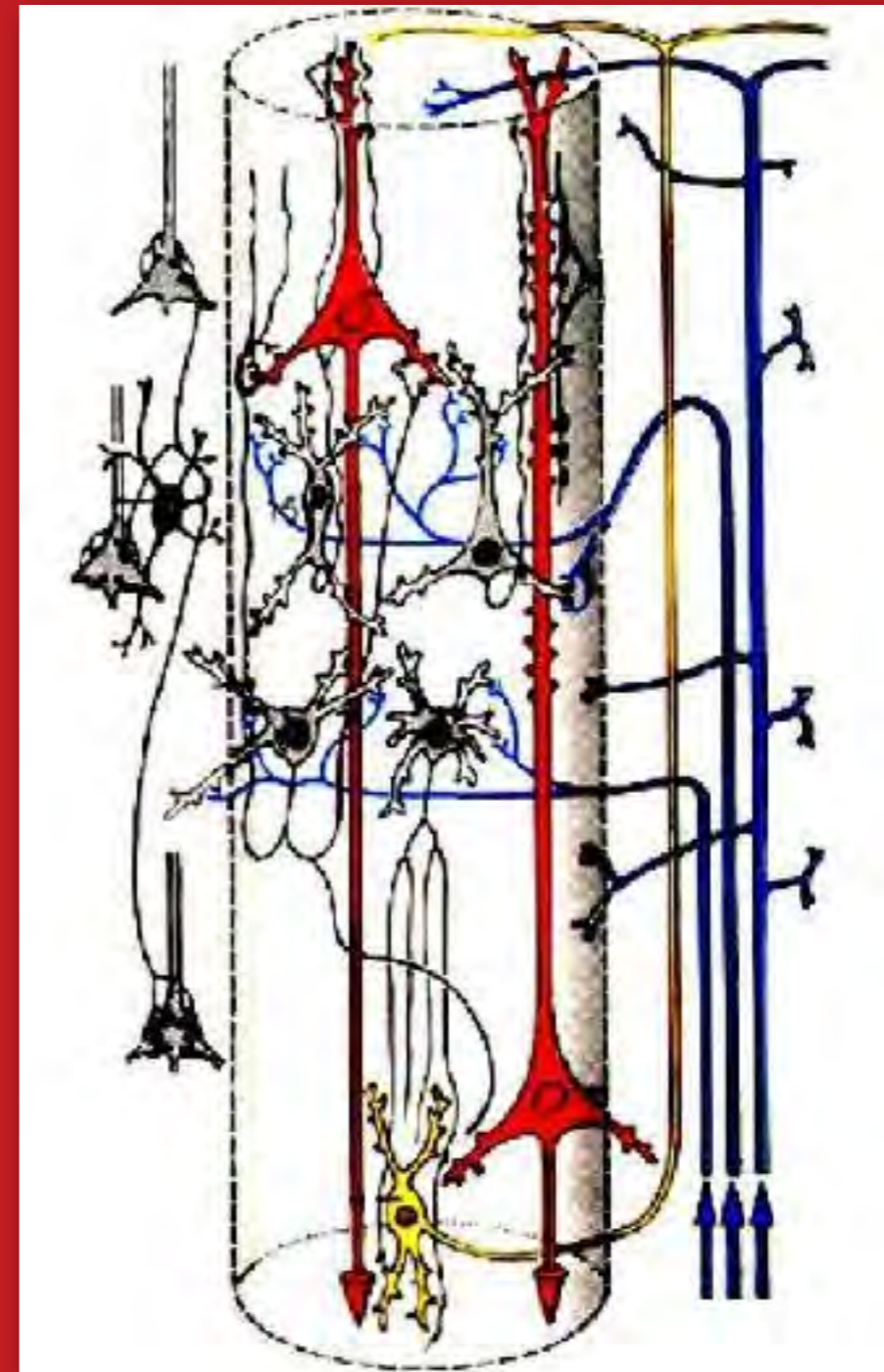
EFFETTI DELLA LOBECTOMIA TEMPORALE SINISTRA O DESTRA SUI VARI TEST DI MEMORIA

TEST	SN	DX
Geometric recall	-	+
Paired associate non sense figures	-	+
Recongnition of non sense figures	-	+
Recurring of non sense figures	-	+
Recognition of faces	-	+
Recognition of unfamiliar melodies	-	+
Recognition of tunes	-	+
Recall of stories	+	-
Paired-associate words	+	-
Recognition of words-numbers	+	-
Recurring nonsense syllabes	+	-

A complicated circuit

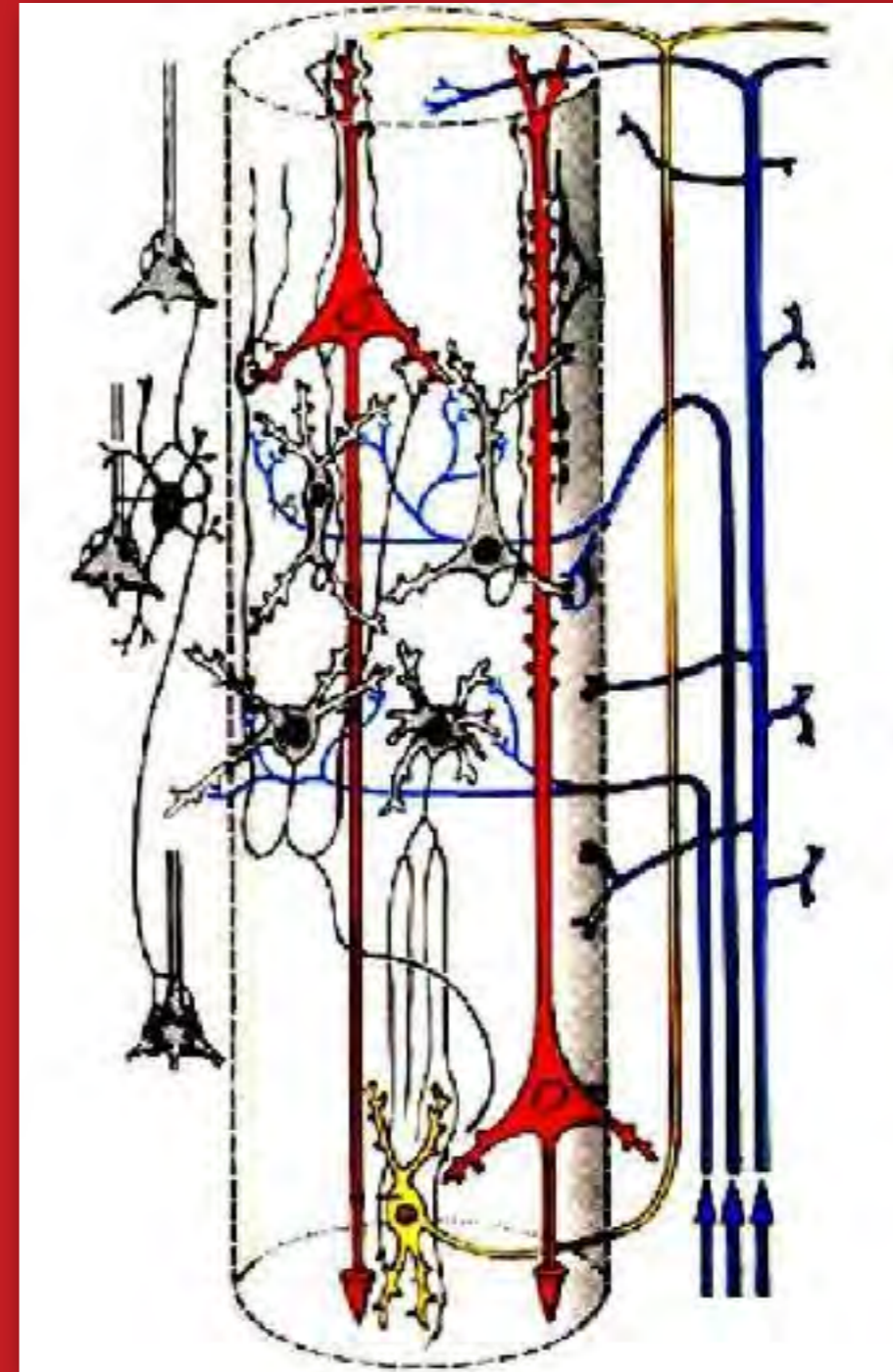
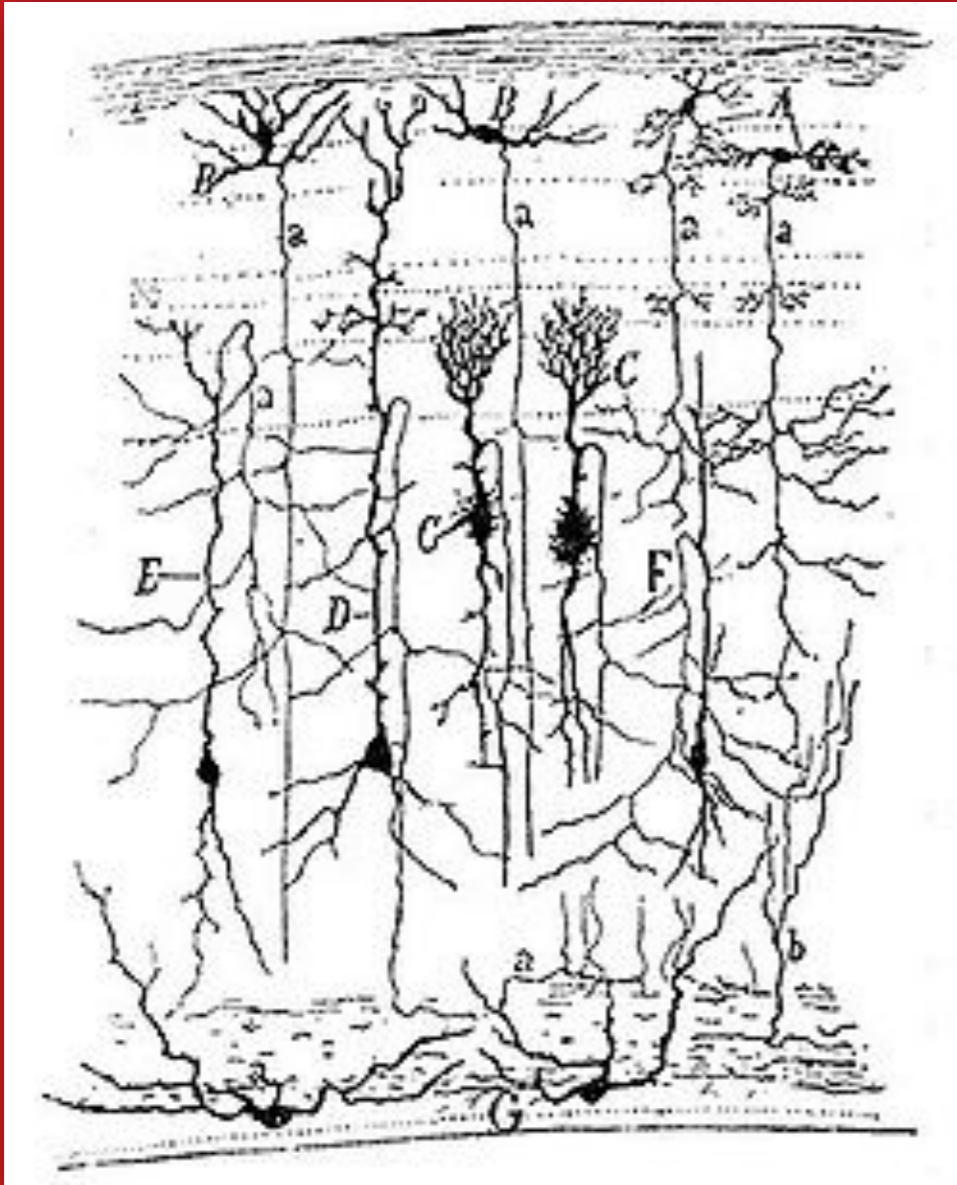


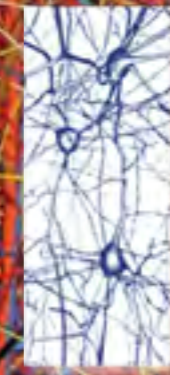
Cortical column



About 10^4 neurons

Cortical column



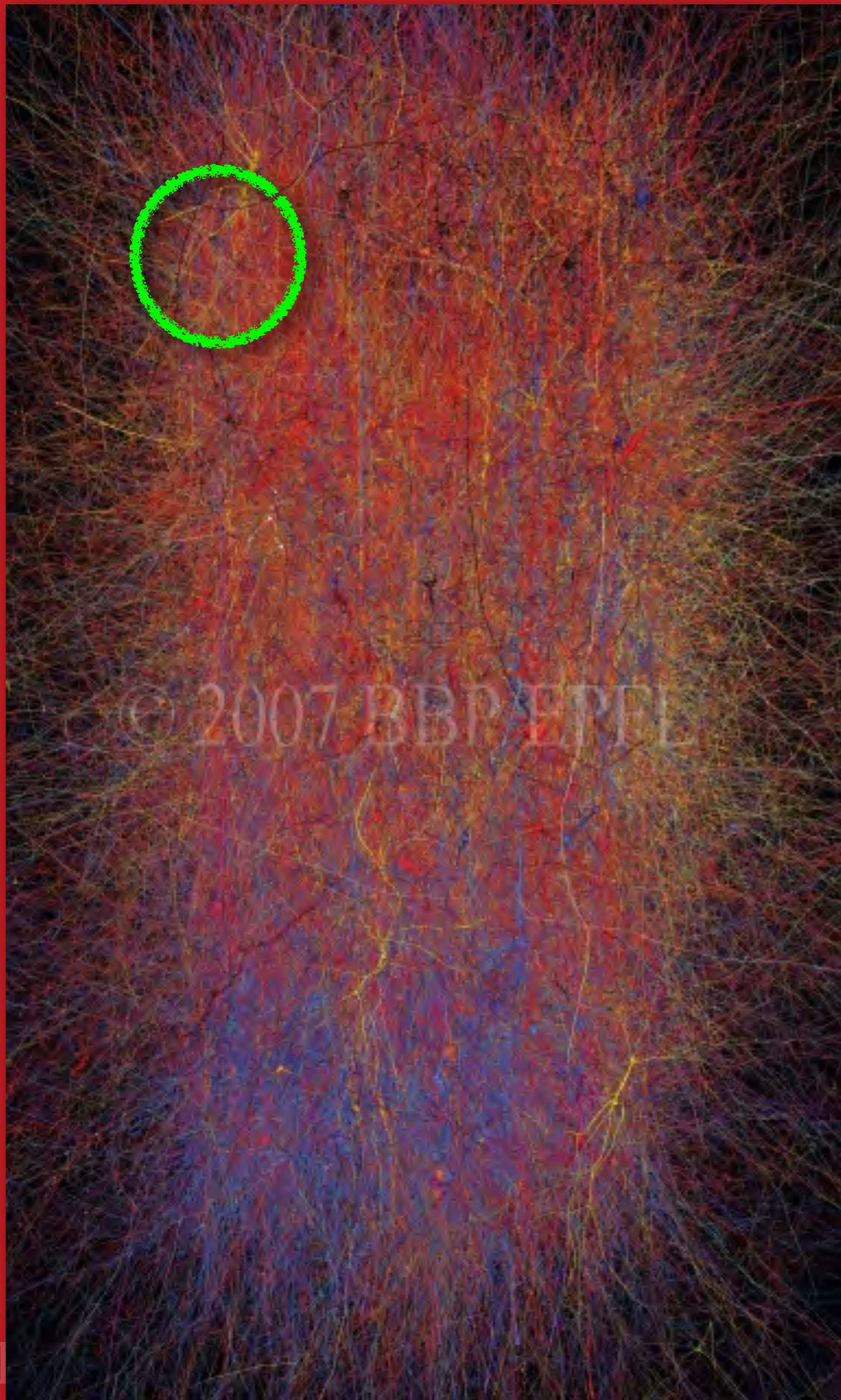


Blue Brain Project

A little bit complicated....



Blue Brain Project



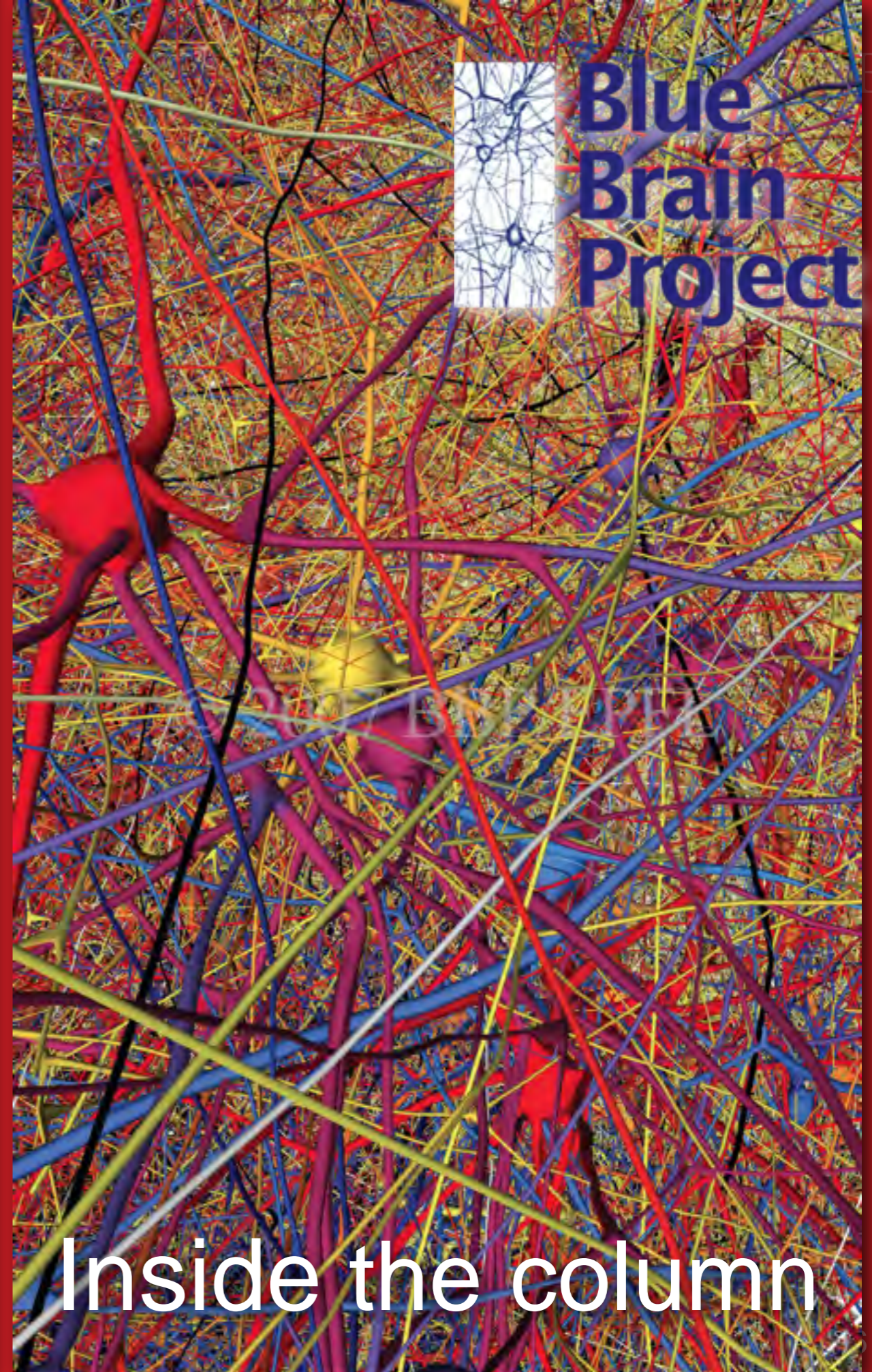
This small region

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A single neuron

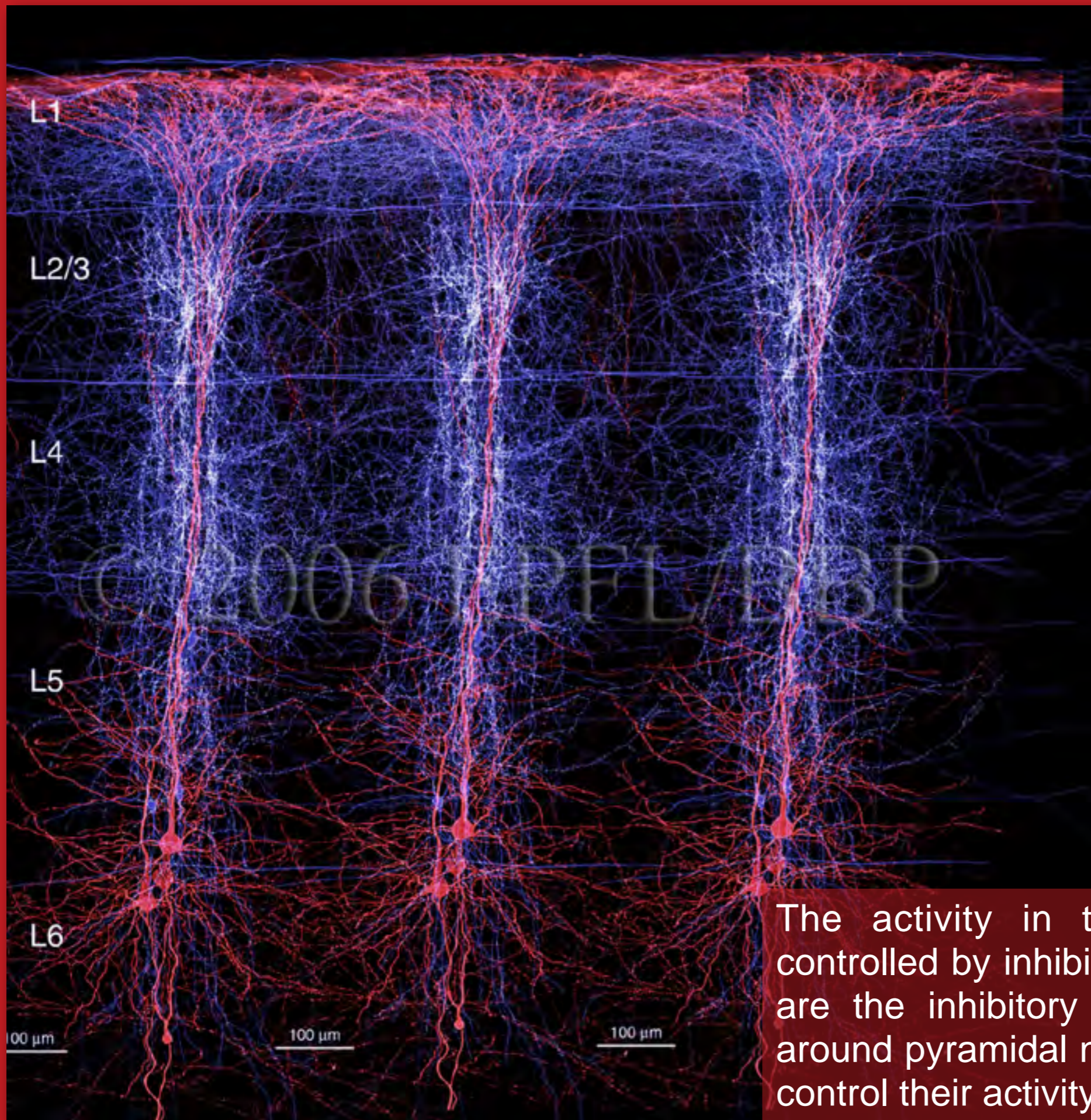


Inside the column



Layer four neuron in context





The activity in the neocortex is tightly controlled by inhibitory neurons. Shown here are the inhibitory fibers in blue that wrap around pyramidal neurons, in red, in order to control their activity and prevent epilepsy.

.....all neural functions rely on:

- the ability of neurons to generate one/more action potentials (bit of information)
- the possibility to send these bits (conduction along a short or long axon)
- the possibility to exchange these bits (synaptic function) and integrate them