



 UCLouvain

**Secteur des Sciences de la santé**  
**Faculté de Médecine**  
**Cours WMDS ANAT 1311**  
**Année académique 2010-2021**

26 novembre 2020

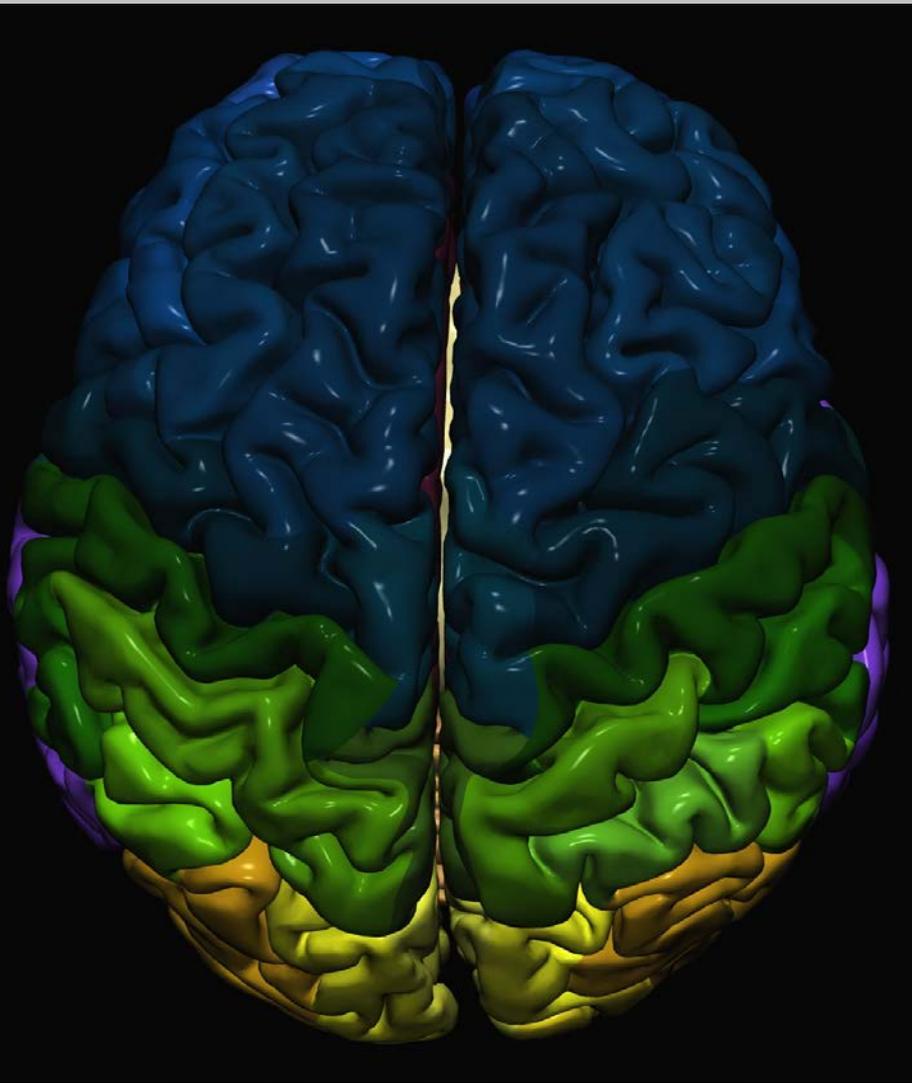
# Neuroanatomie radiologique

Pr. Thierry DUPREZ

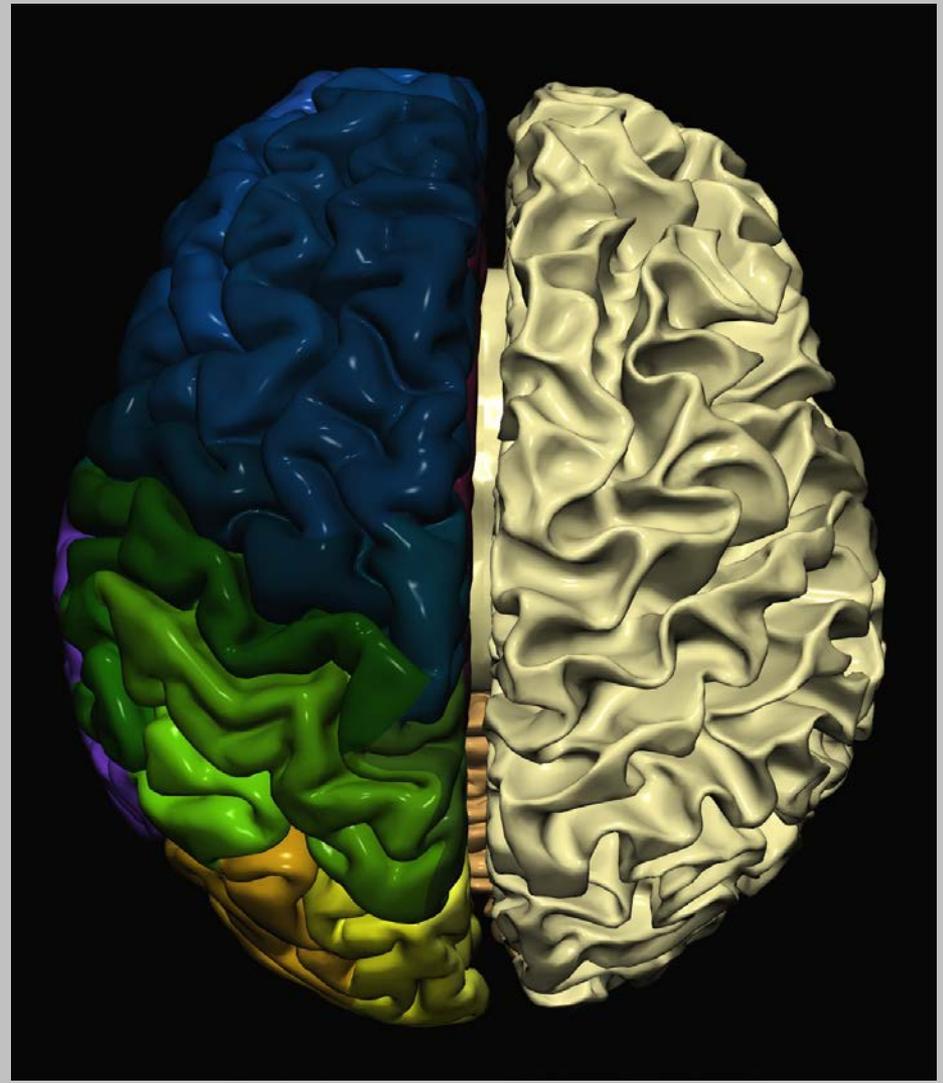


**Module 4:** anatomie de la sous-corticalité  
overview de l'IRM neuro en routine clinique

# **Anatomie de la sous-corticalité**

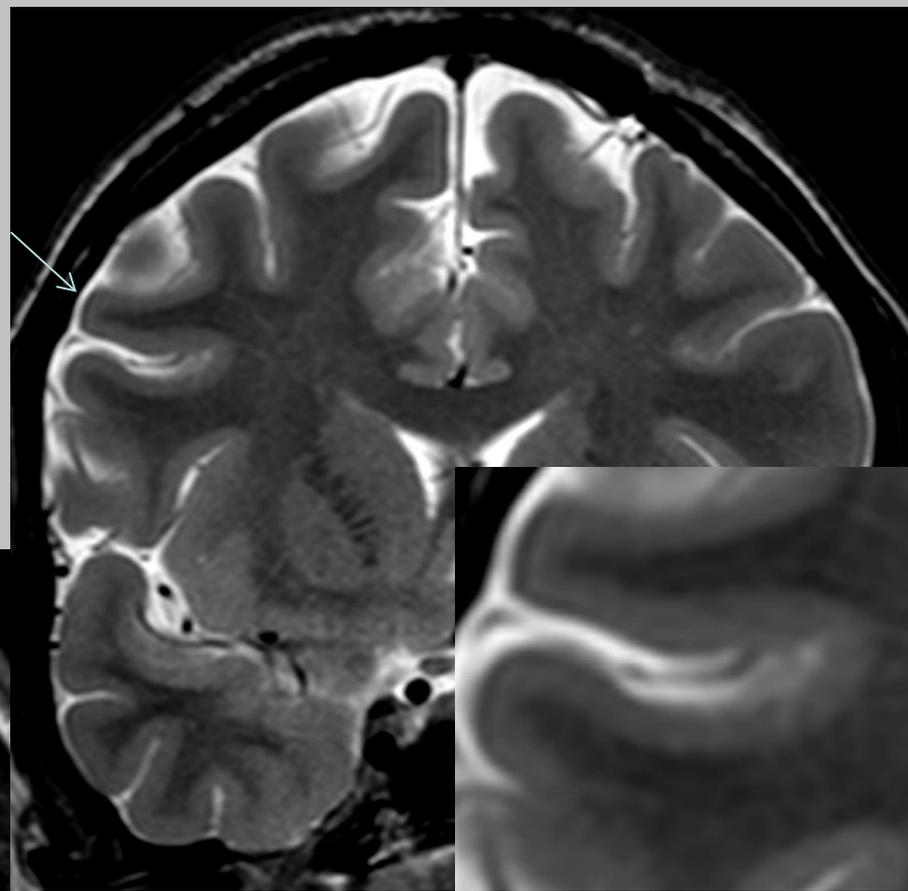


**Surface corticale**

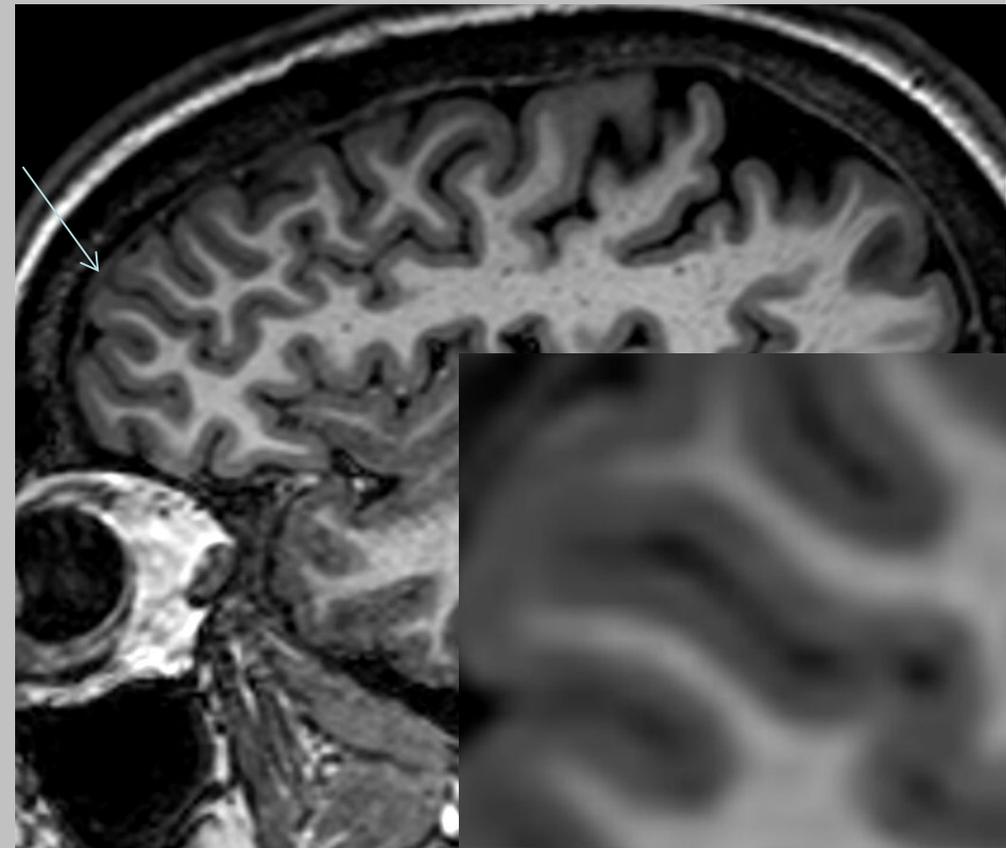


**Décortication:**  
substance blanche sous-corticale

Corticalité en pondération T1



Corticalité en pondération T2





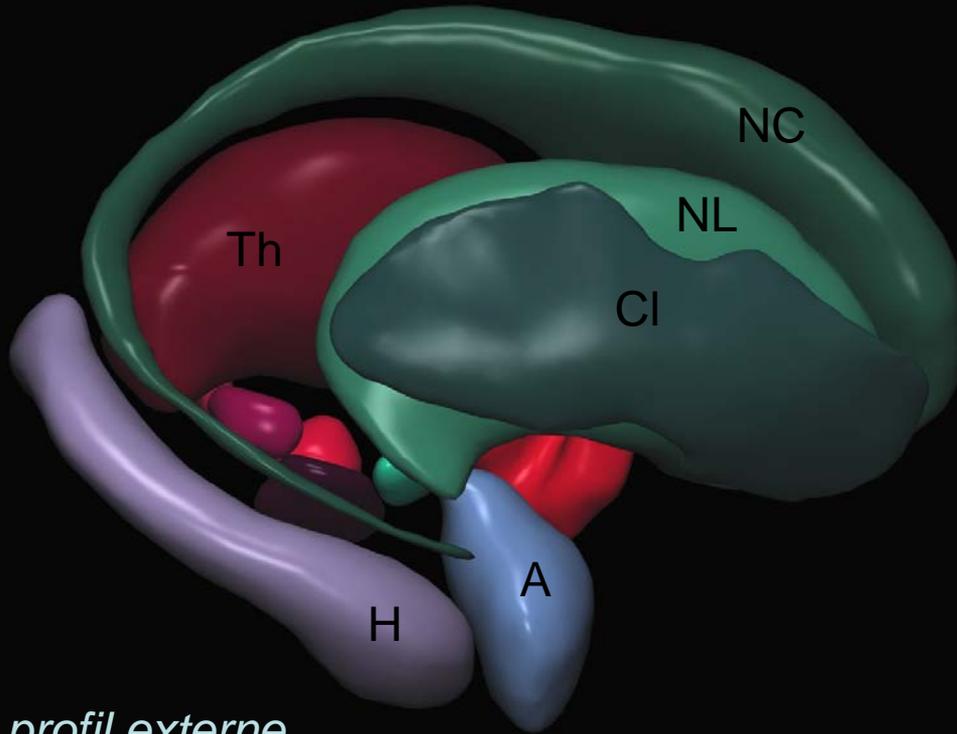
Ablation de la SB: **structures profondes**



Ablation des ventricules:  
**structures centrales 'pleines'**

# Noyaux Gris Centraux

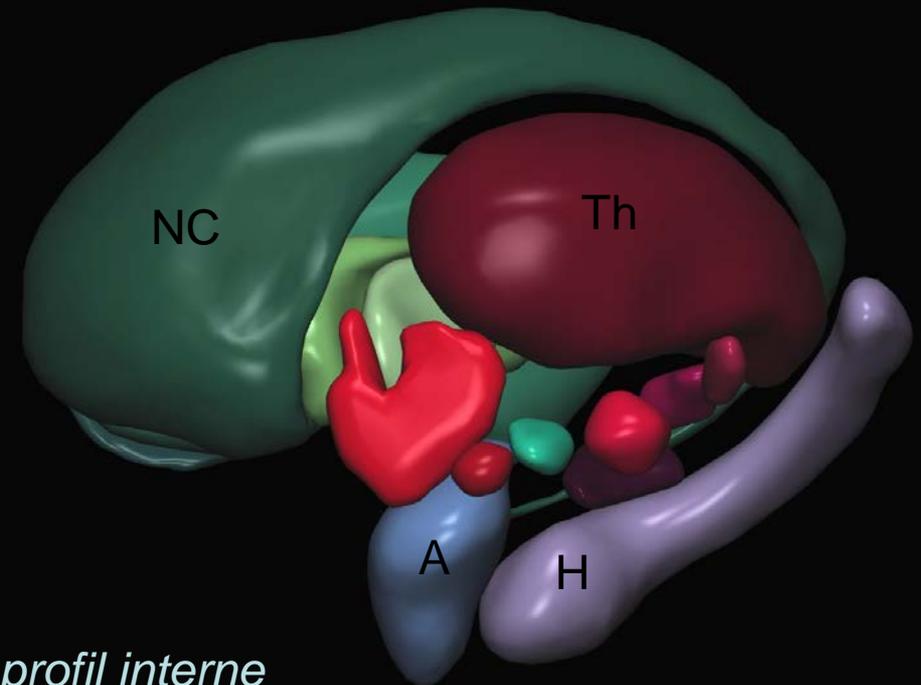
**C**lastrum  
**N**oyau **C**audé  
**N**oyau **L**enticulaire  
**T**halamus



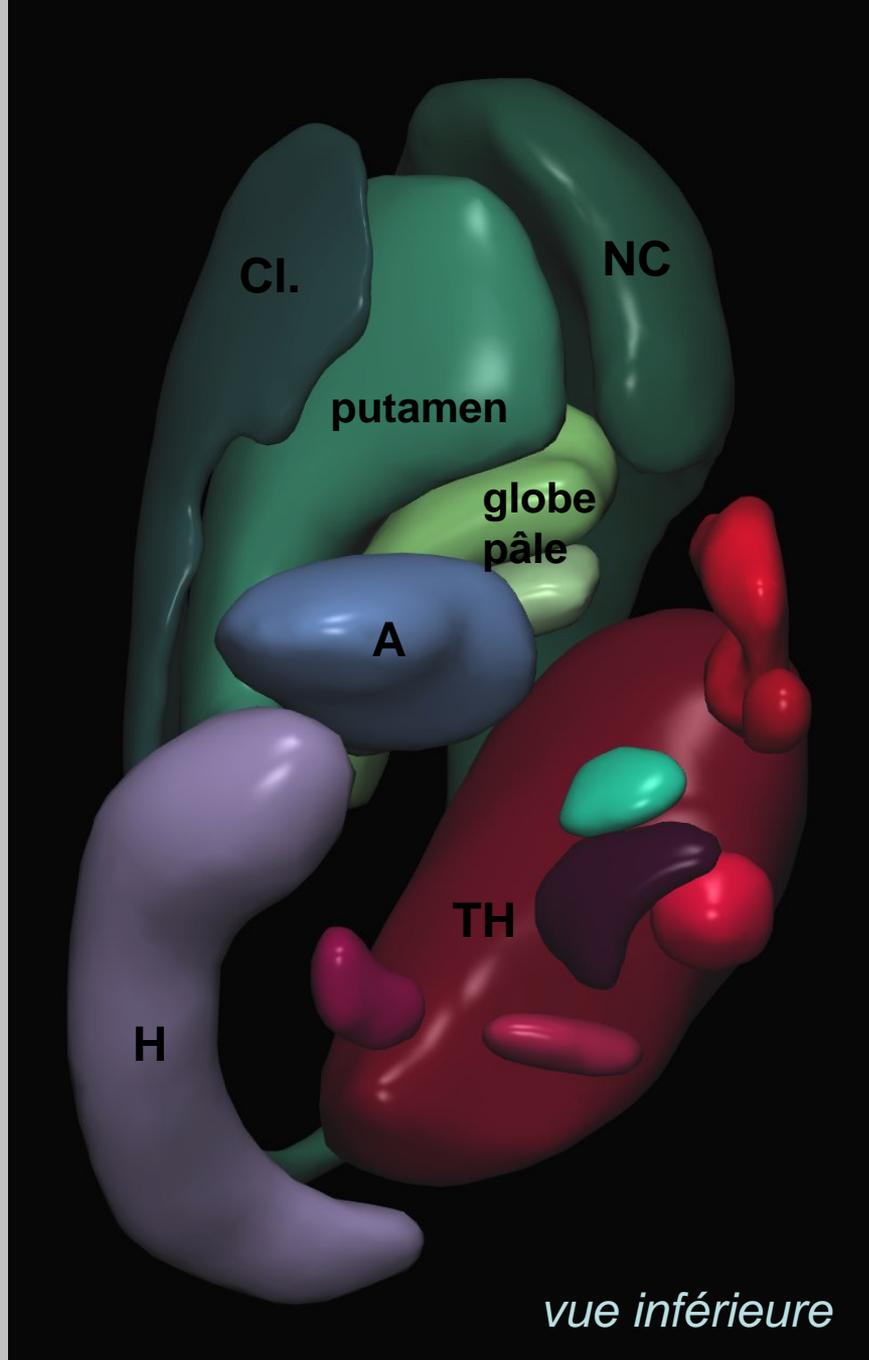
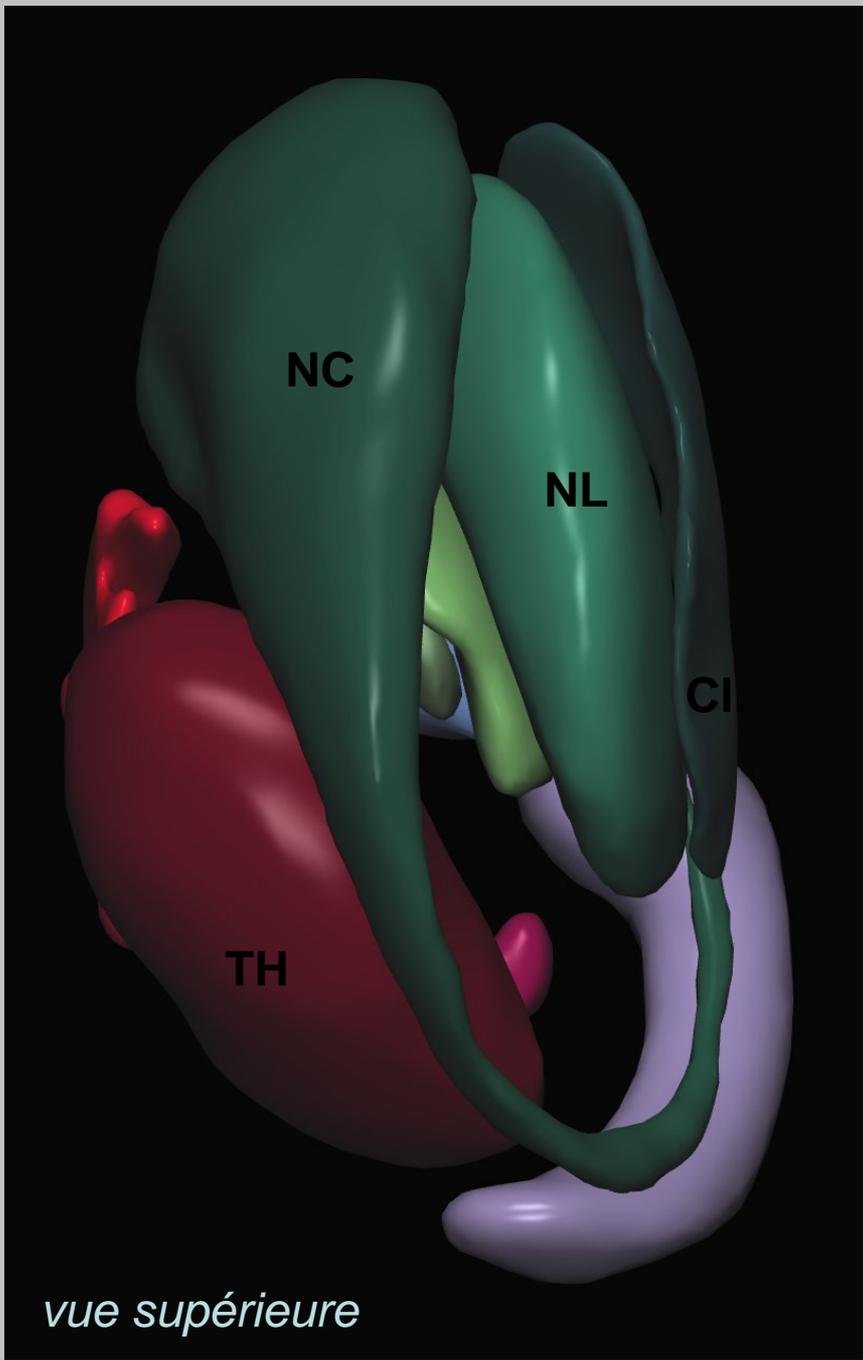
*profil externe*

## Gyri du 'cerveau primitif'

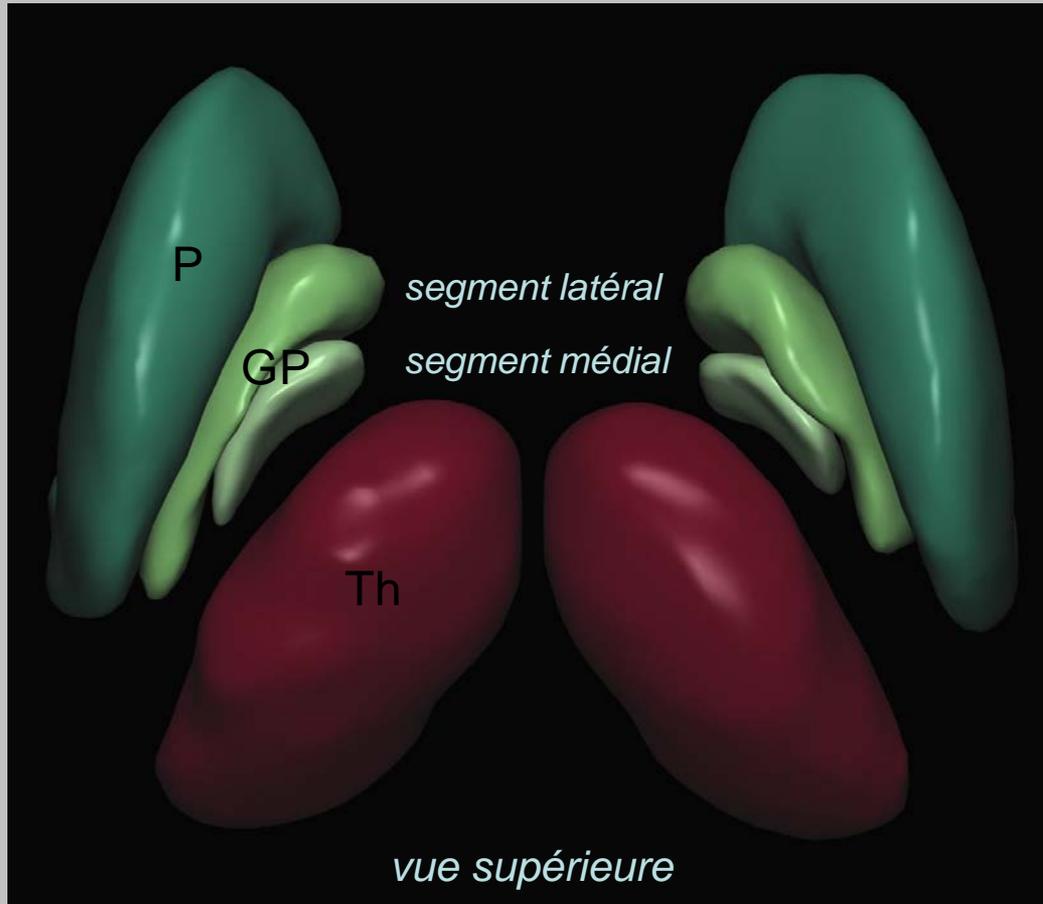
**H**ippocampe  
**A**mygdale



*profil interne*

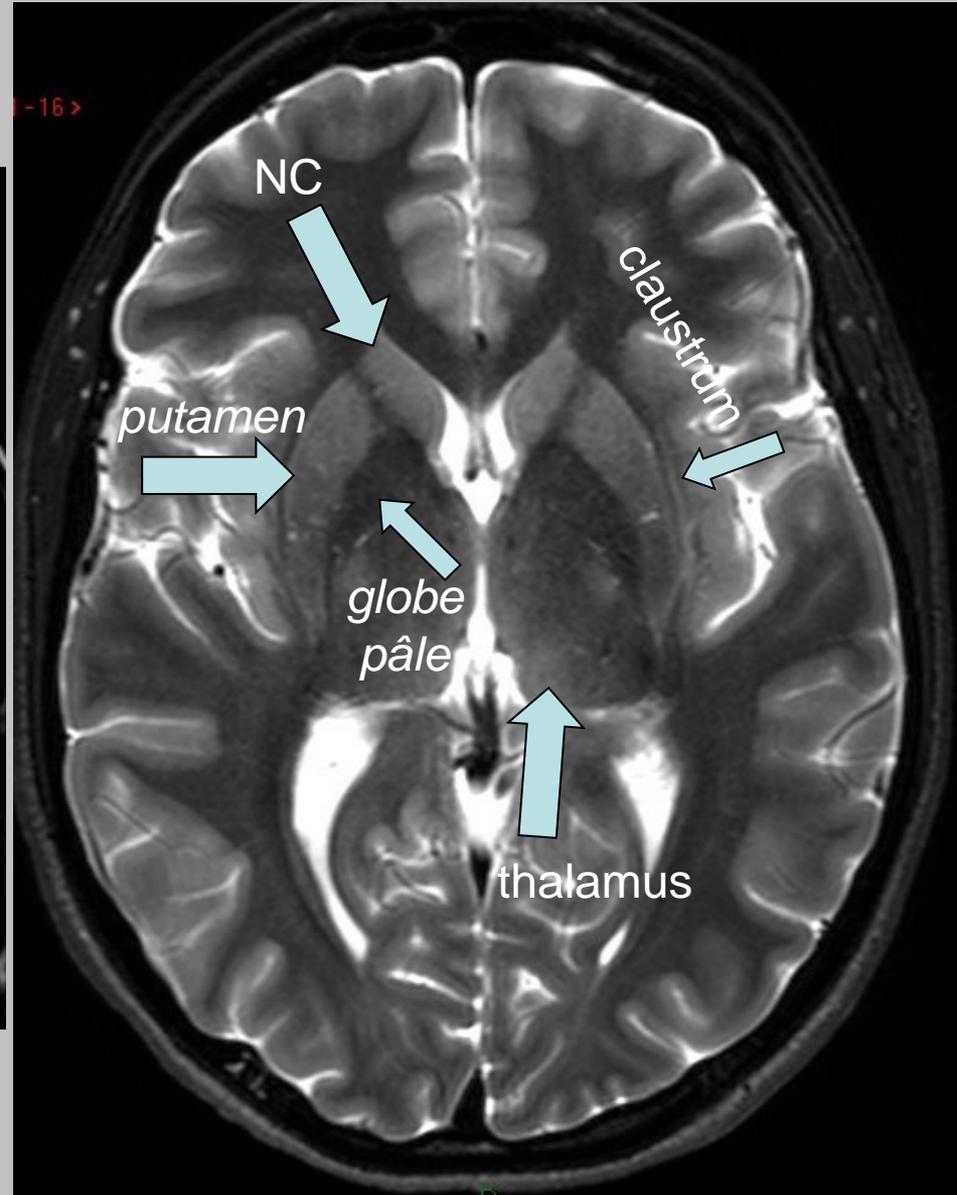
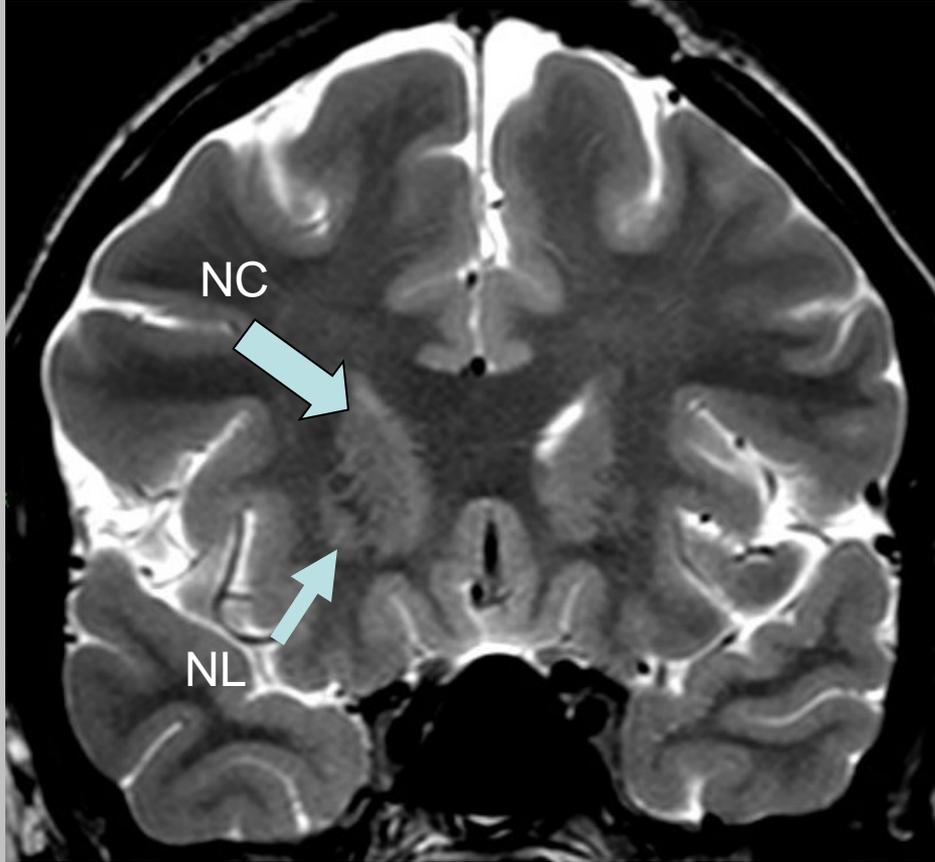


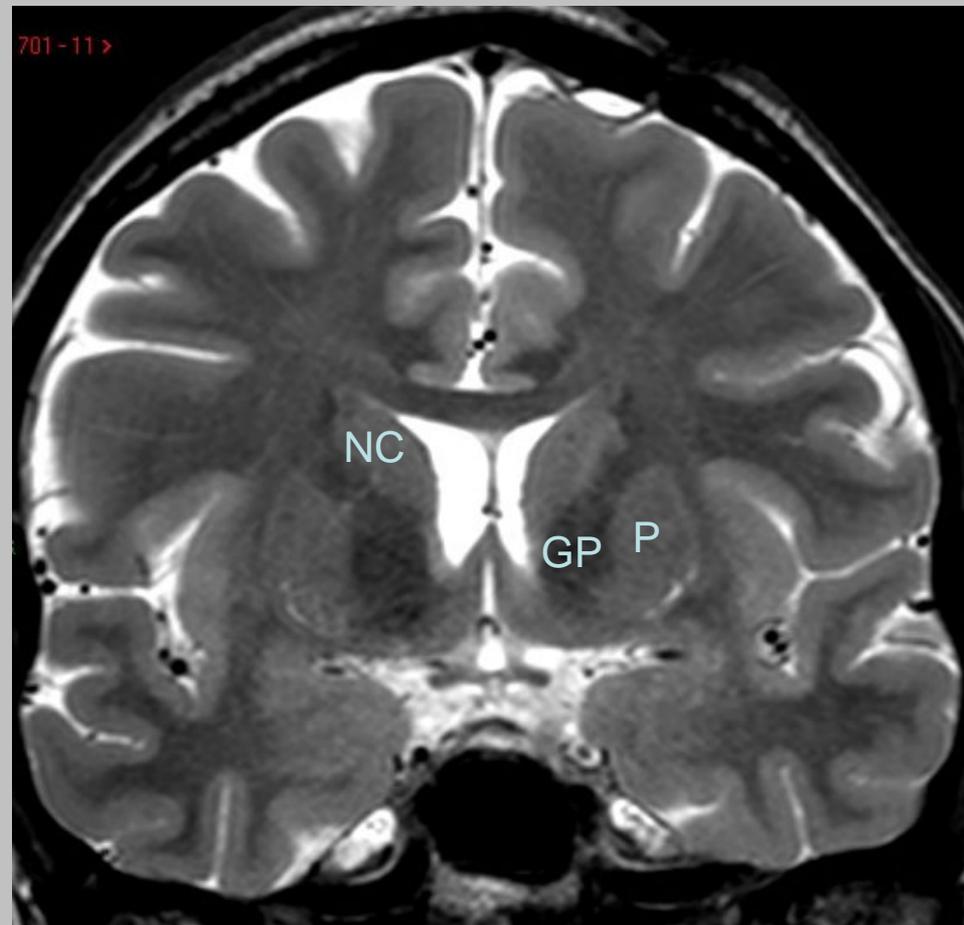
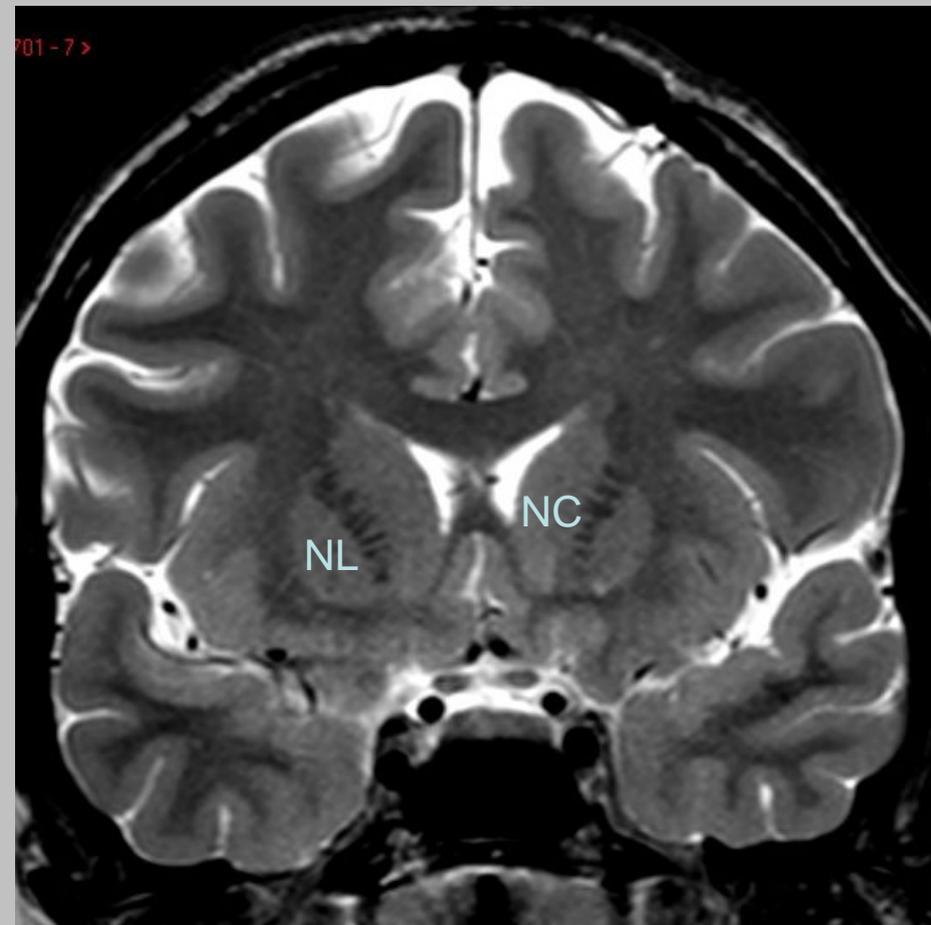
## Thalamus + noyau lenticulaire

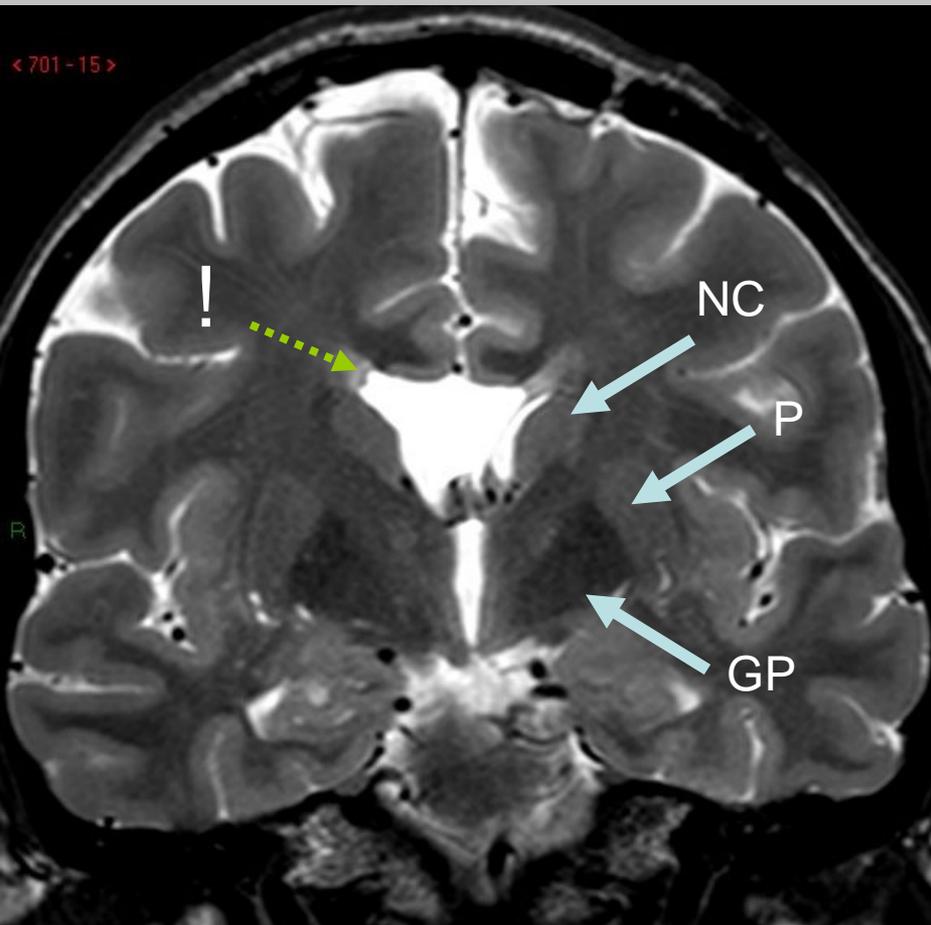


### Noyau lenticulaire

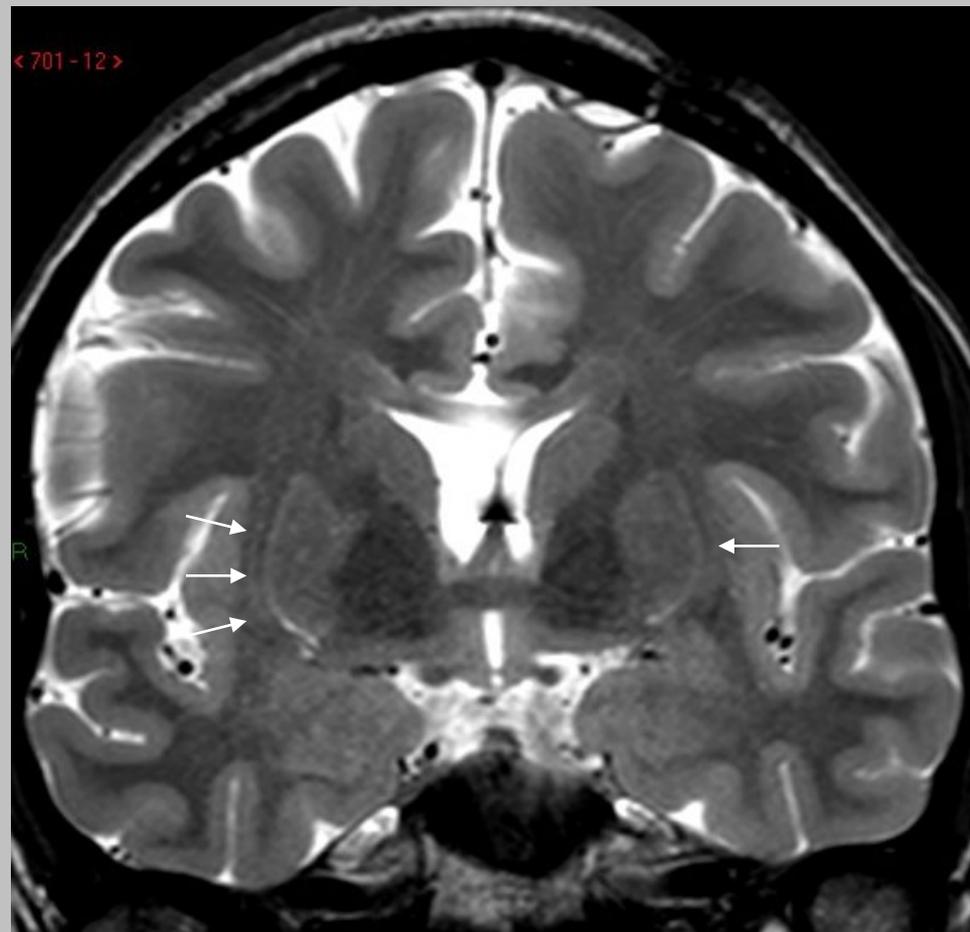
- Putamen (latéral)
- Globe pâle (medial)



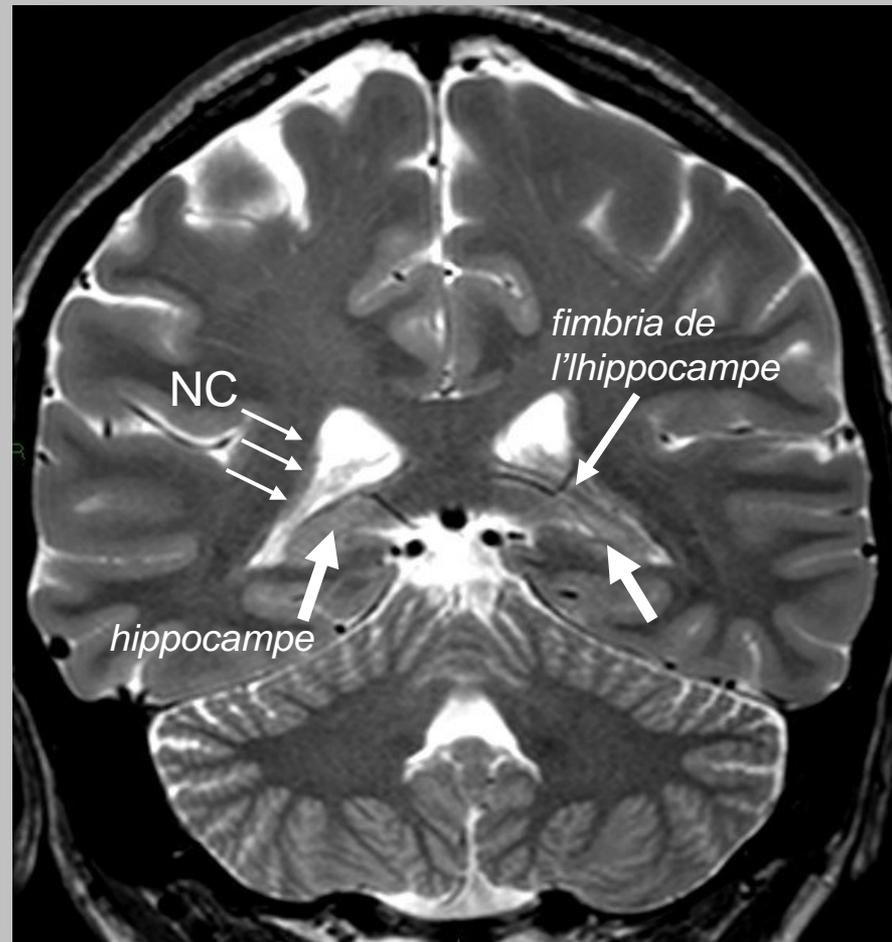
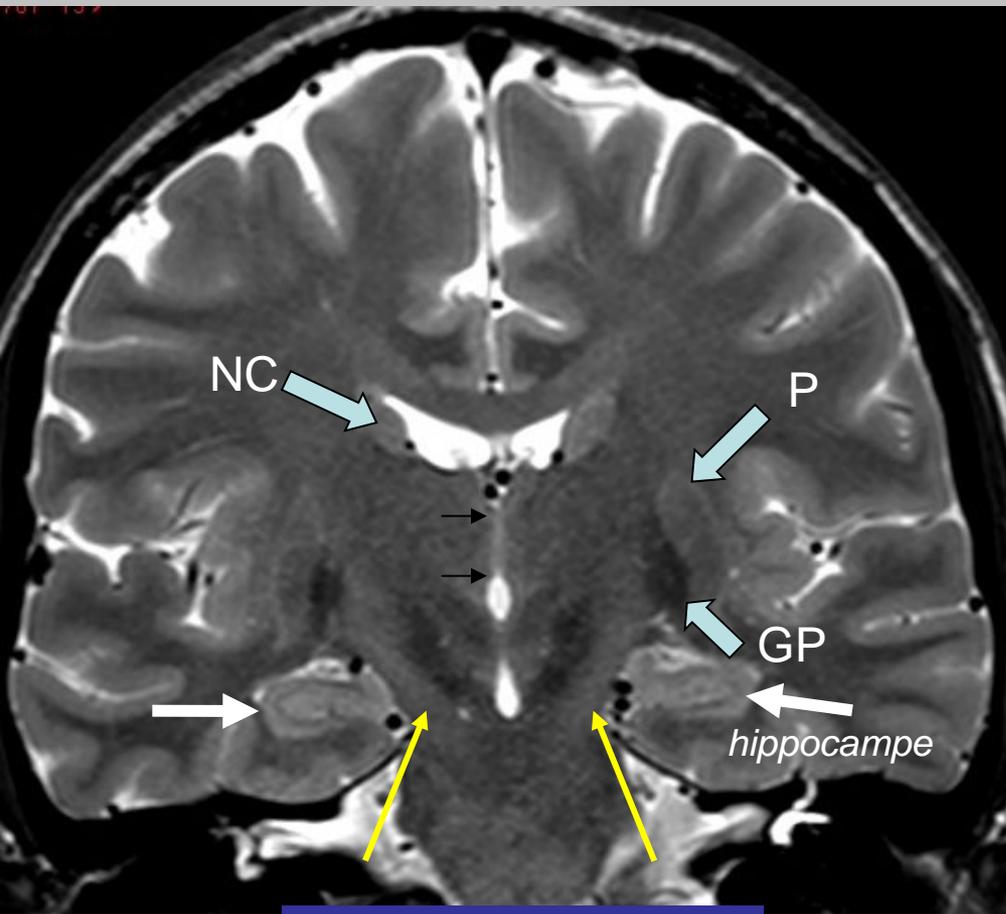




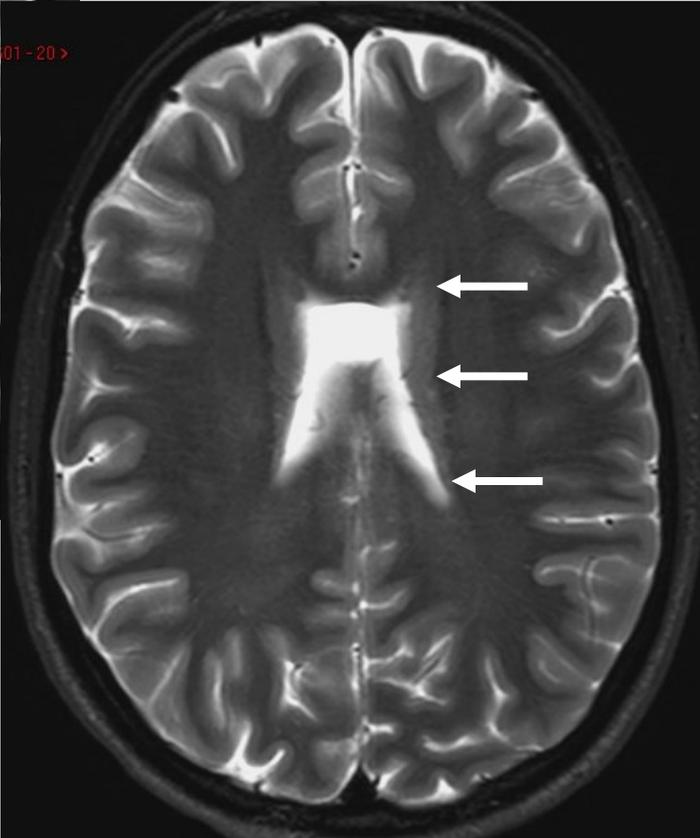
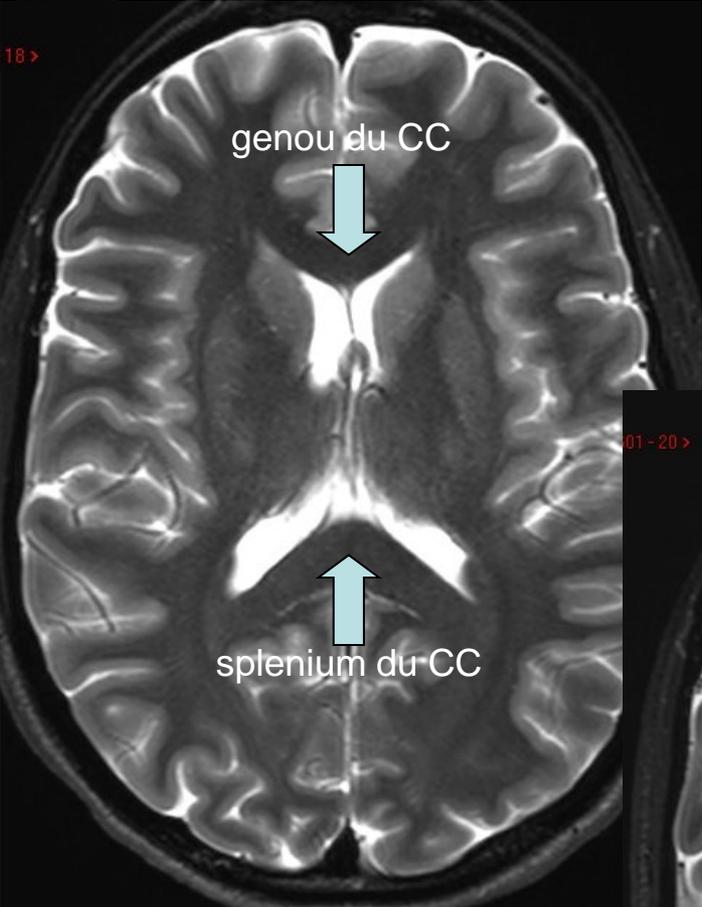
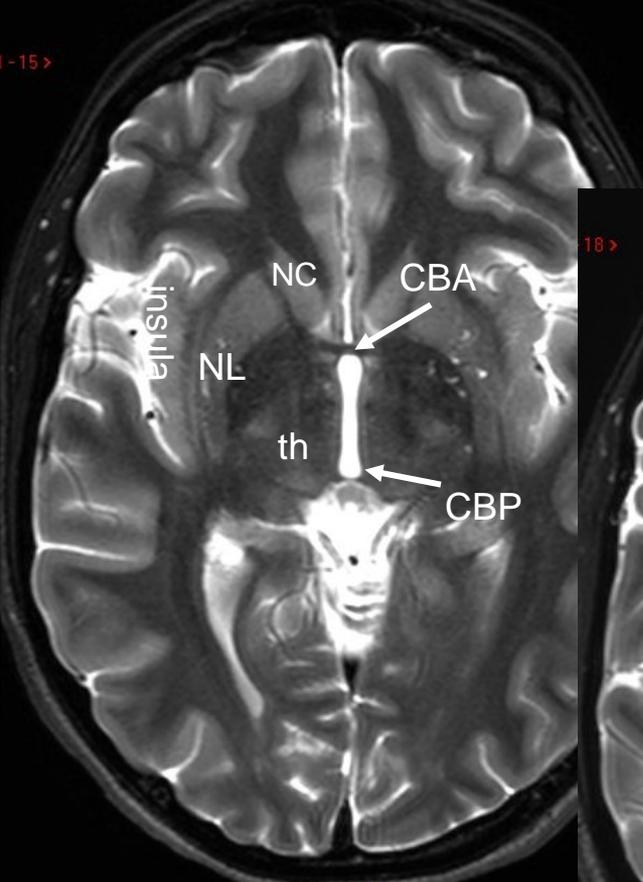
! exérèse focale partielle du CC



claustrum



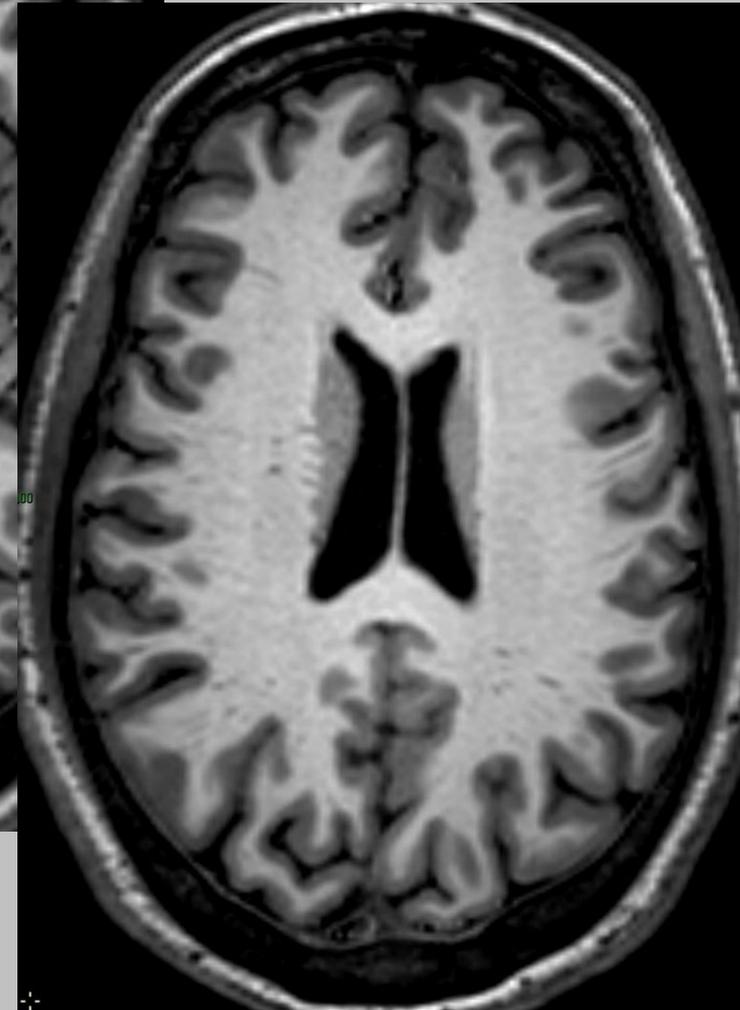
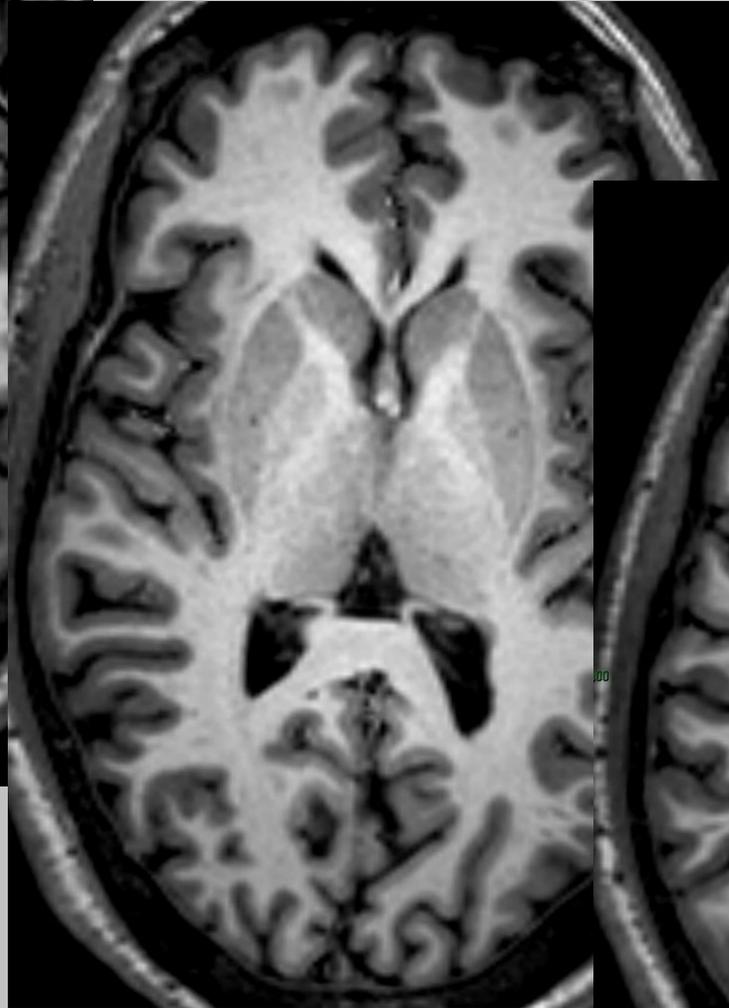
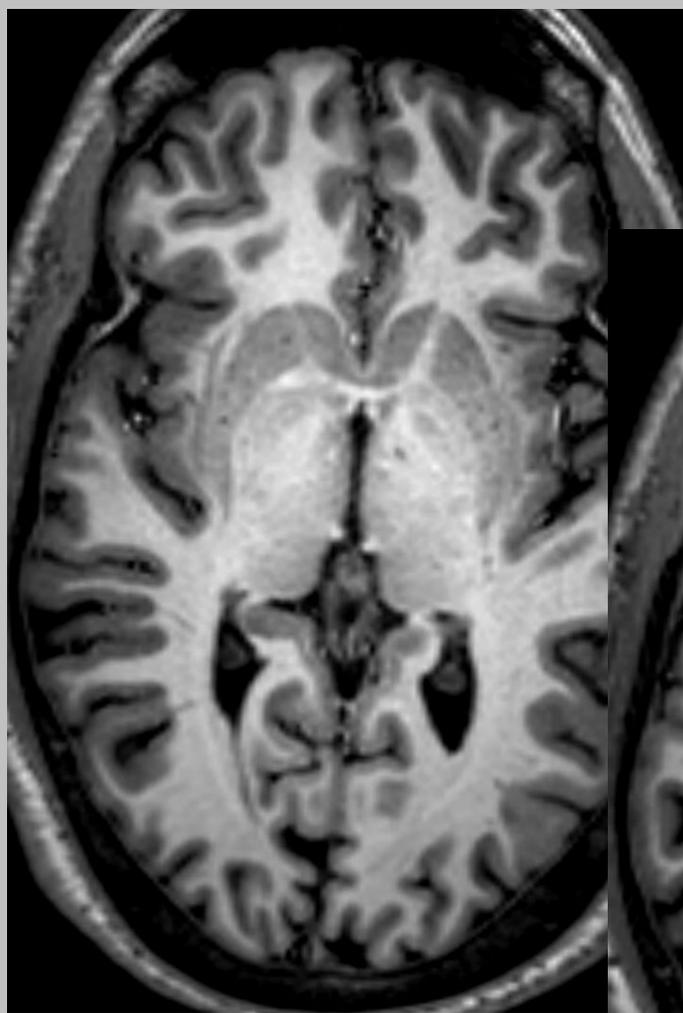
IRM – pondération T2



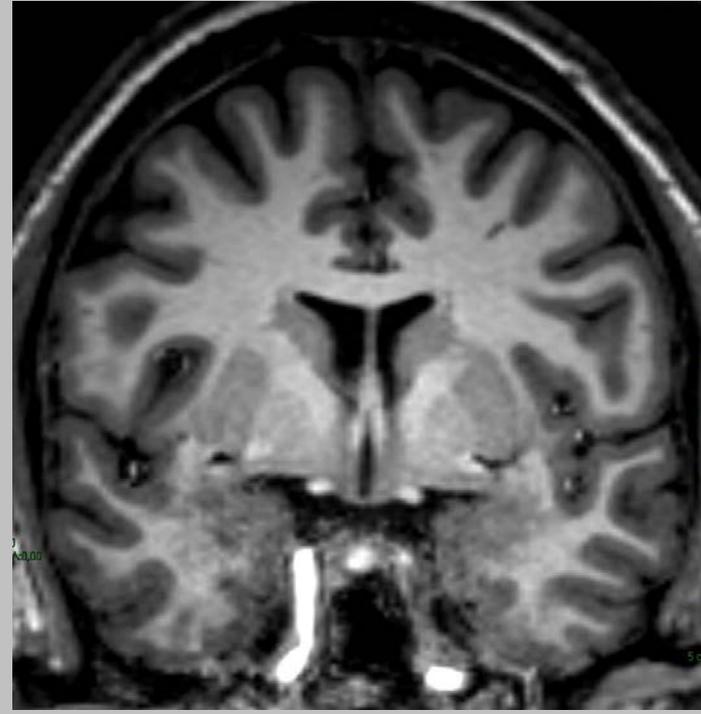
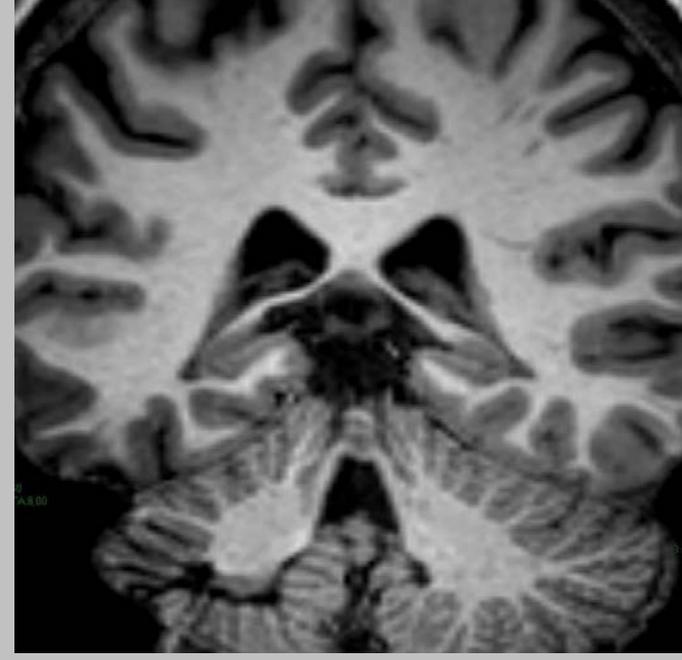
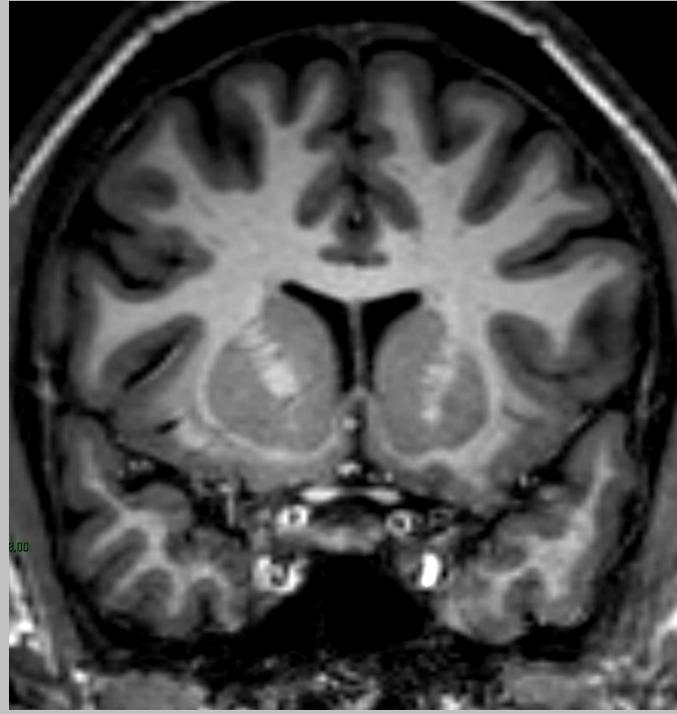
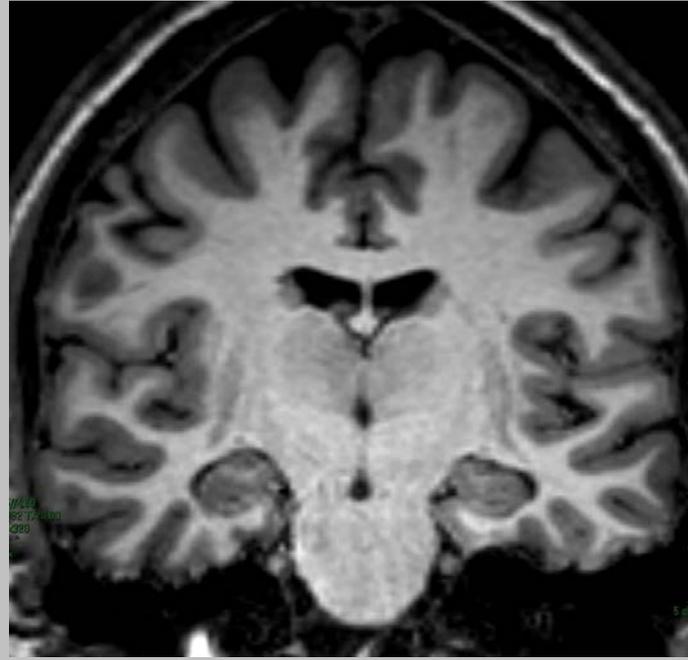
# IRM – pondération T1

## Capsule interne

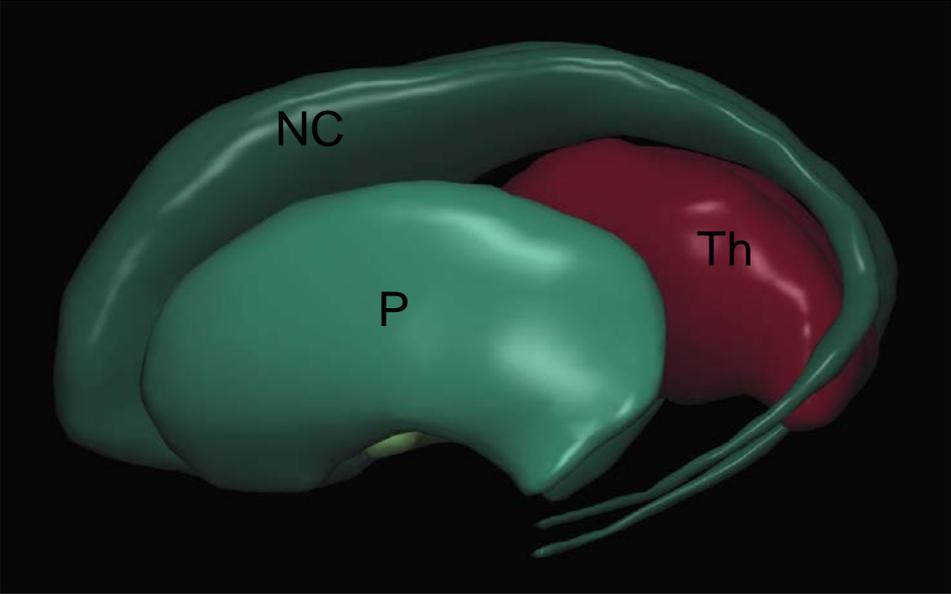
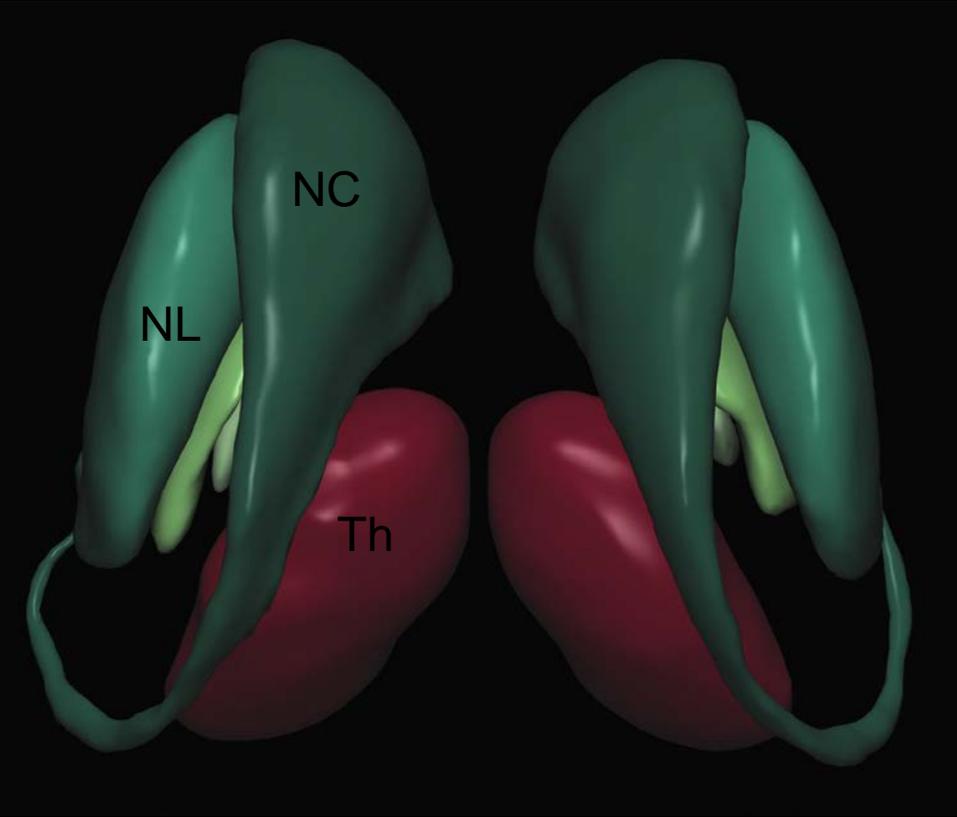
- Bras antérieur
- Genou
- Bras postérieur

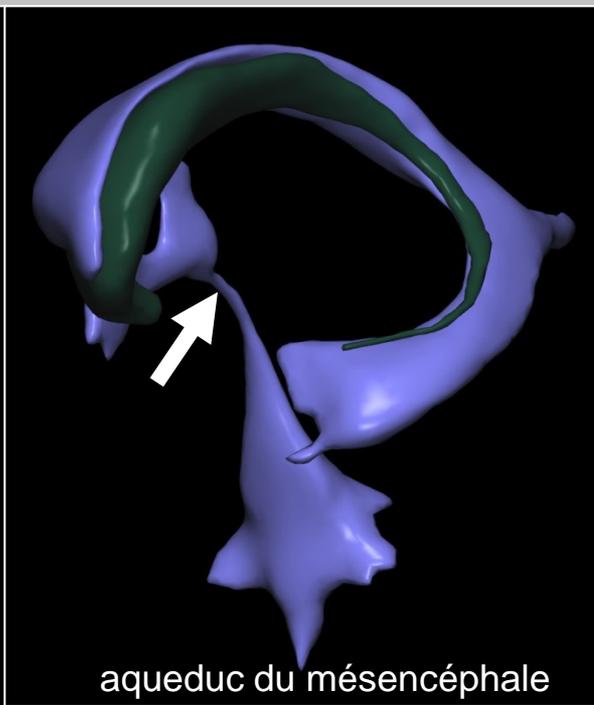
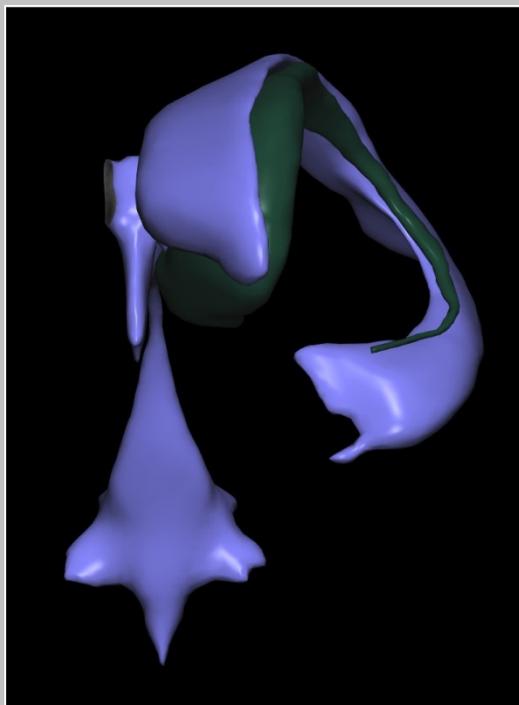


# IRM – pondération T1

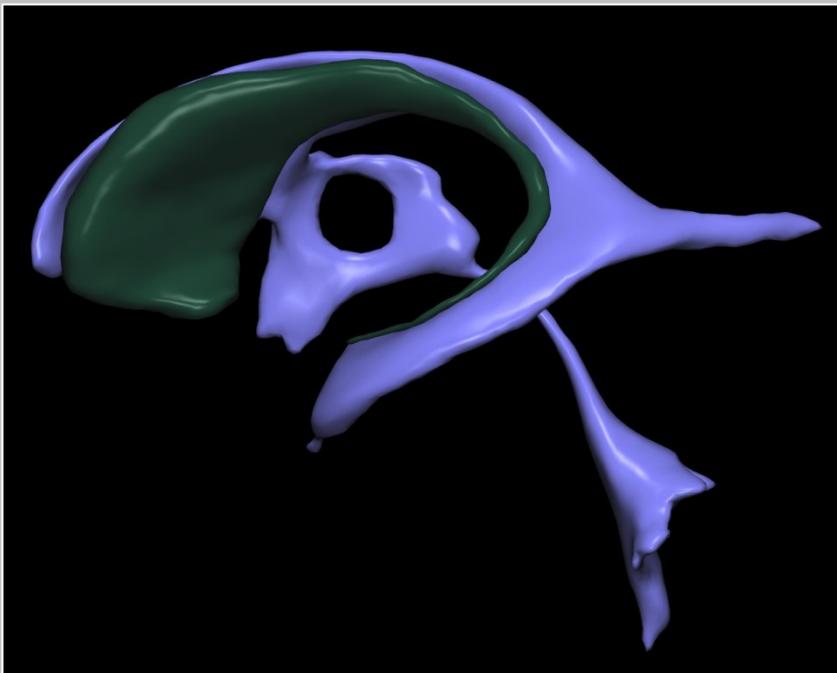
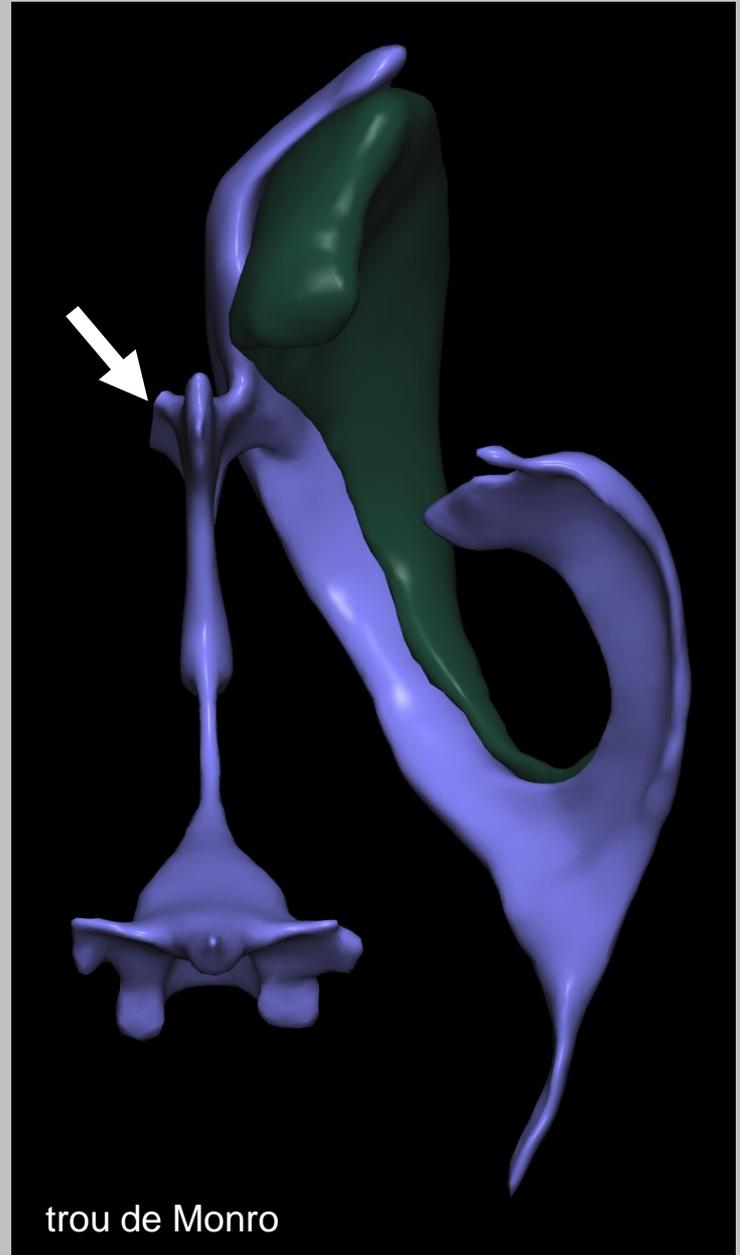


# Noyau caudé

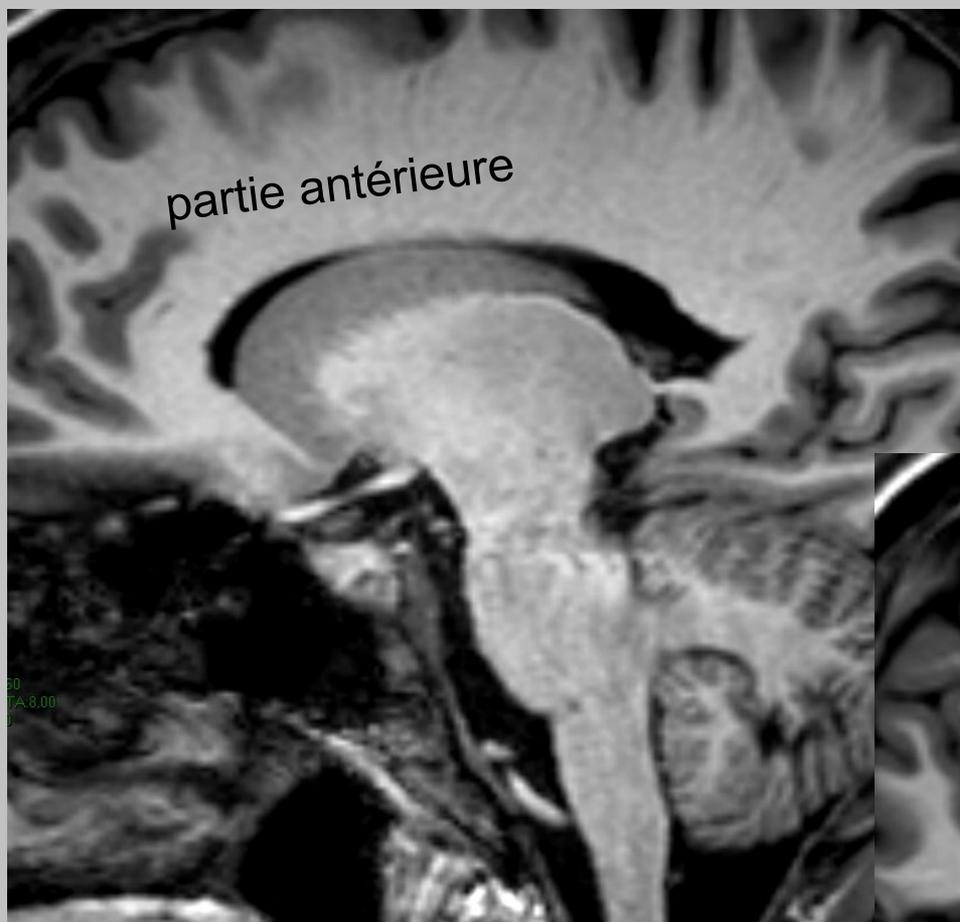




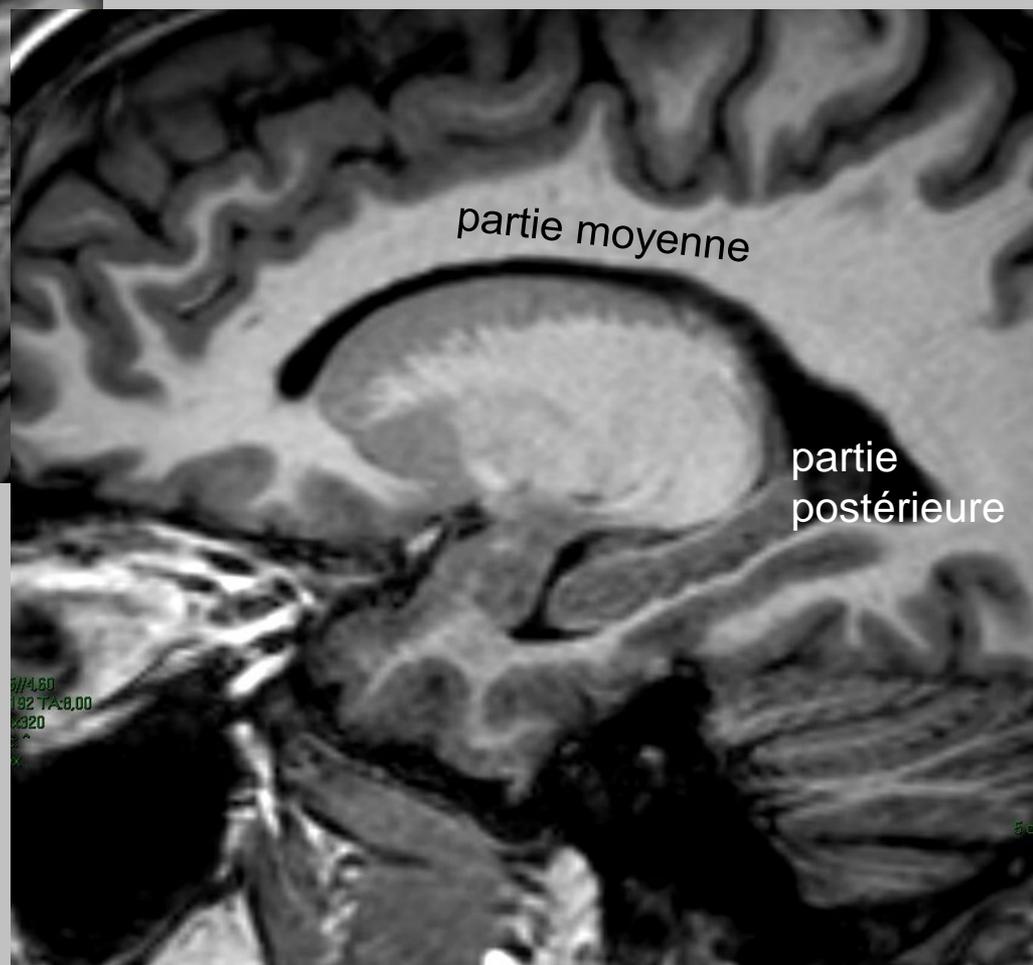
## Noyau caudé +VL



trou de Monro

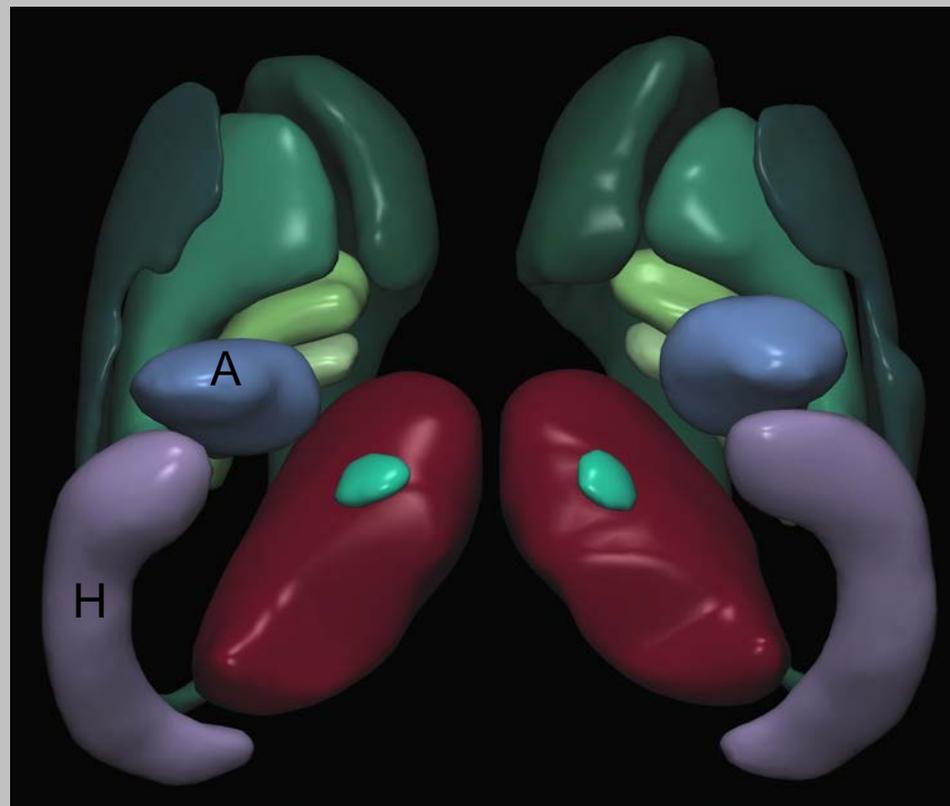
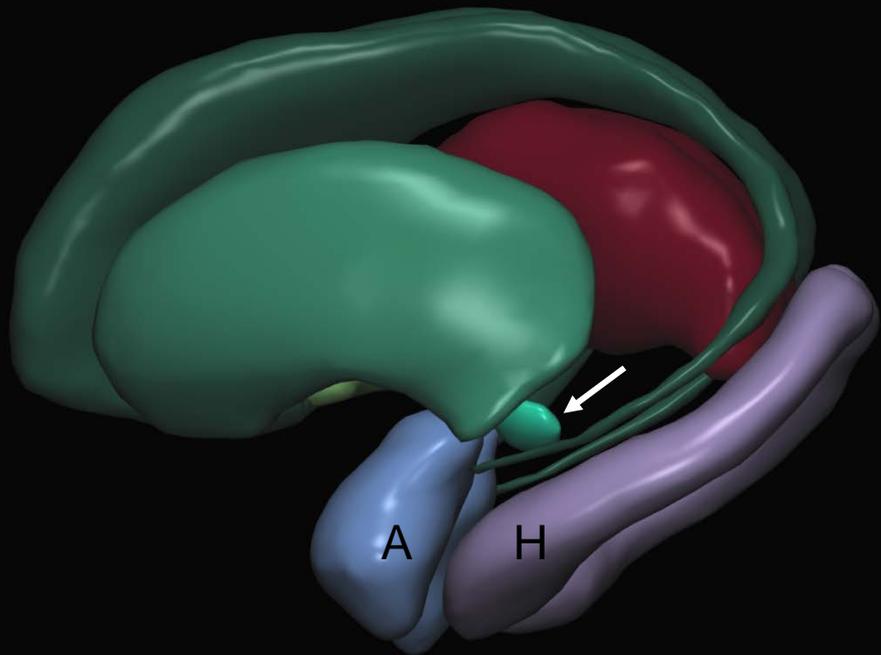


Noyau caudé + VL



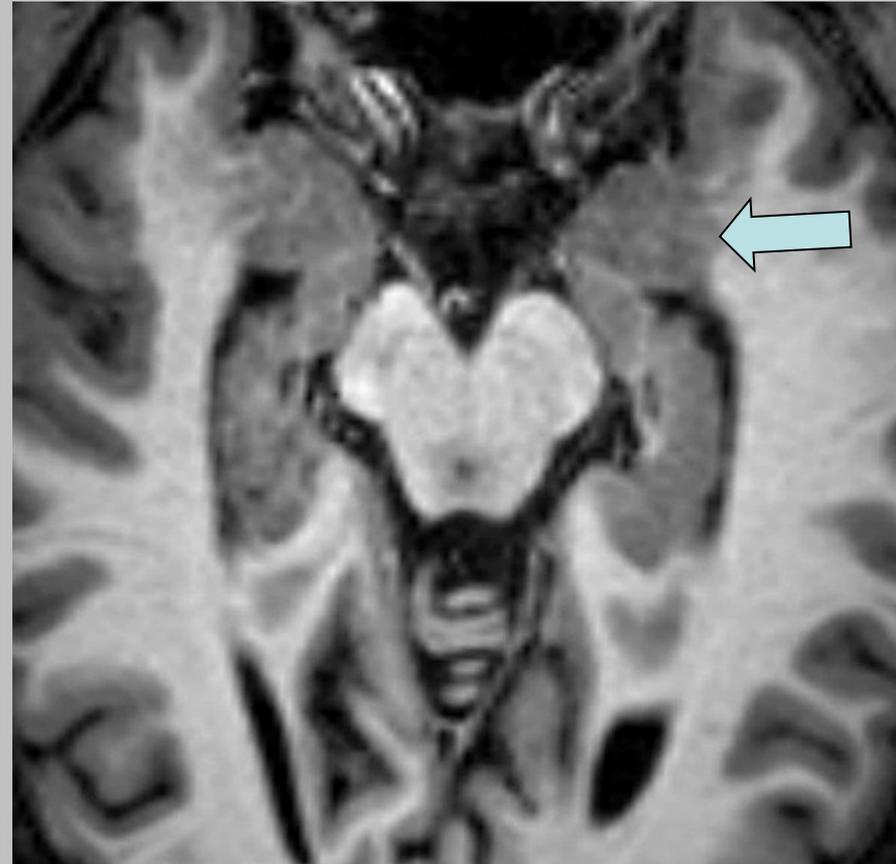
Vue latérale

Vue inférieure

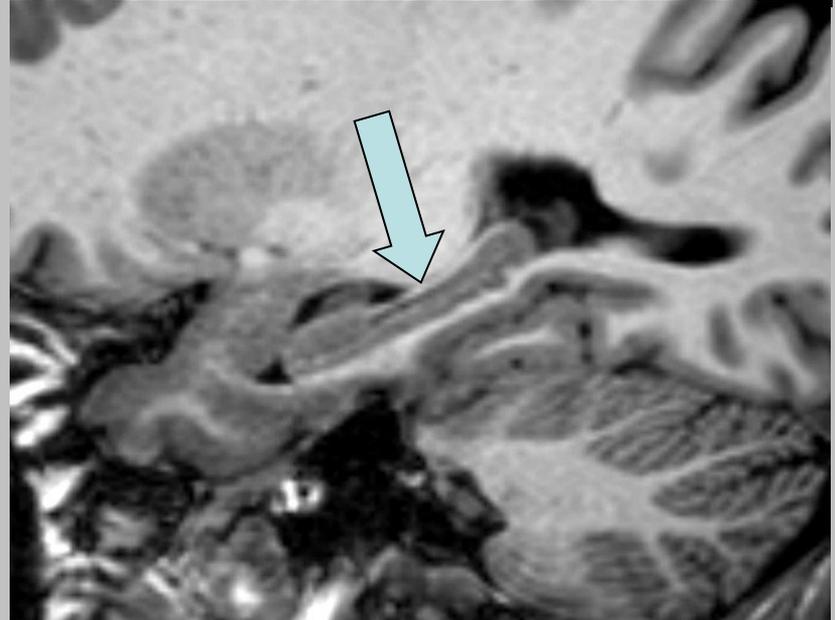
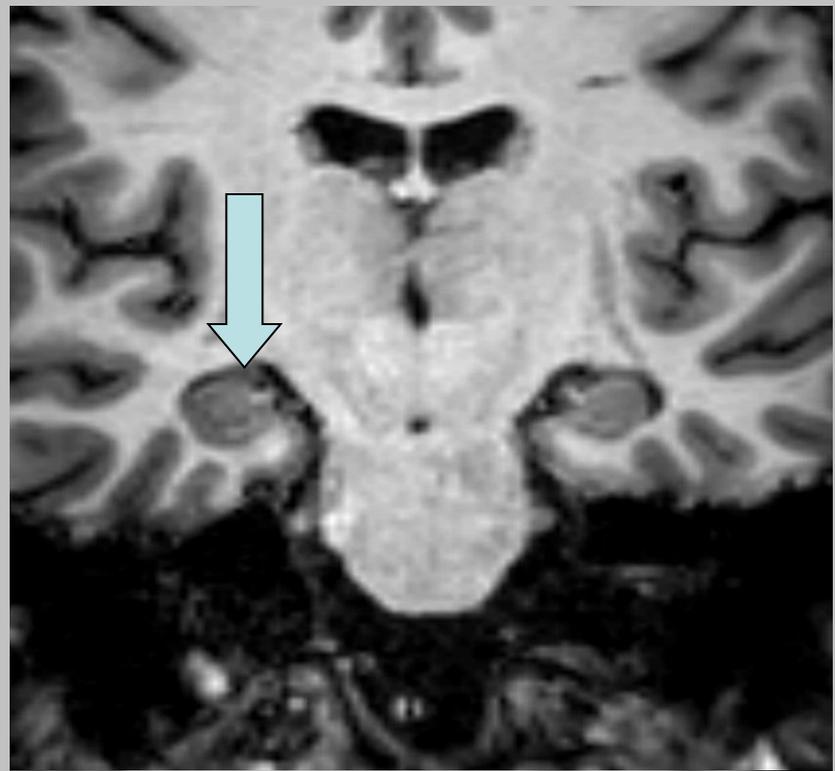
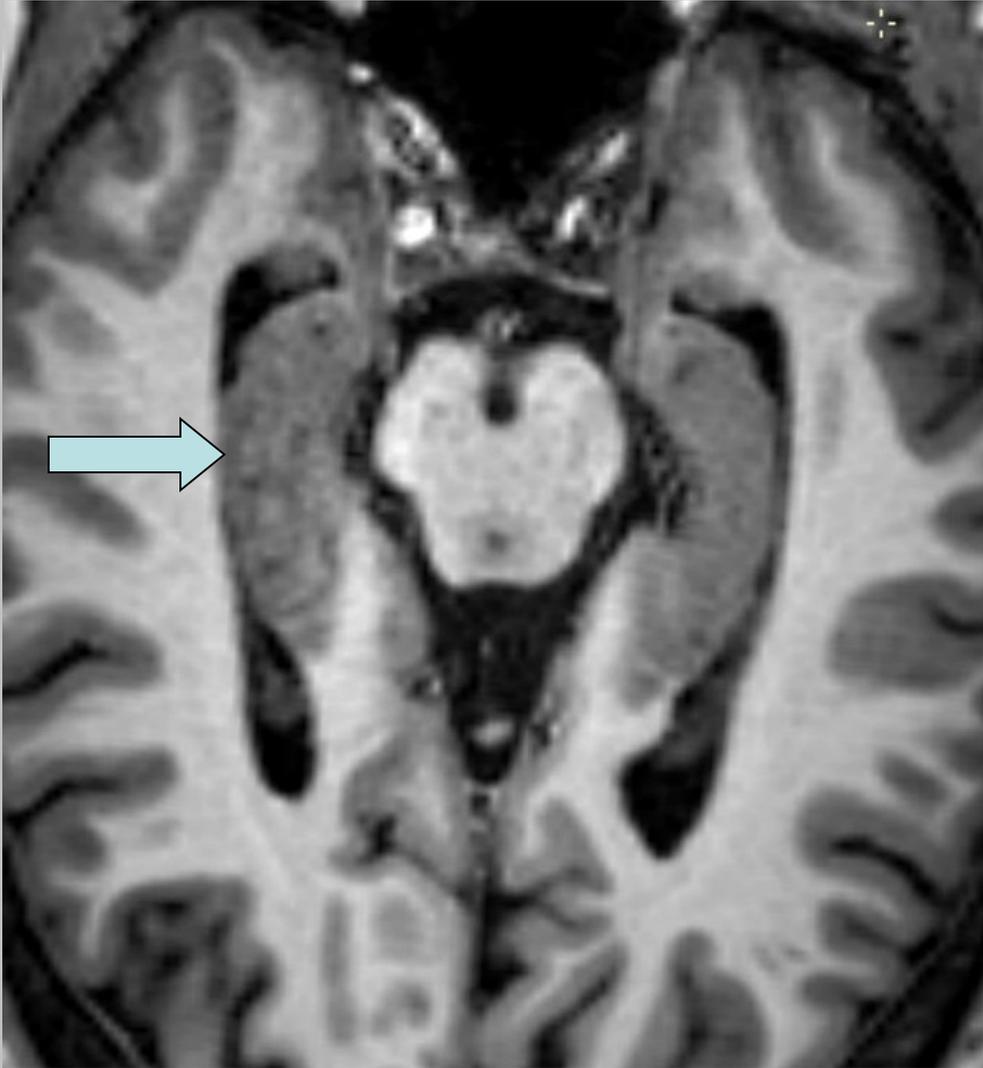


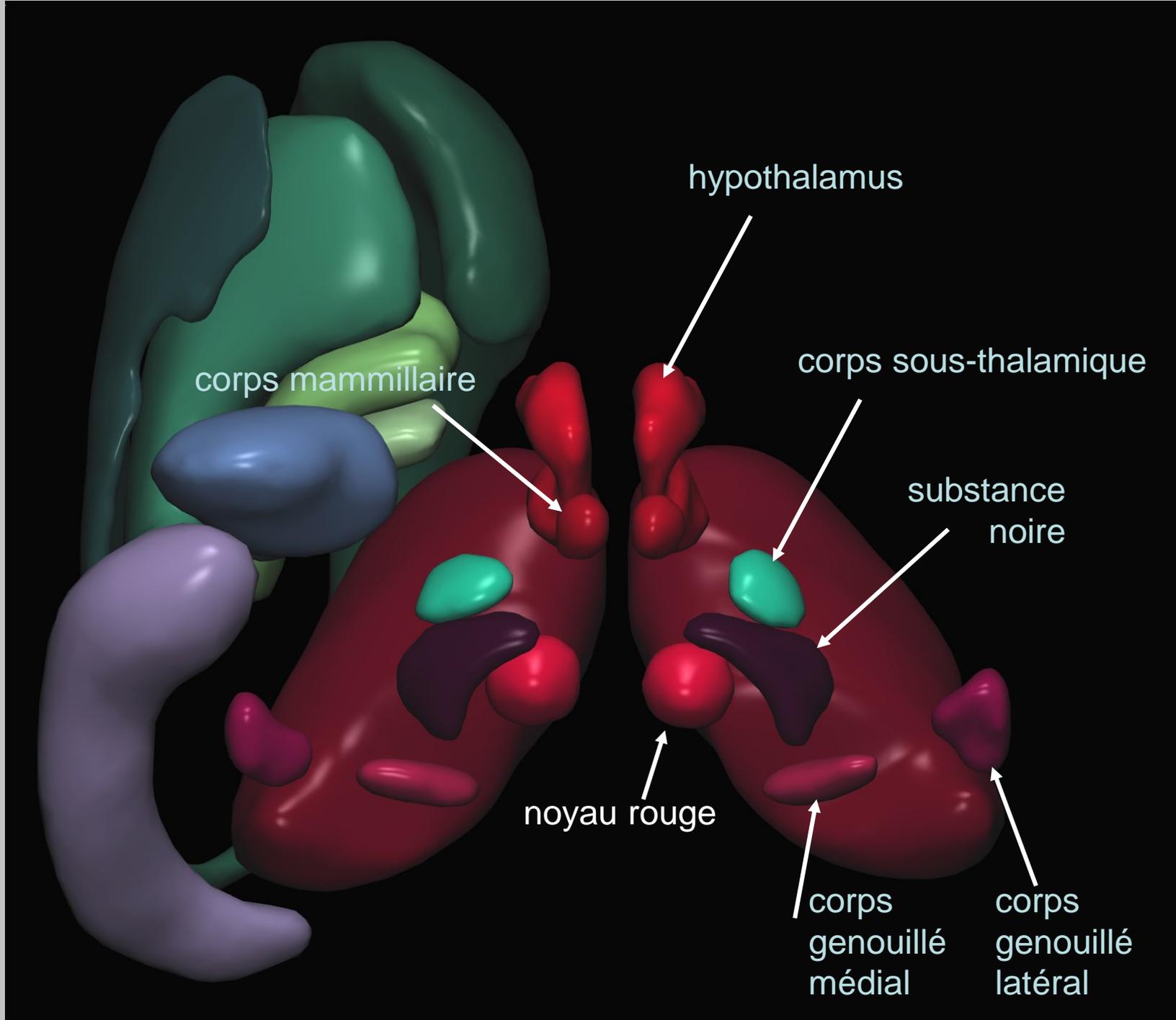
gyrus amygdalien  
gyrus hippocampique

# Gyrus amygdalien



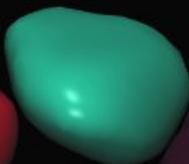
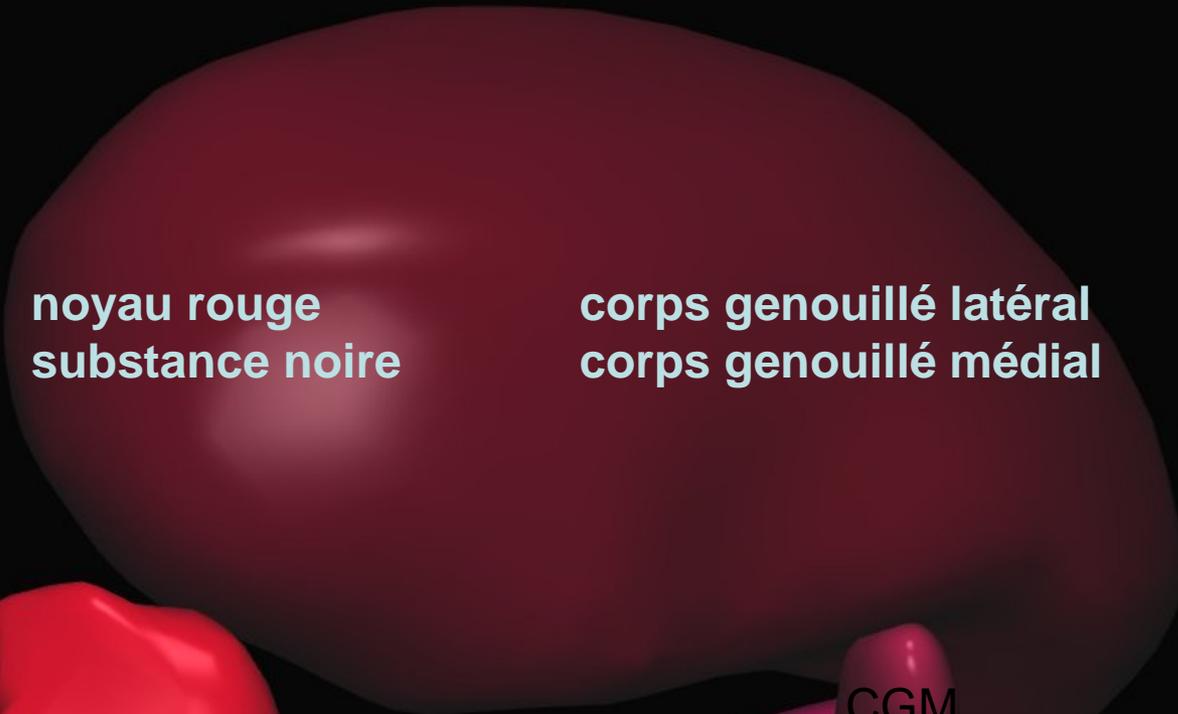
# Hippocampe





noyau rouge  
substance noire

corps genouillé latéral  
corps genouillé médial



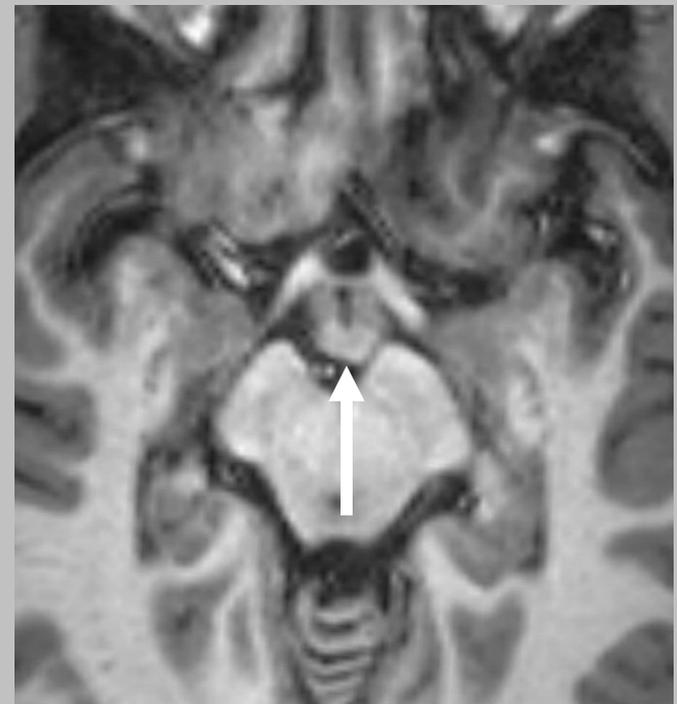
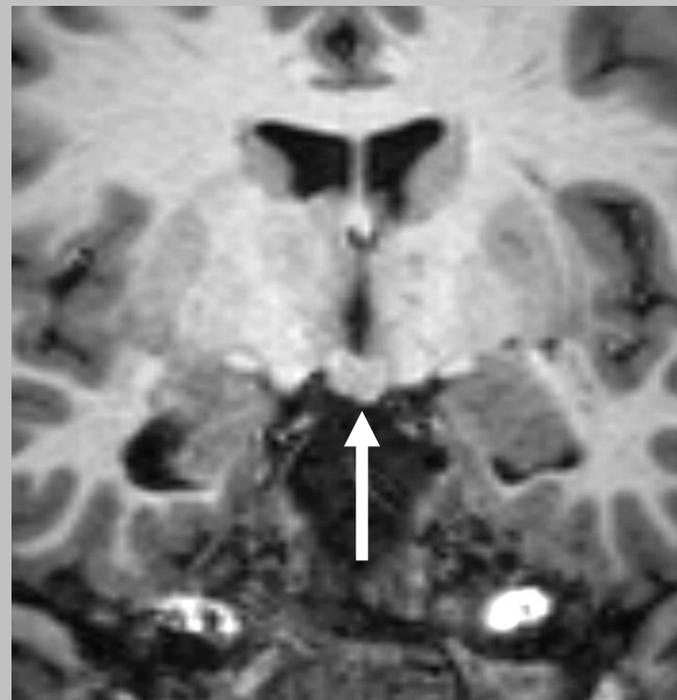
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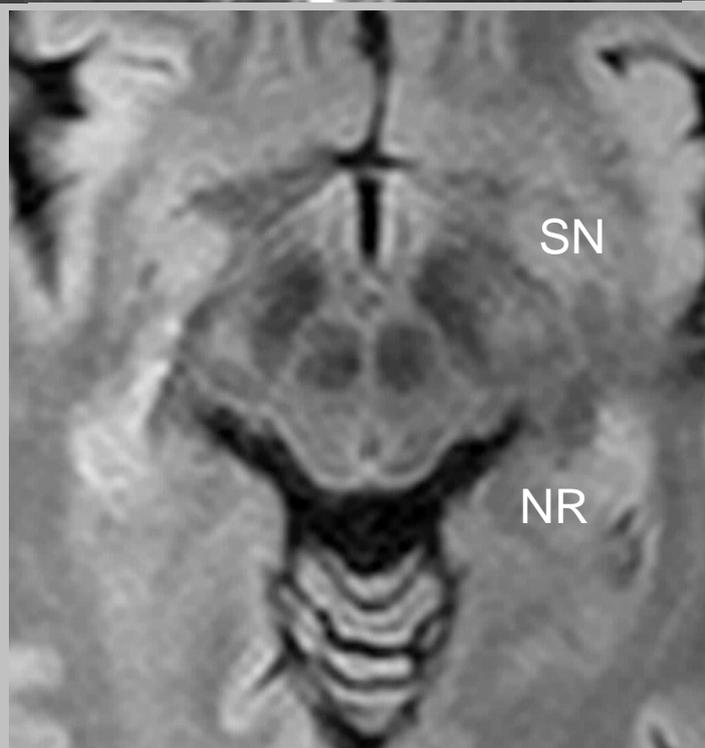
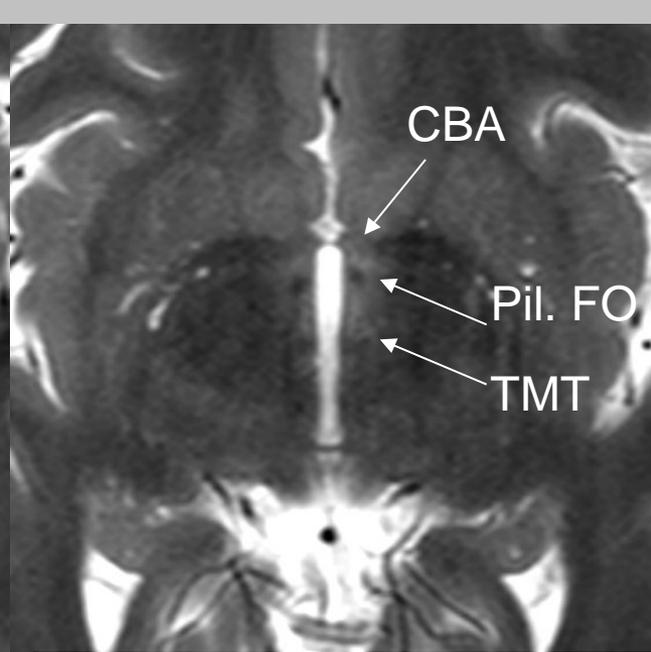
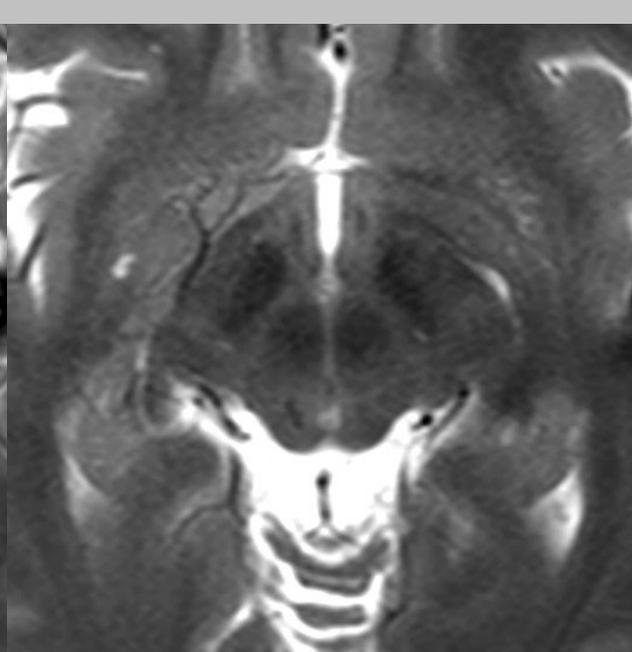
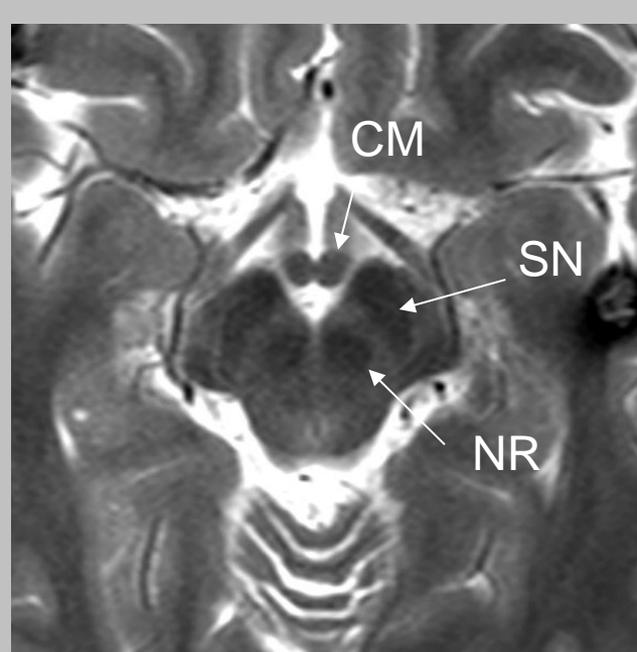
SN

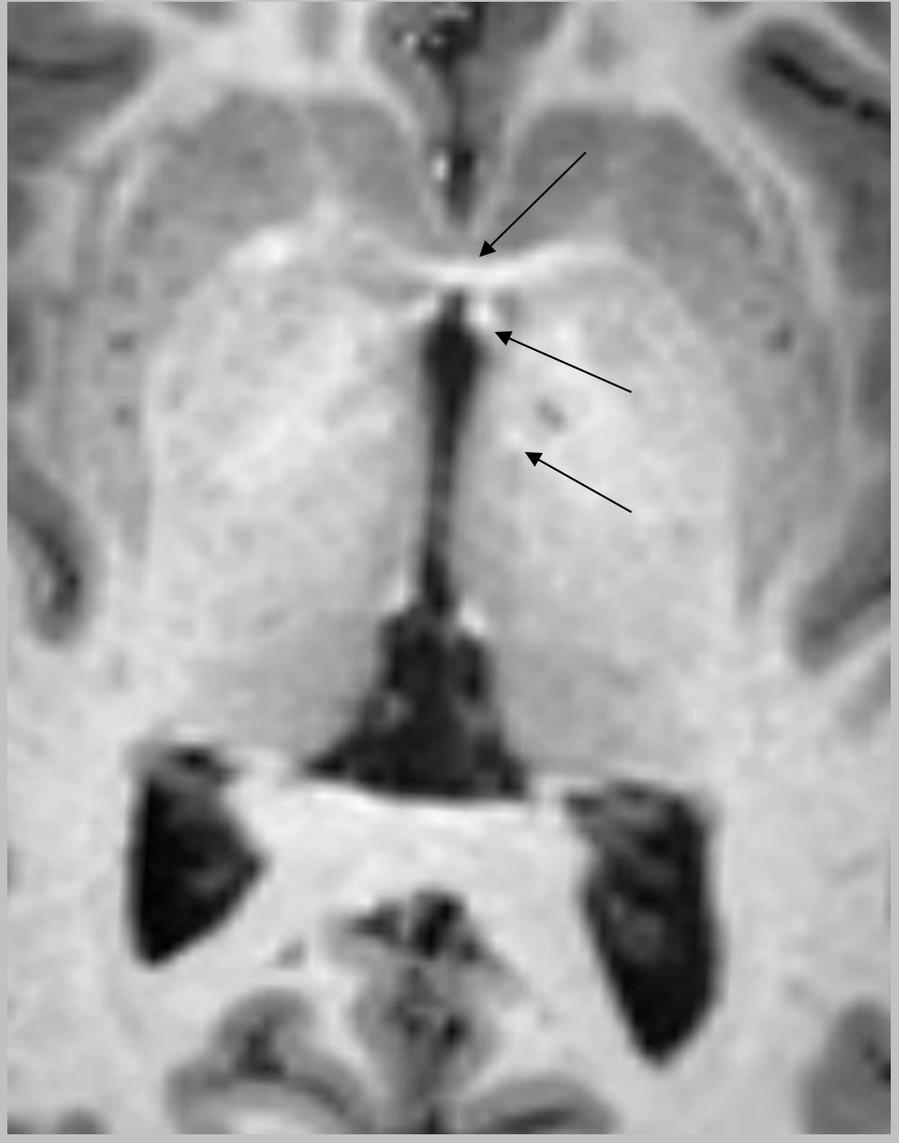
CGL

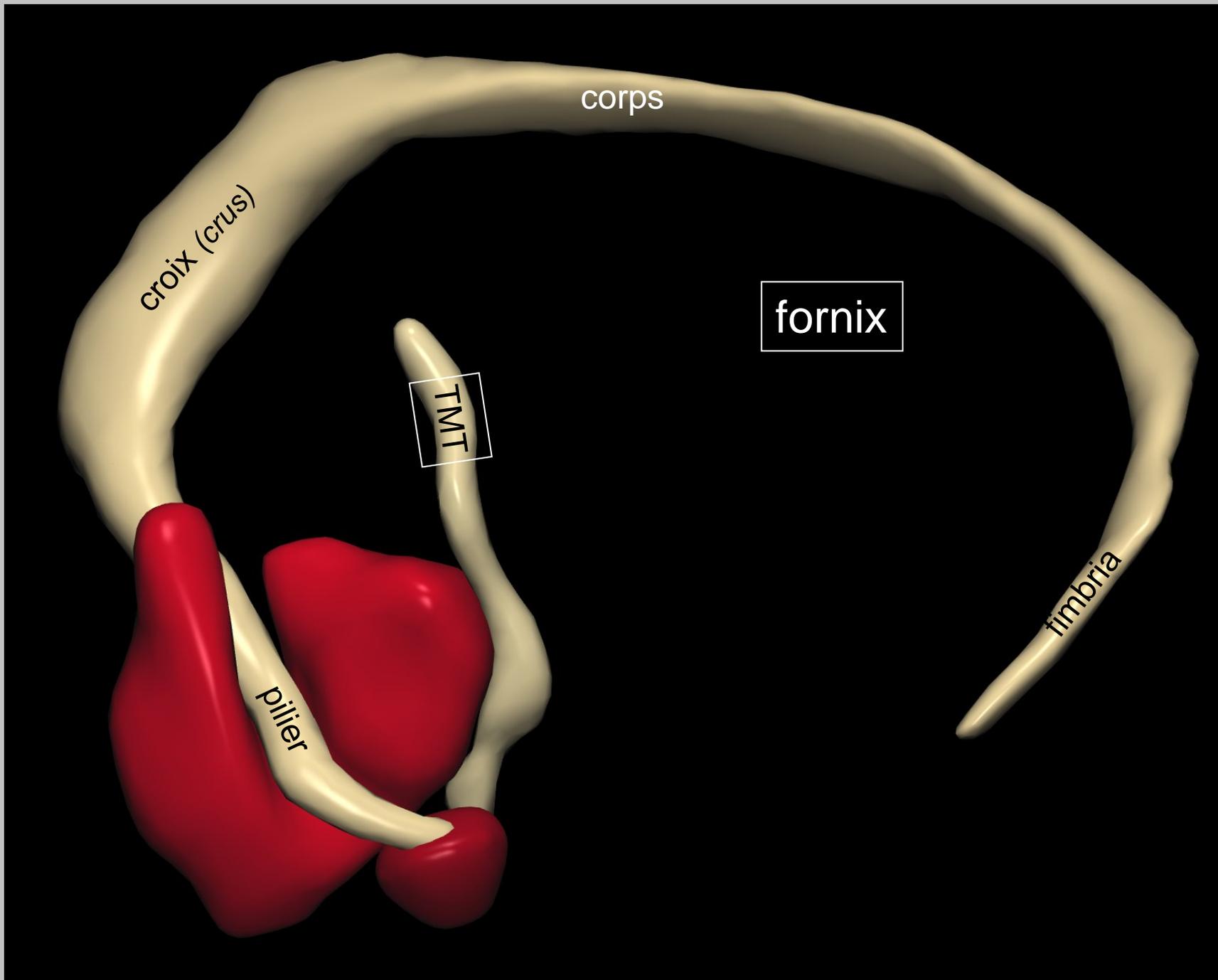
CGM

# Corps mammillaires









croix (crus)

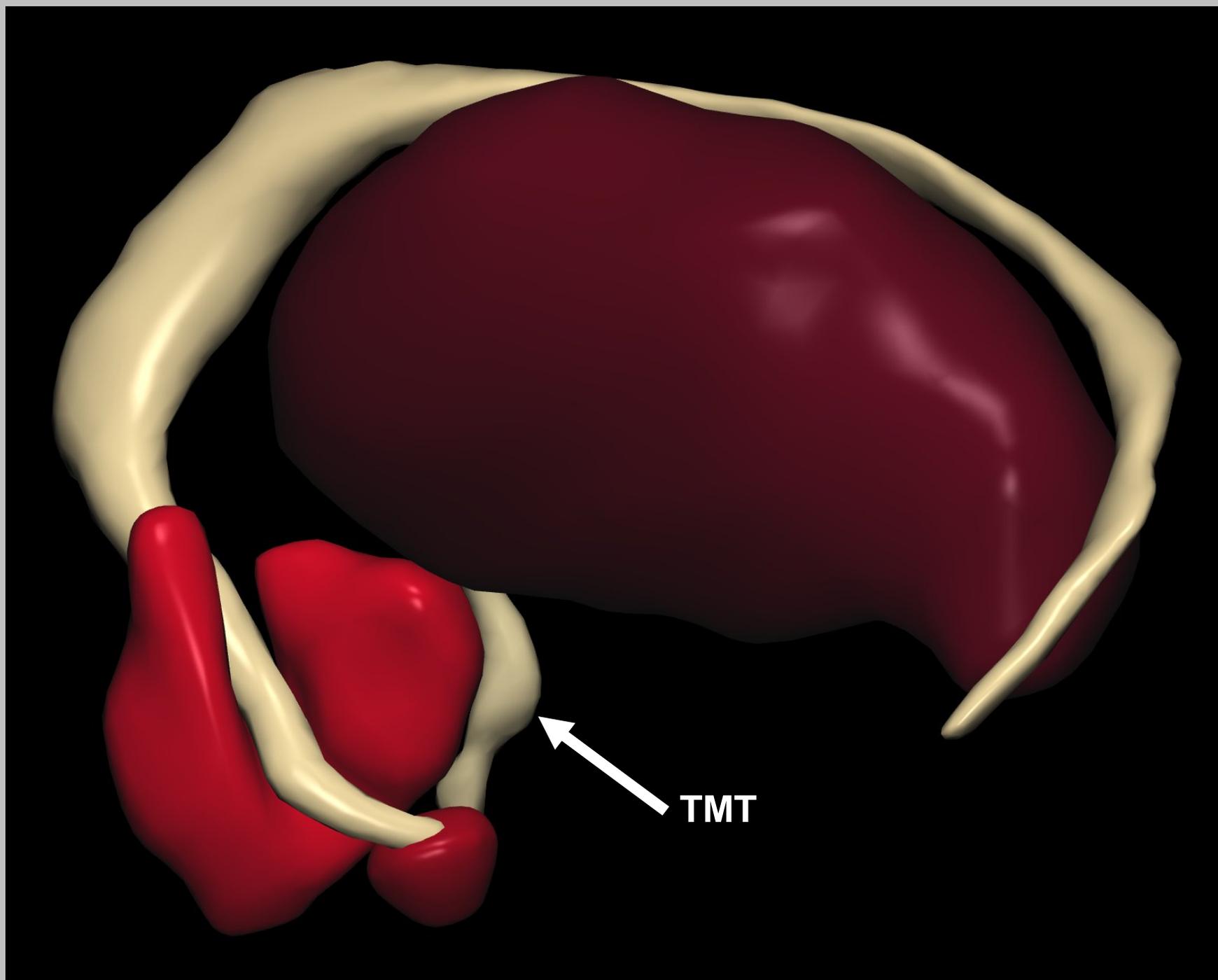
corps

fornix

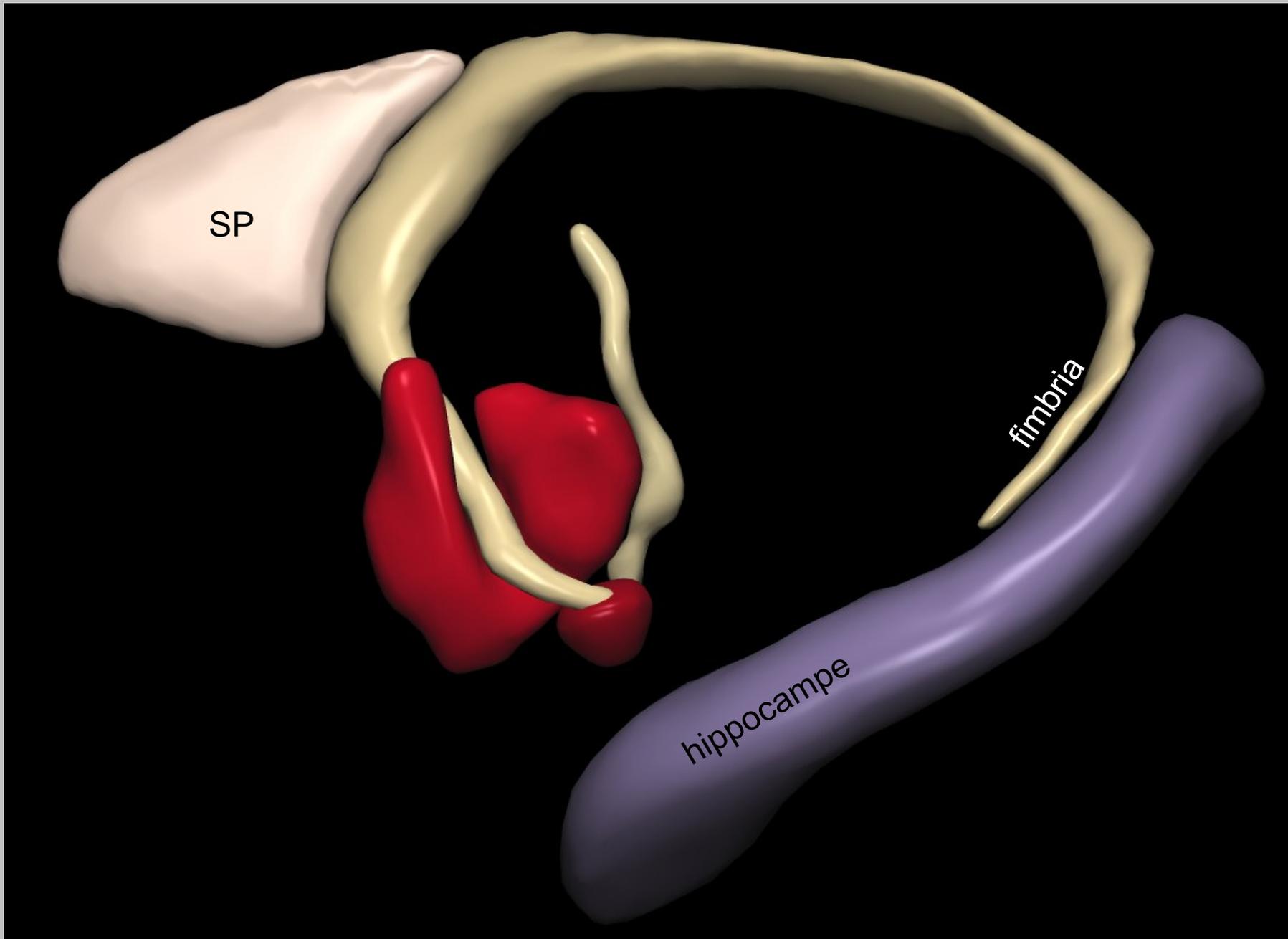
TMT

pilier

fimbria



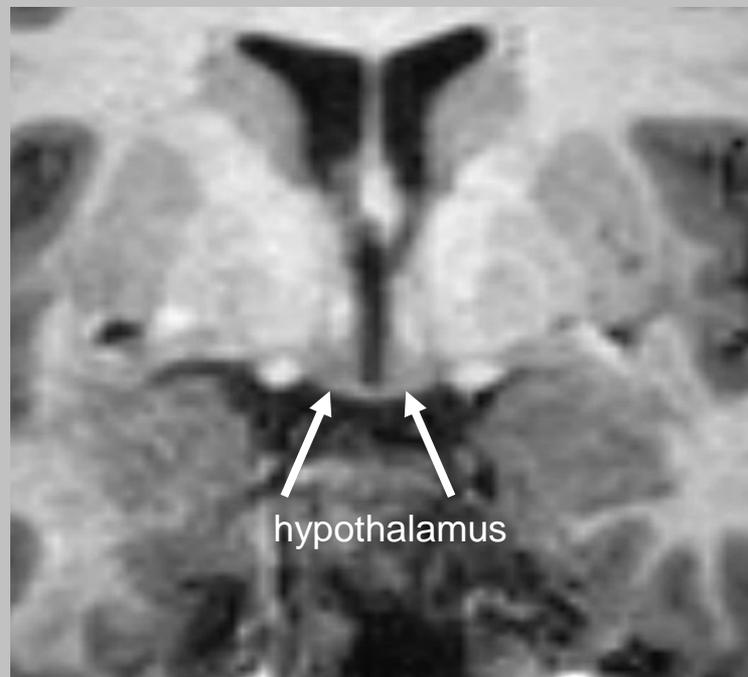
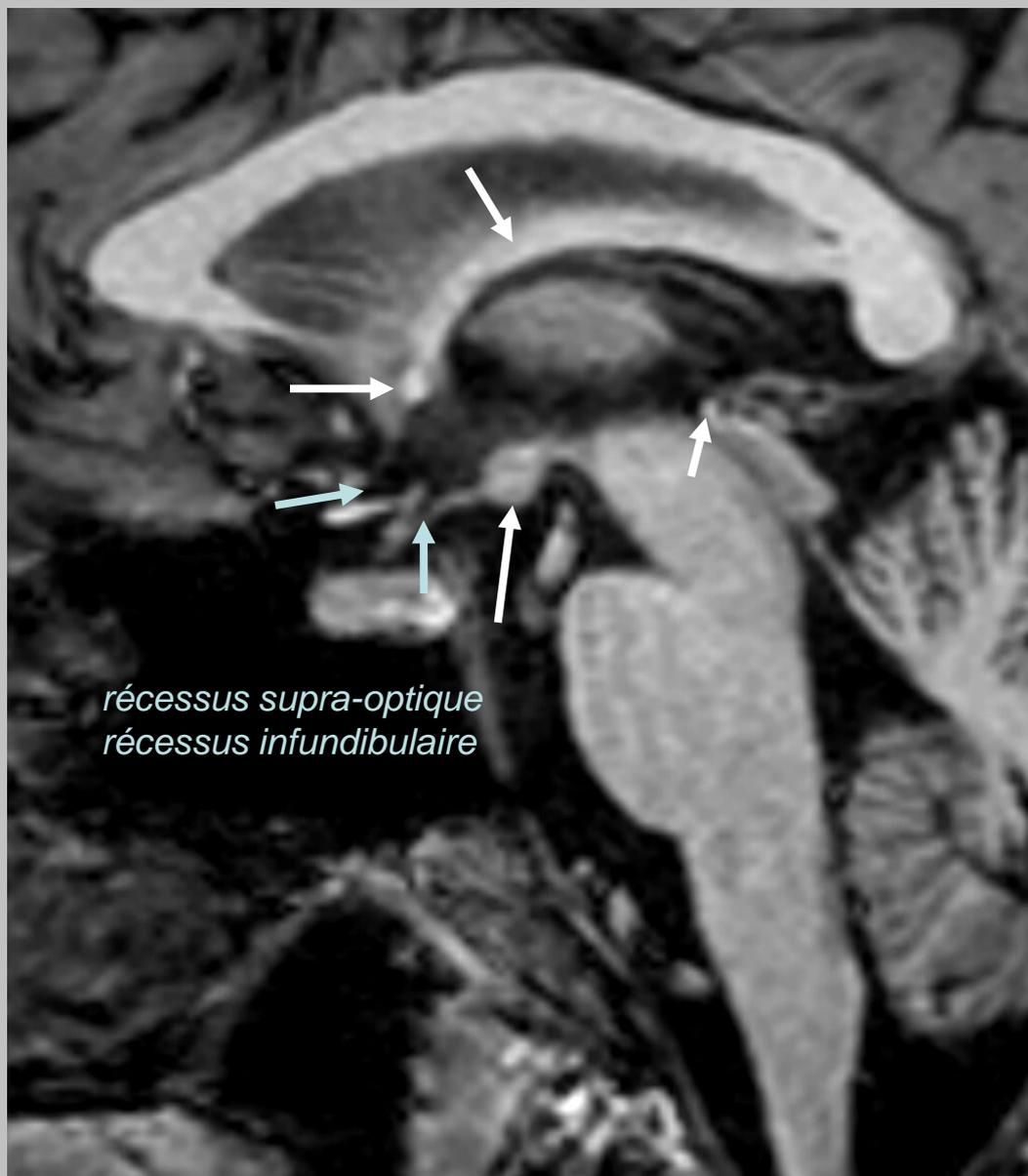
TMT

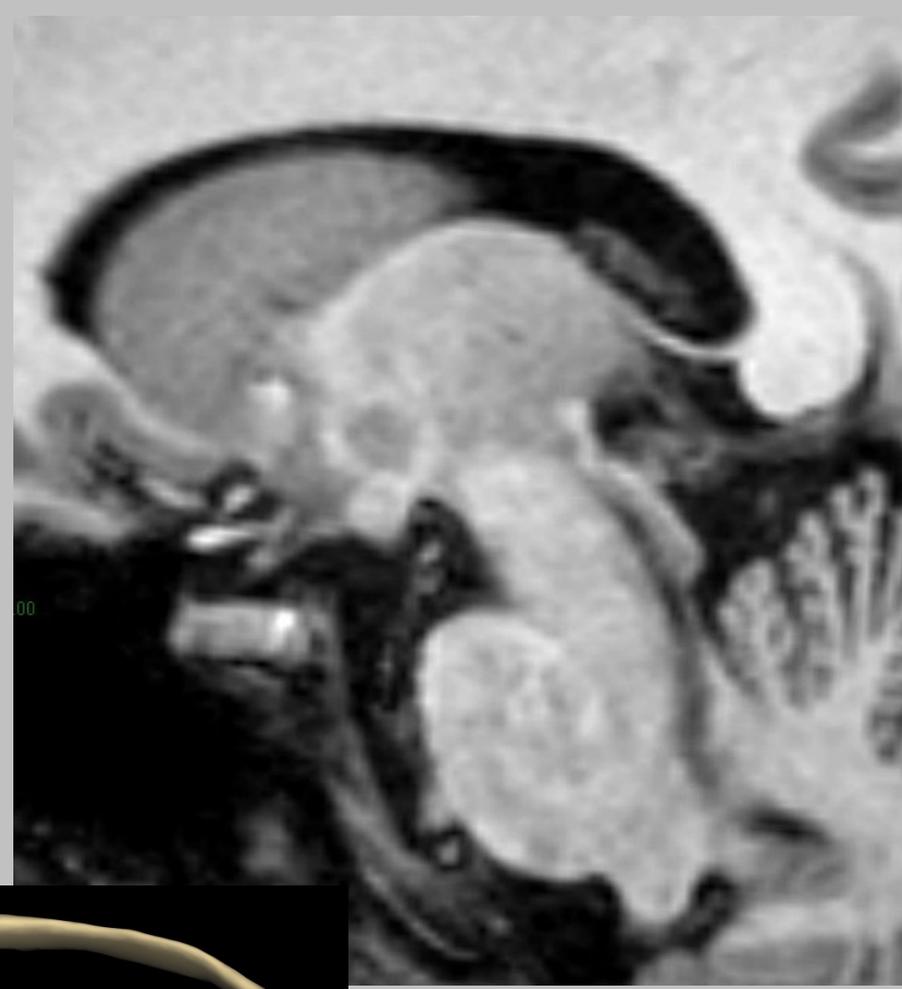
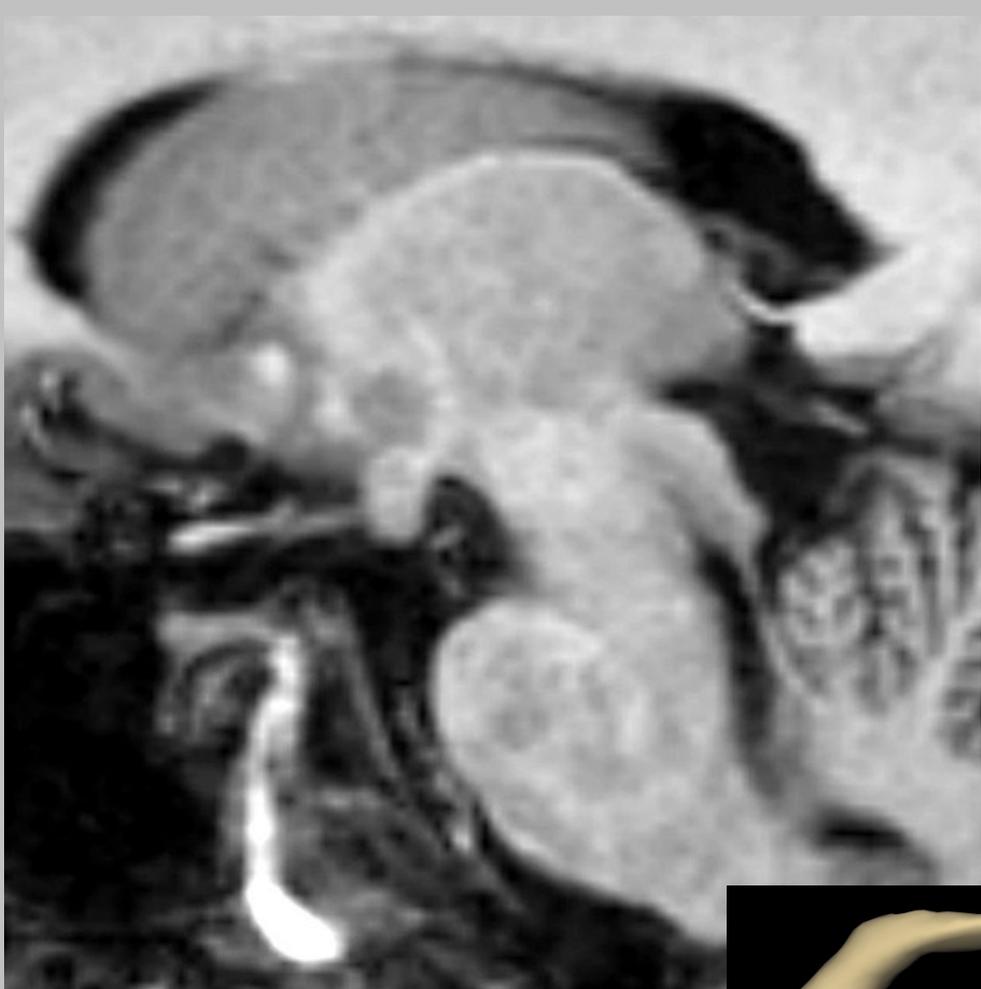


SP

fimbria

hippocampe





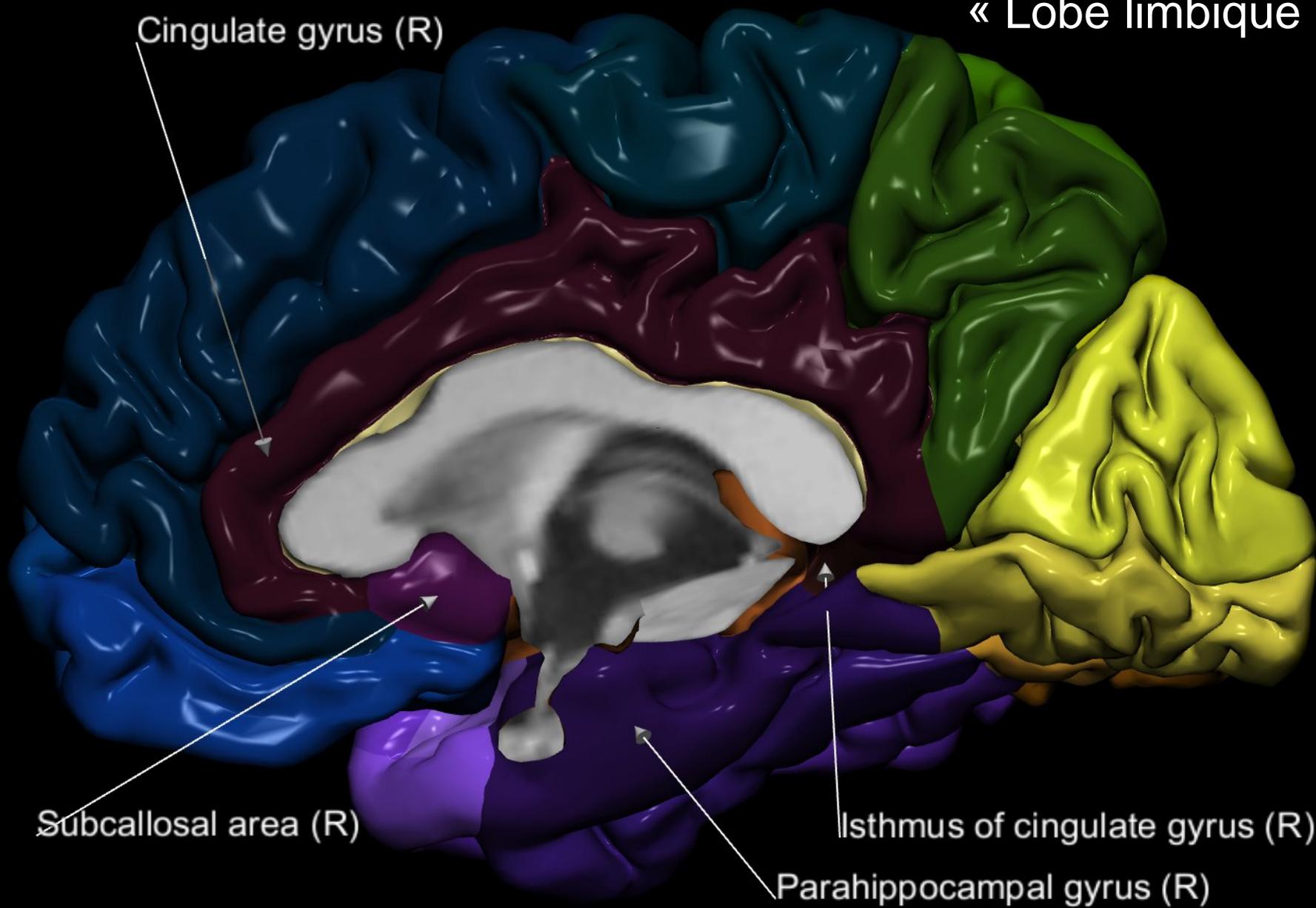
« Lobe limbique »

Cingulate gyrus (R)

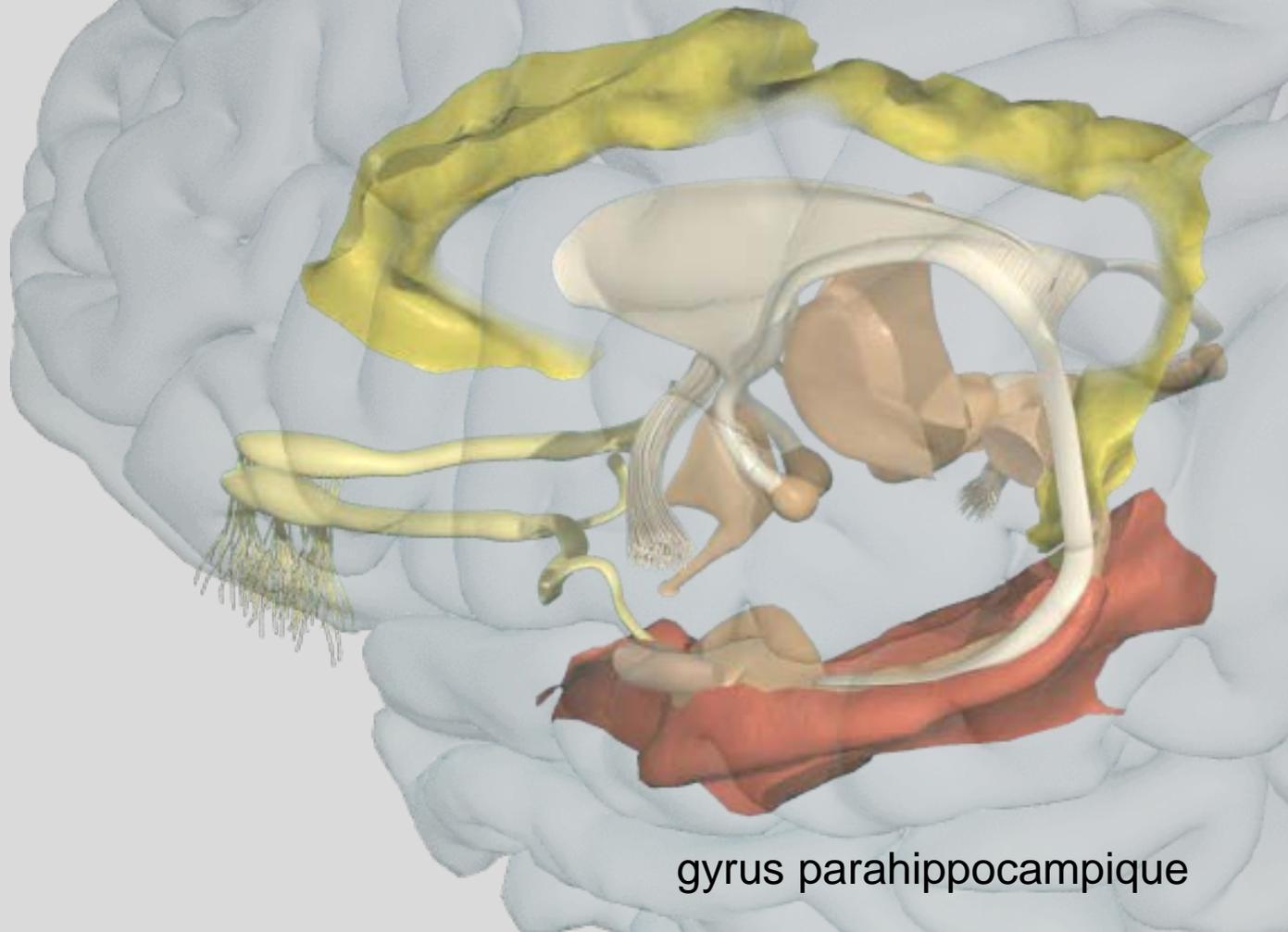
Subcallosal area (R)

Isthmus of cingulate gyrus (R)

Parahippocampal gyrus (R)

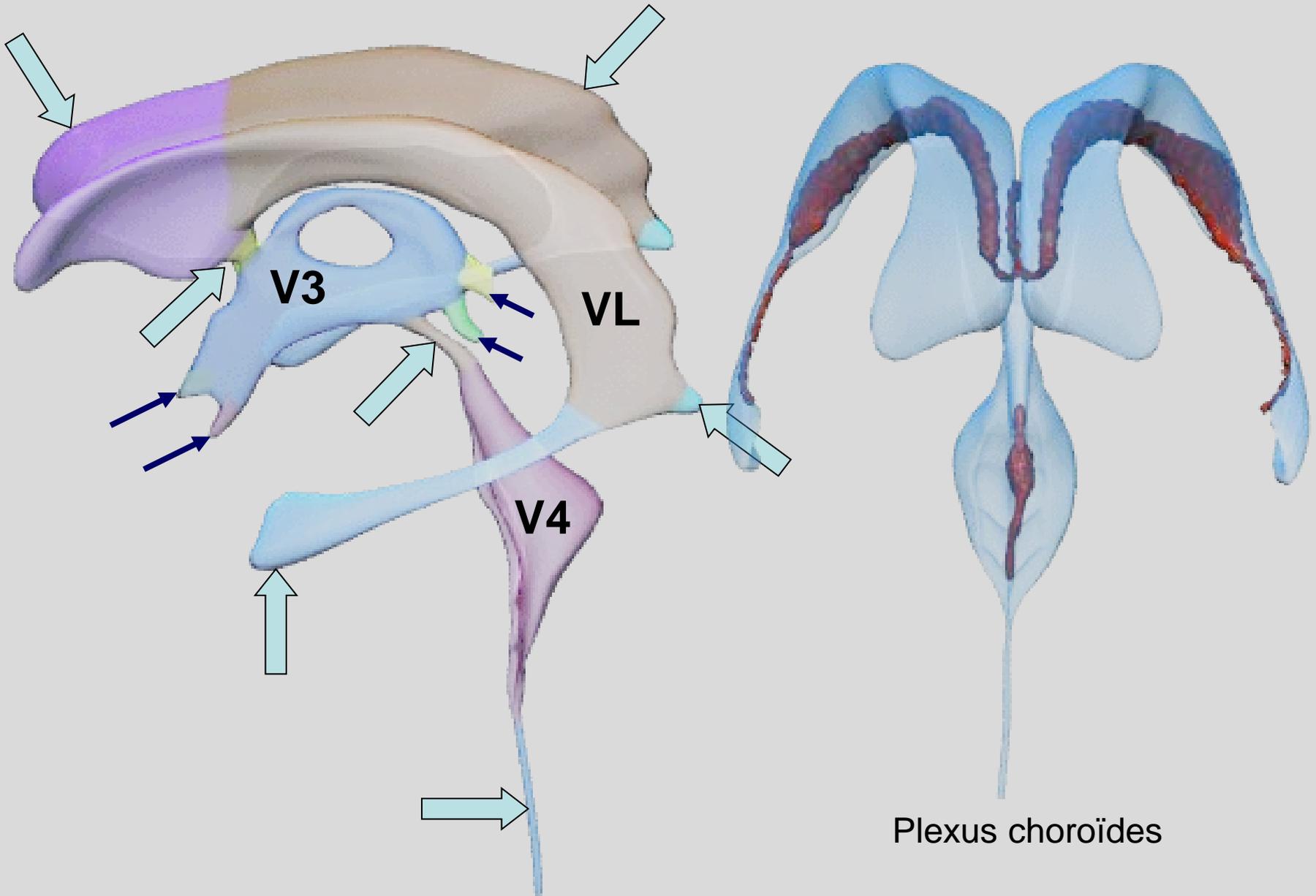


gyrus cingulaire (*cingulum*)

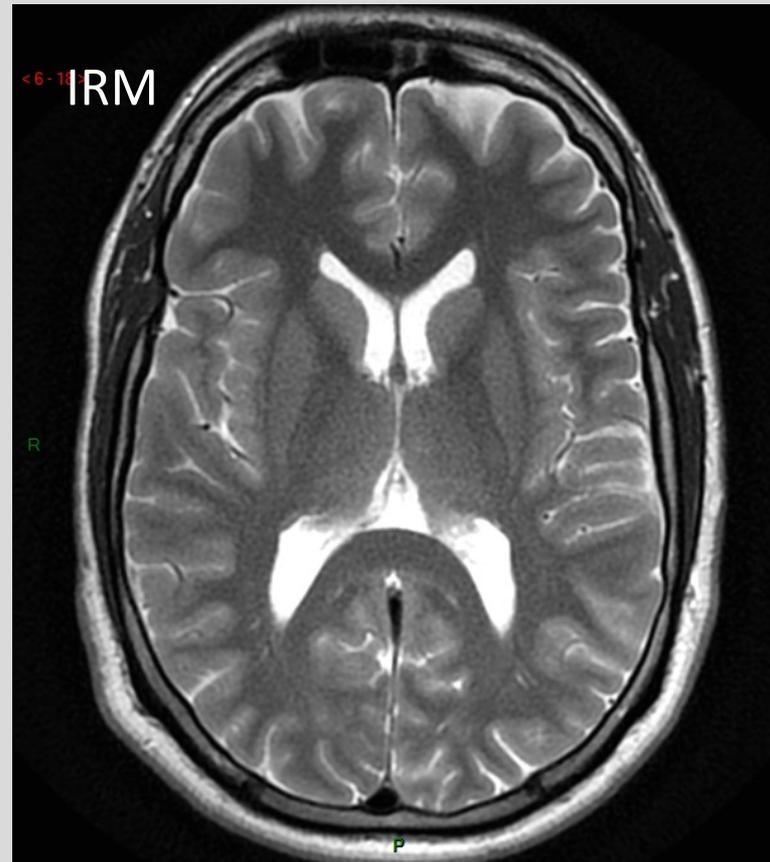
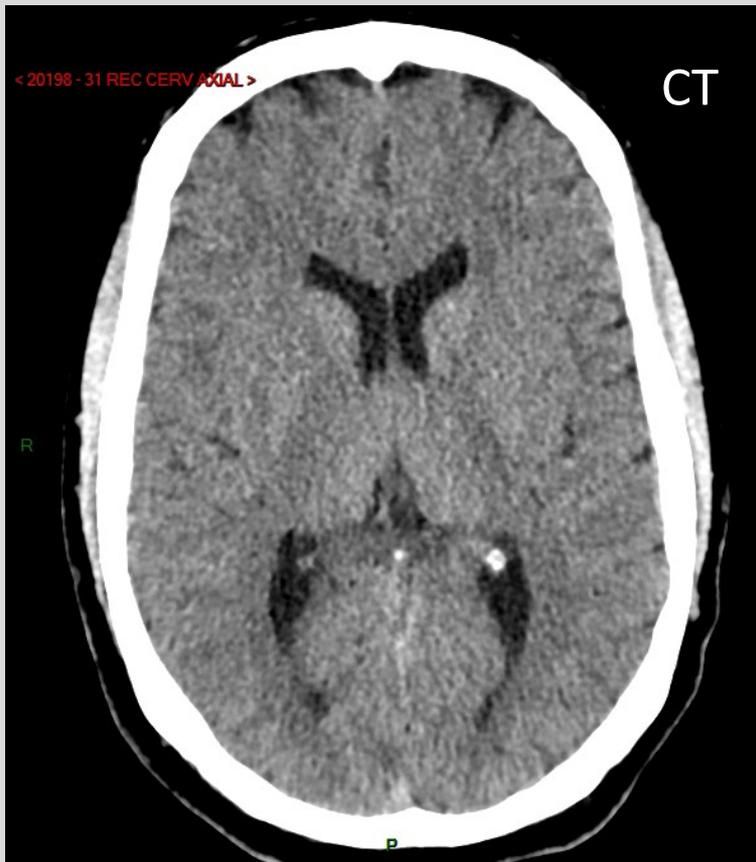


gyrus parahippocampique

# Système ventriculaire

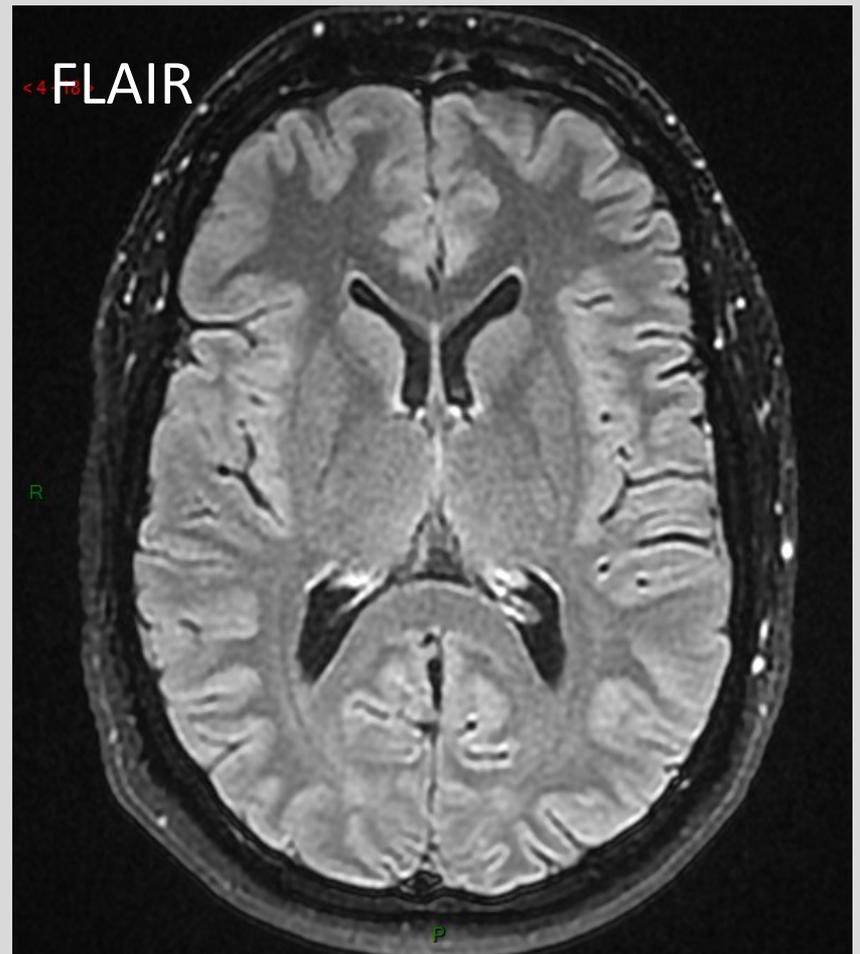
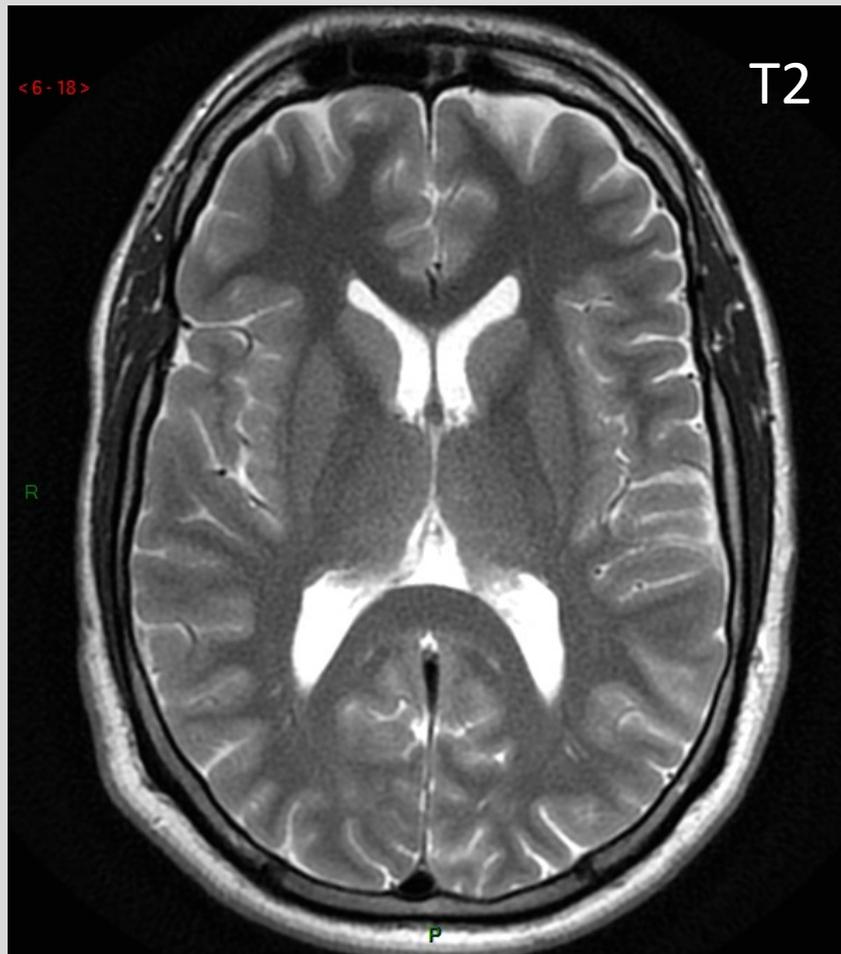


# Overview des examens en IRM de l'encéphale en routine clinique



Comparaison d'une coupe transversale chez la même personne dans un plan identique:

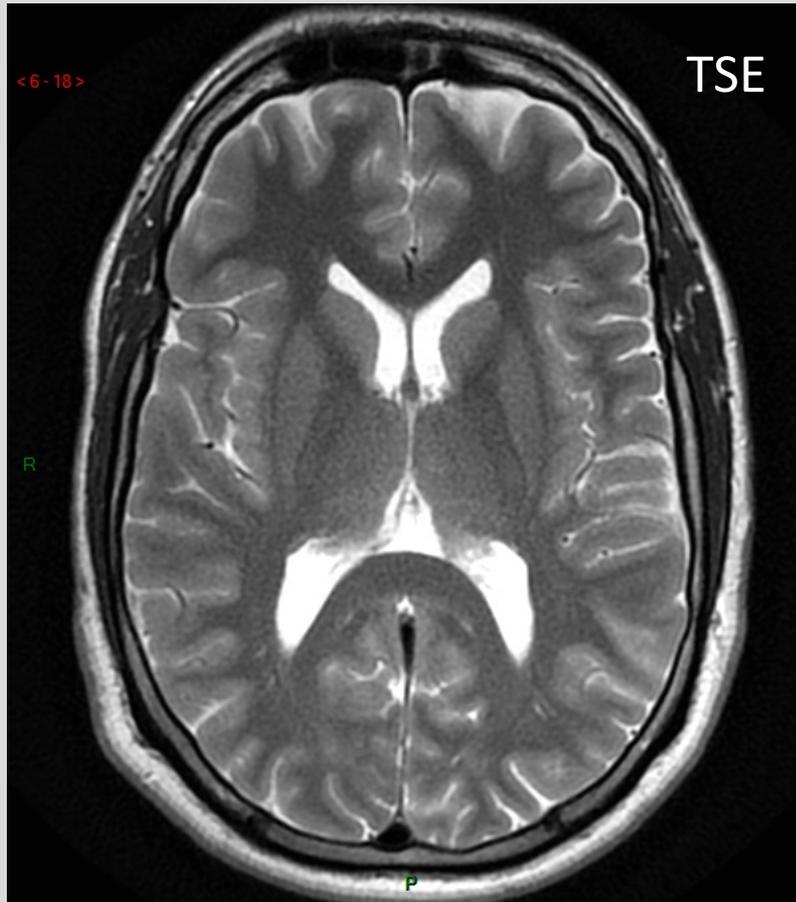
- **CT scanner** à gauche
- **IRM** en pondération **T2** à droite



Chez la même personne, même plan de coupe: comparaison de la pondération **T2** (à gauche) et **FLAIR** (à droite)



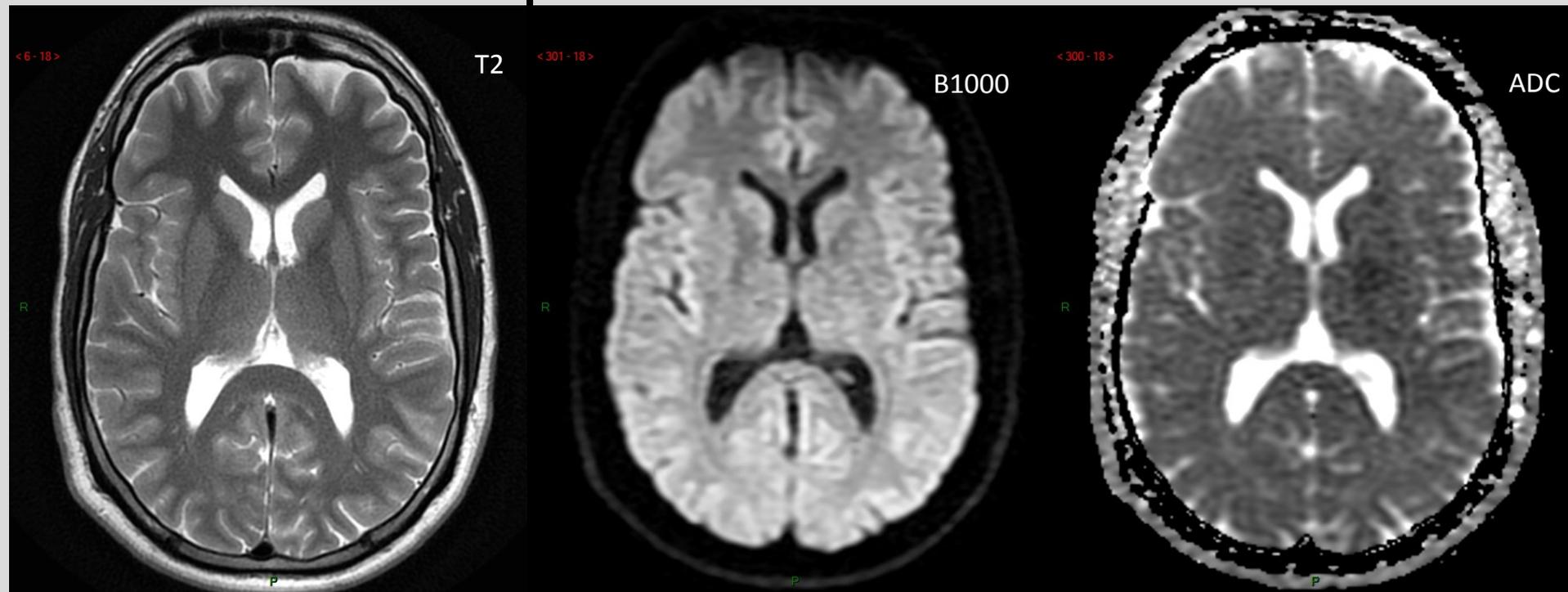
Valeur ajoutée de la pondération **T2** (à gauche) vs **FLAIR** (à droite) en fosse postérieure



Pondération T2 spin echo rapide (TSE) à gauche et écho de gradient (GRE) à droite

*Quelle valeur ajoutée à ma pondération GRE T2 ?*

Pondération de diffusion



Pondération T2

Pondération en diffusion

Cartographie de l'ADC

*Domaine qualitatif*

*Domaine quantitatif*

Précisez les caractéristiques majeures  
(au moins 1 par séquence)  
des différentes pondérations de l'examen cérébral 'standard' ?

POURQUOI l'examen cérébral standard en IRM  
ne contient-il pas de séquence diagnostique\* pondérée T1 ?

\*Il existe parfois des images pondérées T1 acquises par des séquences rapides à coupes épaisses de 'scout-view' qui passent 'par hasard' dans la lésion mais qui ne peuvent être considérées comme des images diagnostiques pondérées T1.

## 2.Examen en IRM en **injection d'emblée de PdC:**

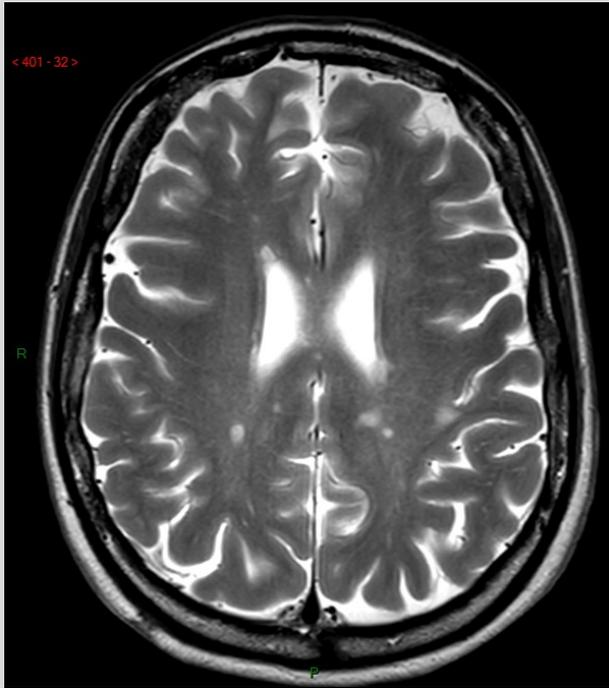
Recherche de foyer de rupture de BHE dans une pathologie connue

Pondération T1 post-contraste

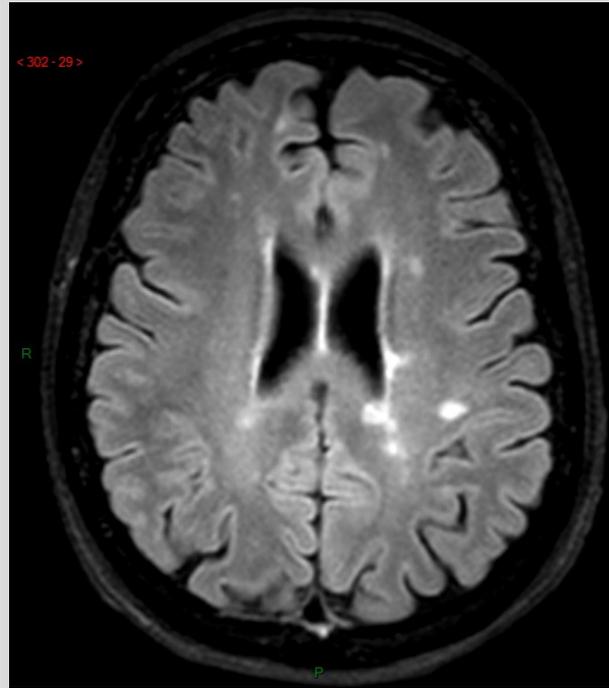
Pondération T2

Pondération FLAIR

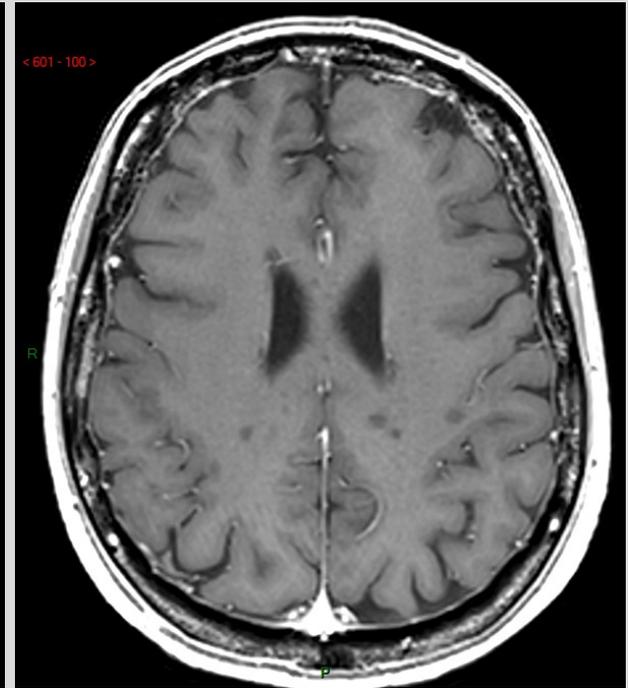
Examen en IRM de l'encéphale en injection d'emblée de produit de contraste :  
→ recherche d'activité inflammatoire dans la sclérose en plaques (SEP)



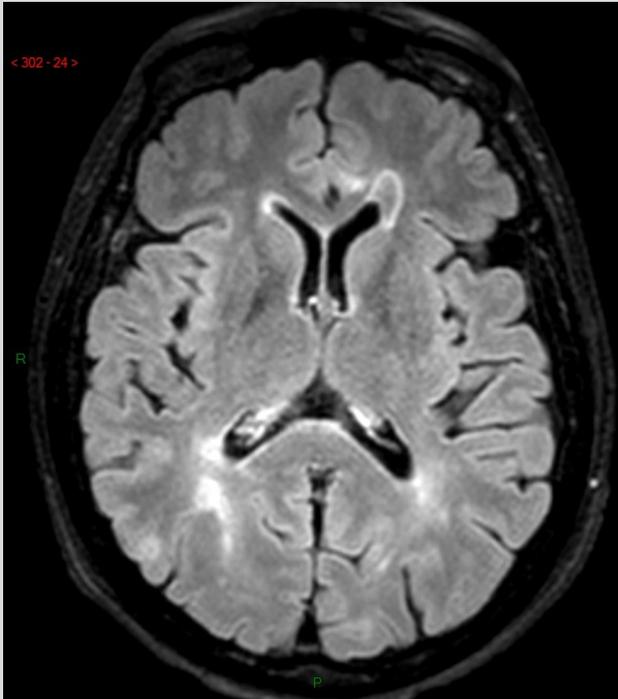
T2



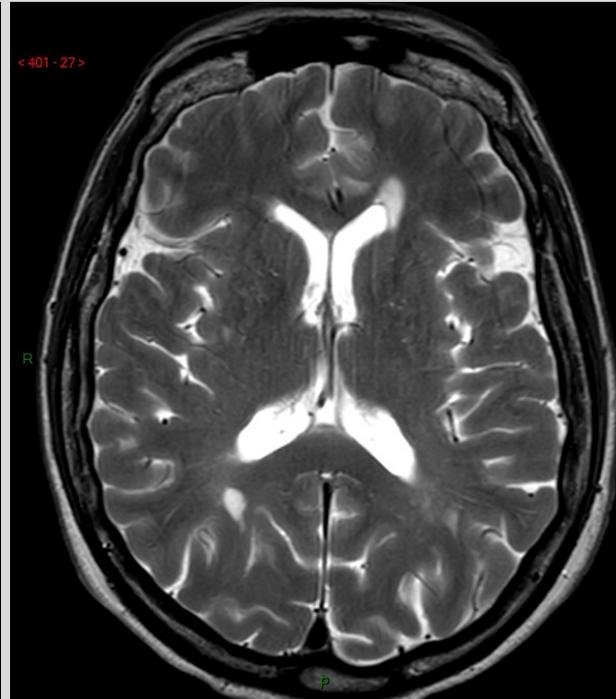
FLAIR



T1



FLAIR



T2



T1

Quelle information qualitative cardinale dans la prise en charge du patient apporte la pondération T1 post-contraste ?

Quelle autre information semi-quantitative cardinale apporte la pondération T1 ?

### **3. Examen en IRM sans et avec injection de produit de contraste (Cas 1)**

→ Caractérisation d'une lésion vue sur les séquences en contraste spontané

Pondération T1 sans et avec PdC

Pondération T2

Pondération FLAIR

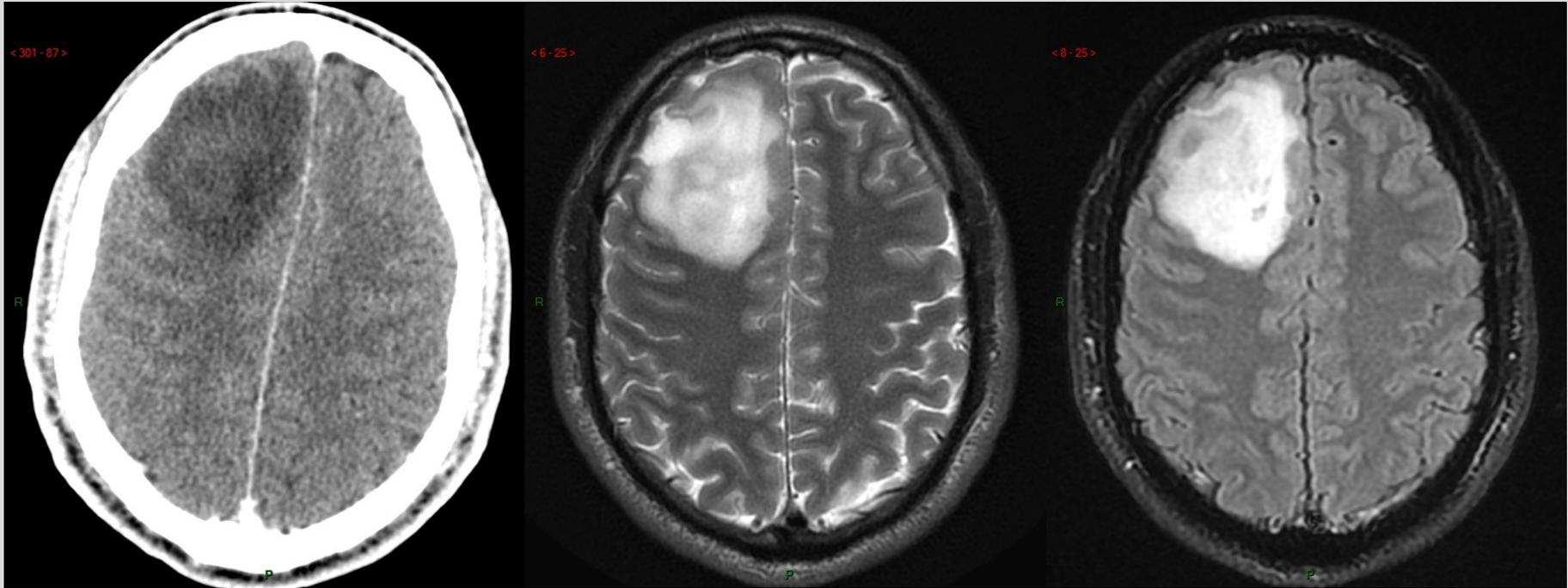
Pondération en diffusion

Pondération T2\* (ou GRE T2)

*+ confrontation à l'imagerie métabolique (ici PET – Tomographie par Emission de Positrons utilisant le traceur Méthionine)*

## IRM cérébrale avant et après injection de produit de contraste

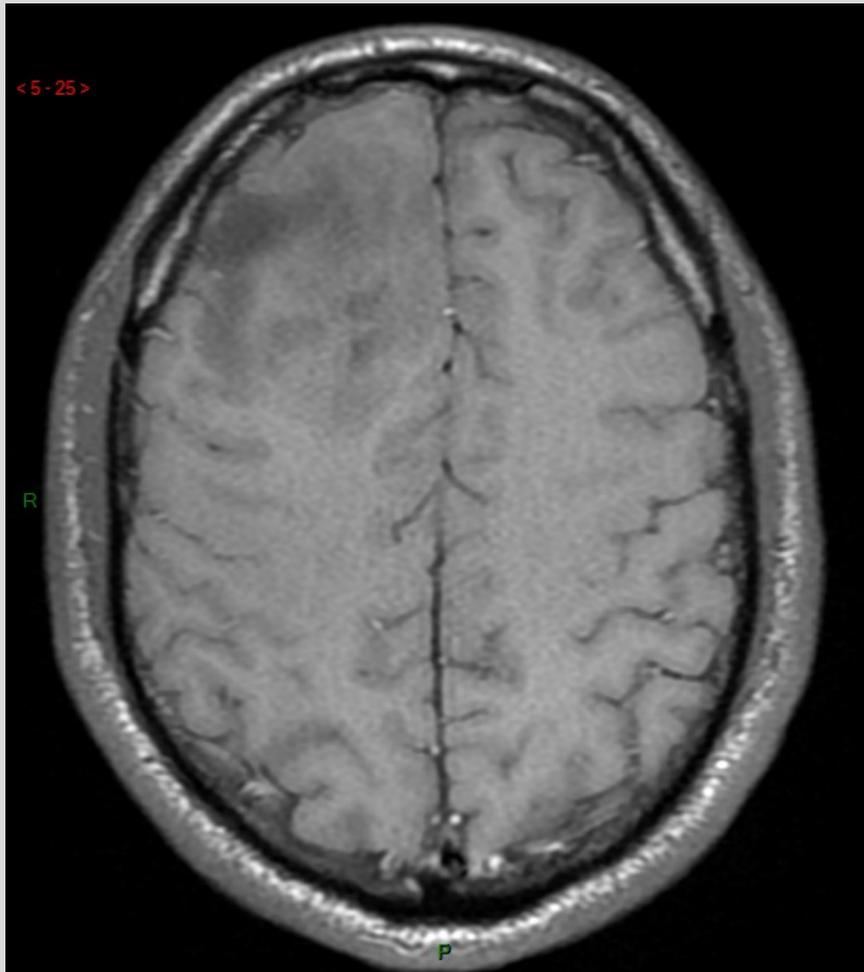
→ Caractérisation d'une lésion cérébrale vue sur les séquences sans injection de PdC



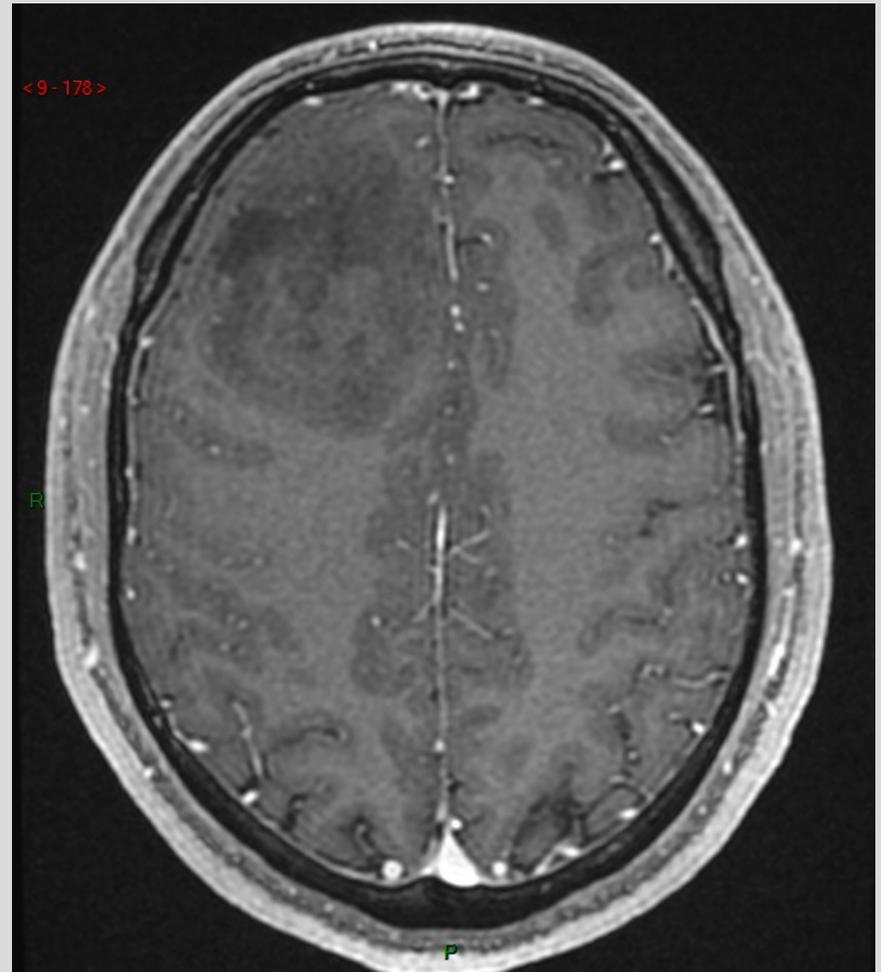
CT scanner cérébral AVEC injection de PdC

T2

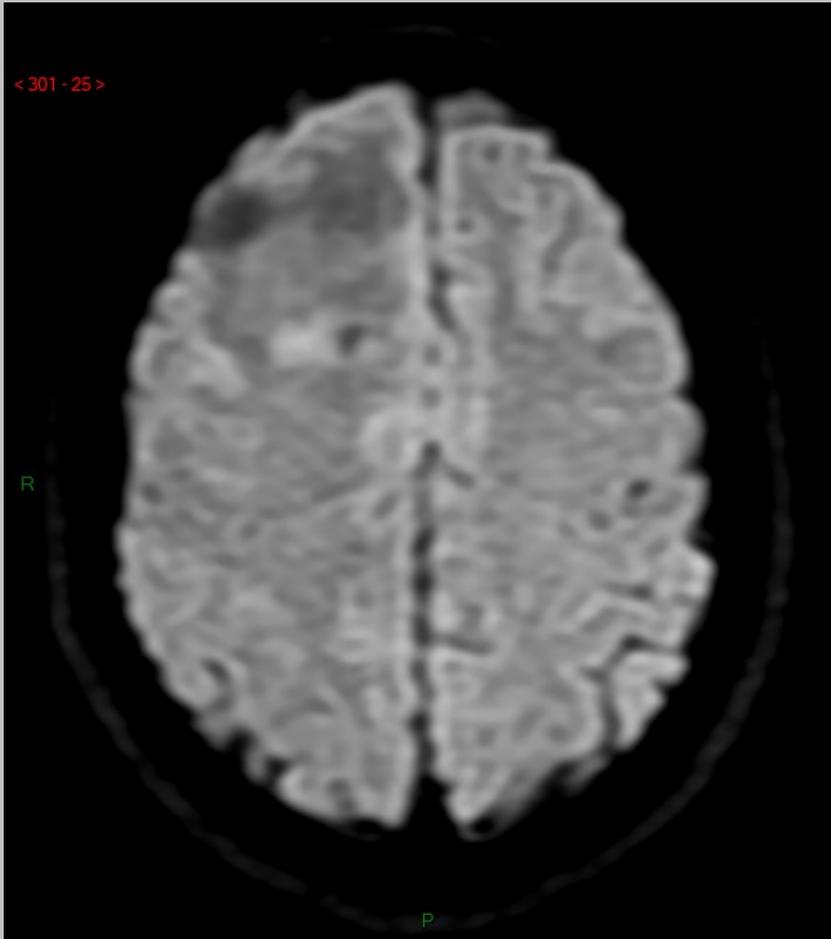
FLAIR



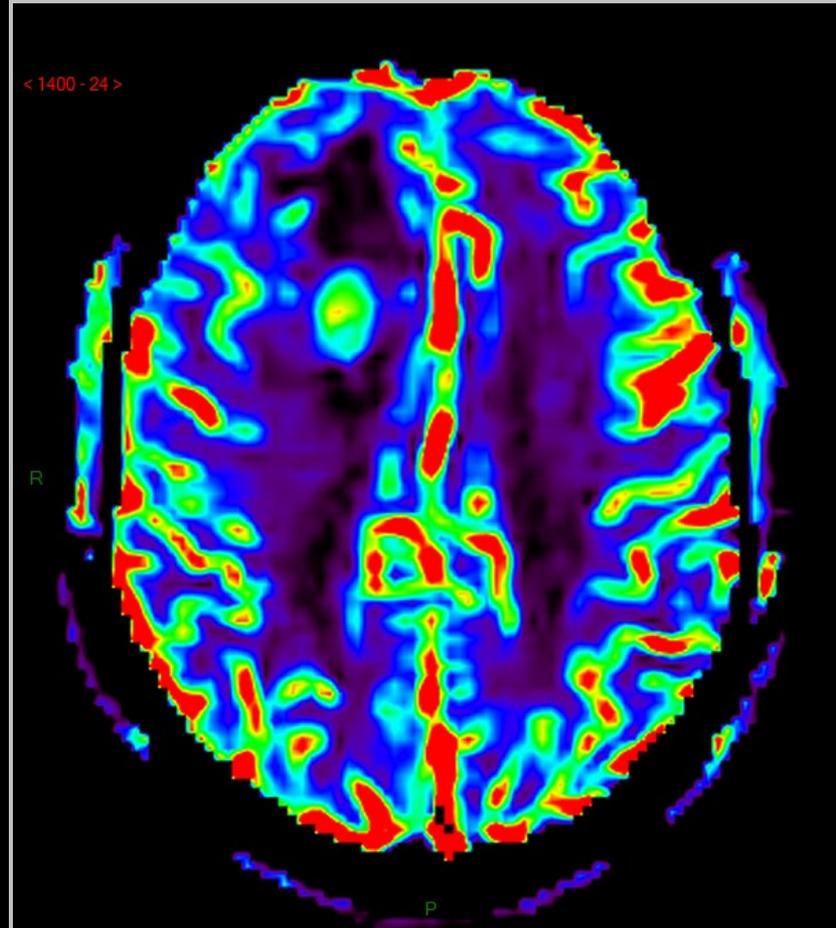
Pondération T1 (TSE) AVANT injection de PdC



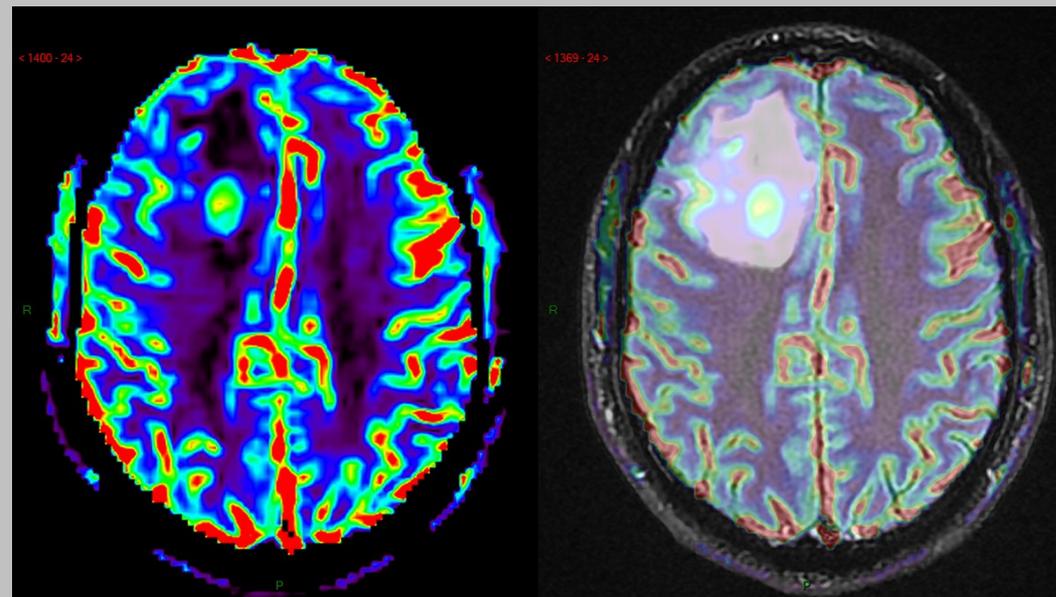
Pondération T1 (GRE) APRES injection de PdC



Séquence pondérée en diffusion  
DWI = Diffusion-weighted Imaging

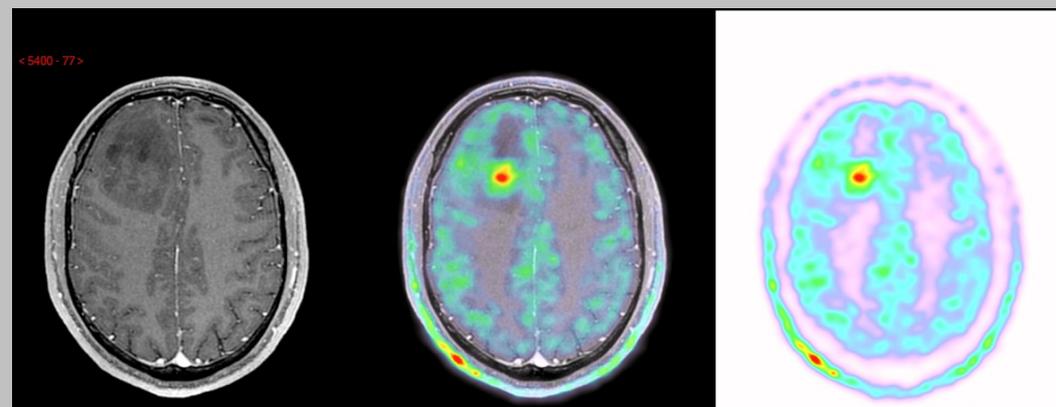


Séquence pondérée en perfusion  
PWI = Perfusion-weighted Imaging (rCBV)



**Superposition** ('overlay') entre:

- imagerie de perfusion (à gauche) ...
- ... et imagerie anatomique (à droite)



**Superposition** ('overlay') au milieu entre:

- imagerie de anatomique T1 (à droite)
- et imagerie métabolique\* (à gauche)

*Quelle information spécifique ?...*

*... convergente ou divergente entre les deux modalités ?*

## **4. Examen en IRM sans et avec injection de produit de contraste (Cas 2)**

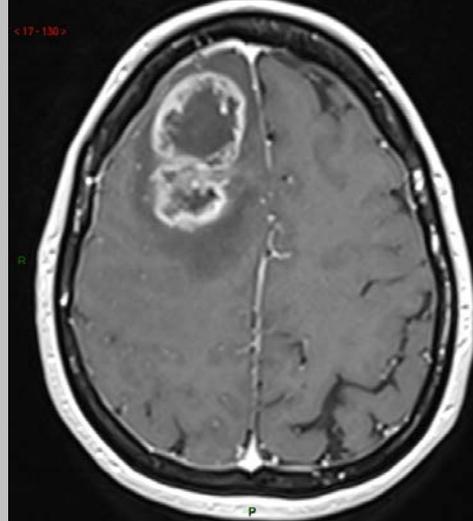
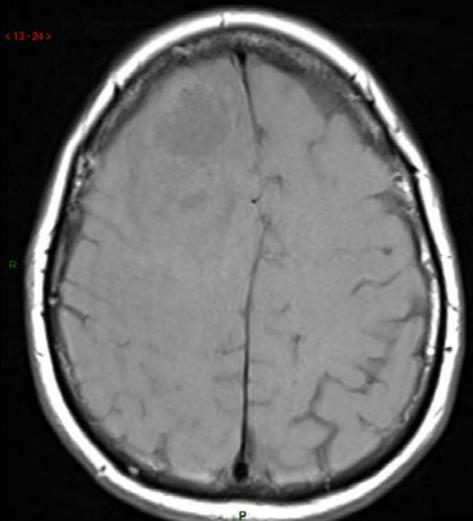
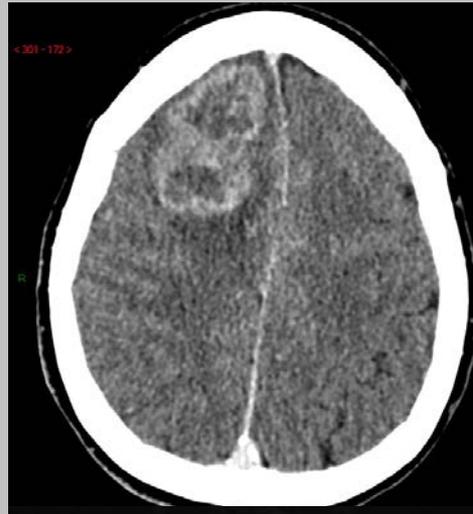
Caractérisation d'une lésion vue sur les séquences en contraste spontané

Pondération T1 sans et avec PdC

Pondération T2

Pondération FLAIR

Pondération en diffusion

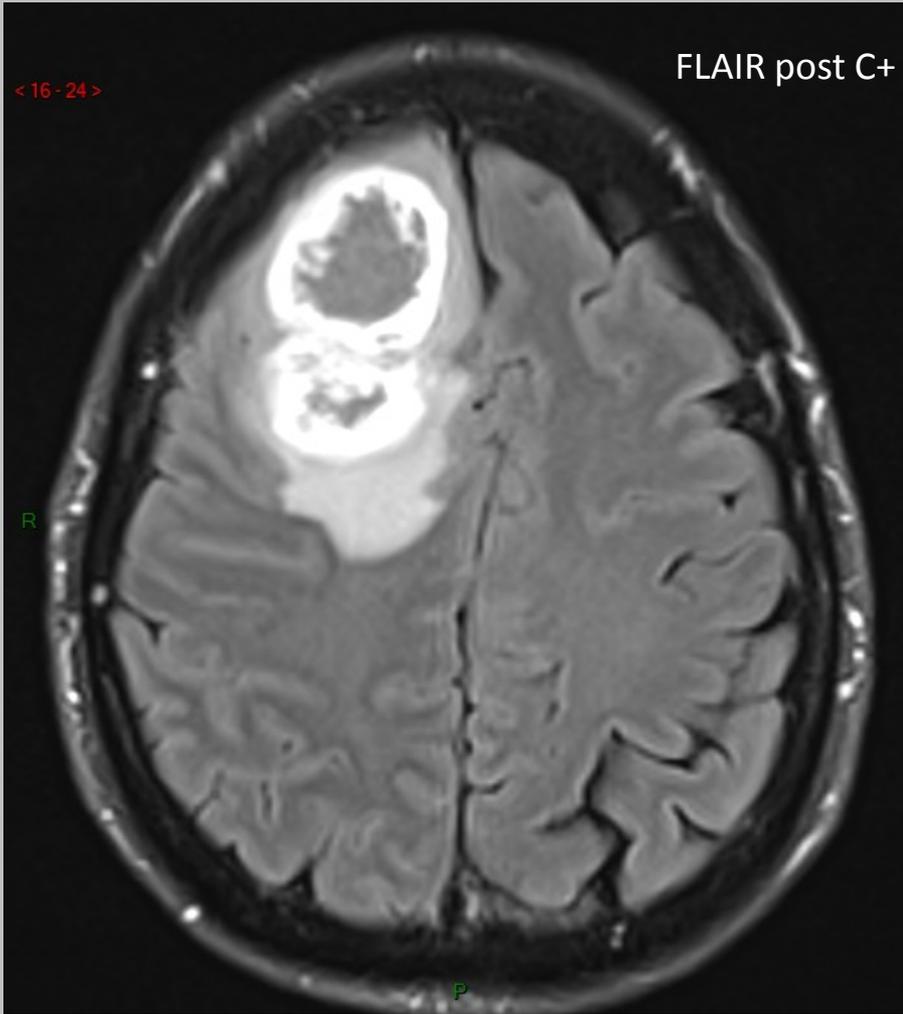


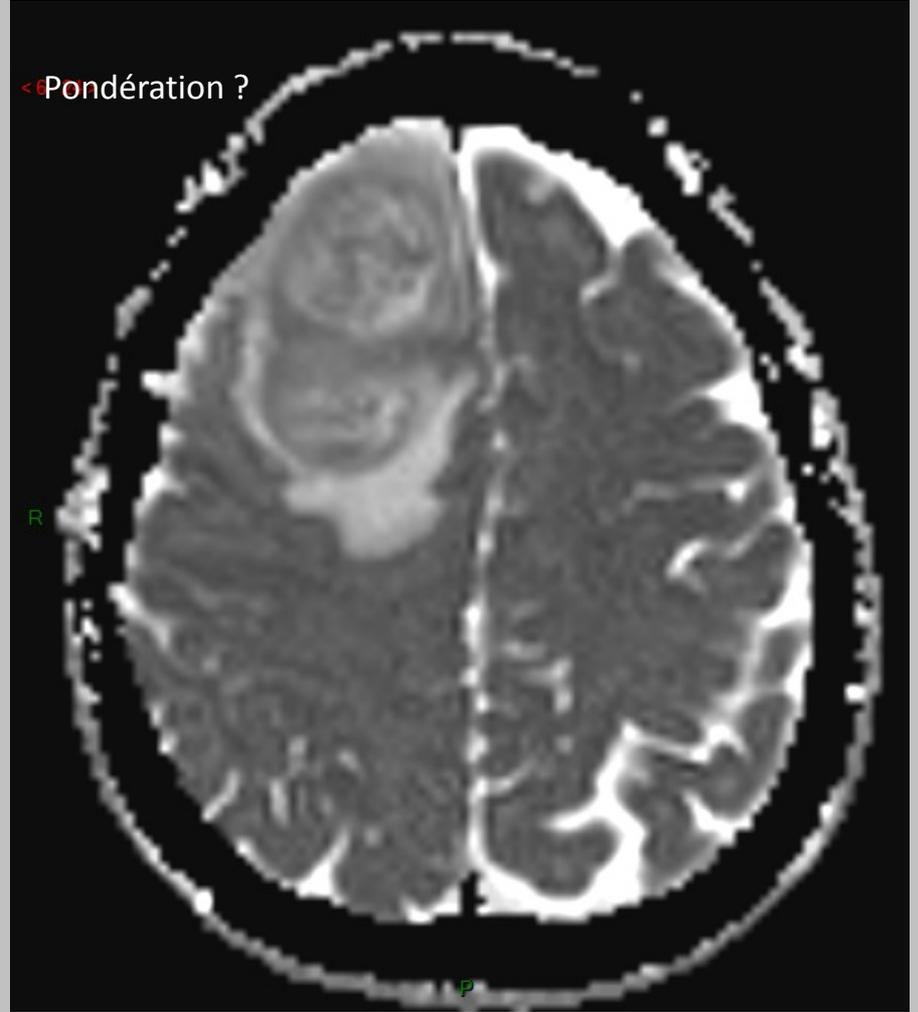
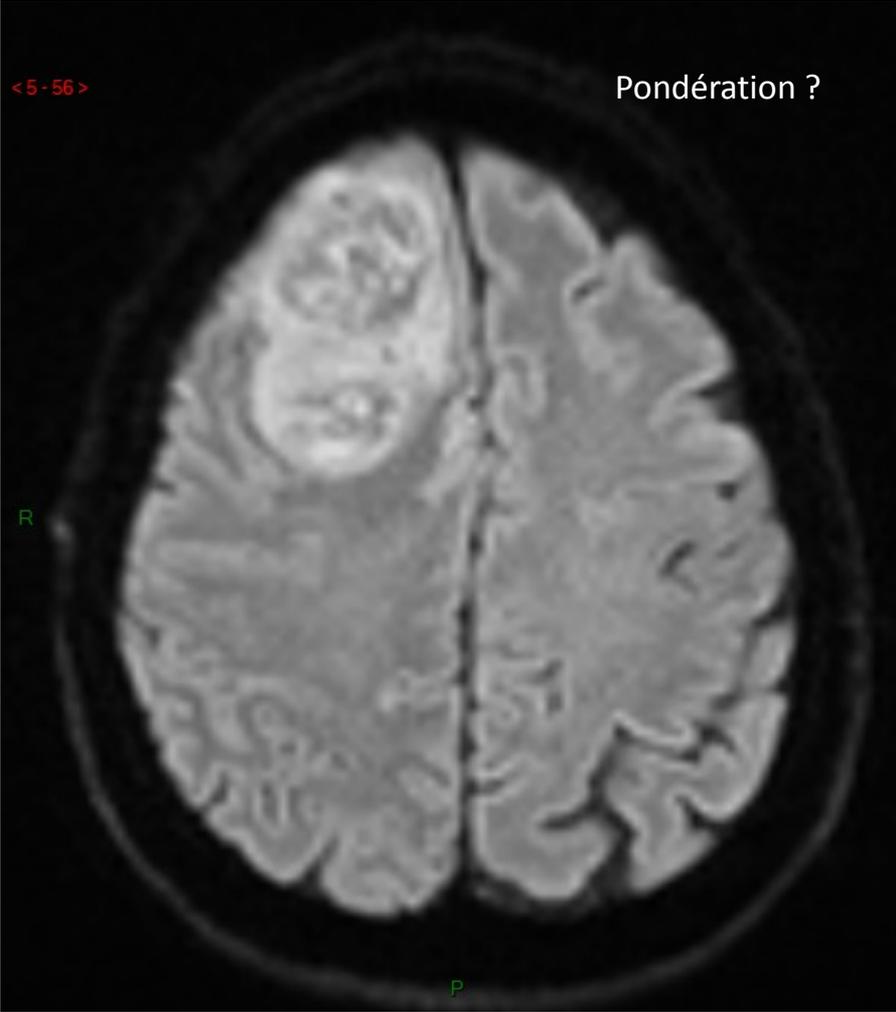
**CT scanner** sans et avec produit de contraste

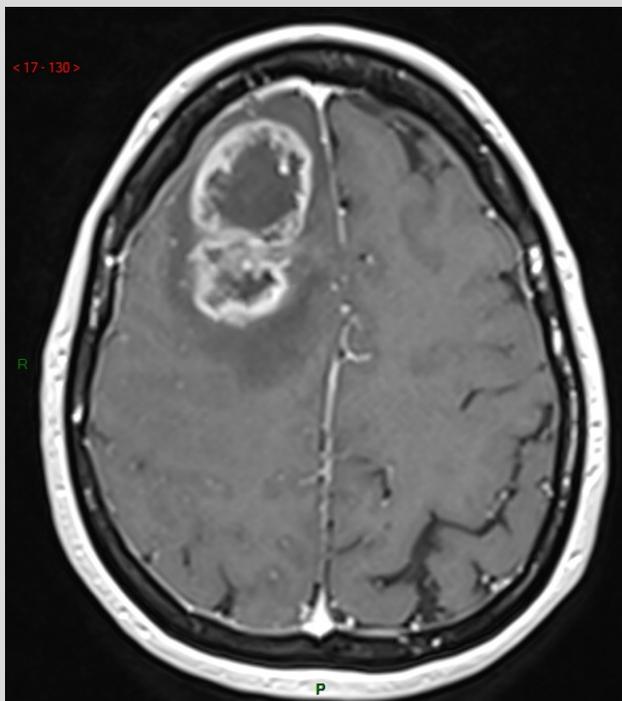
**IRM pondérée T1** sans et avec produit de contraste

*Quelle différence entre les deux modalités?*

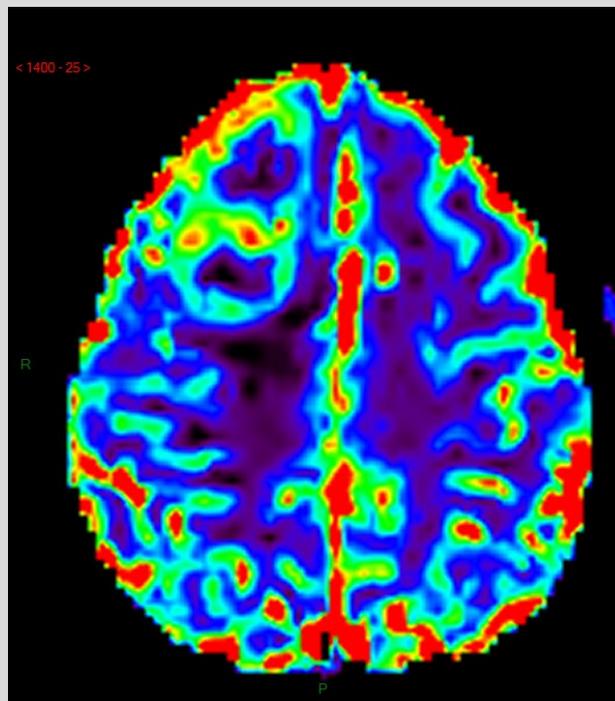
*Quelle différence importante avec le cas précédent ?*



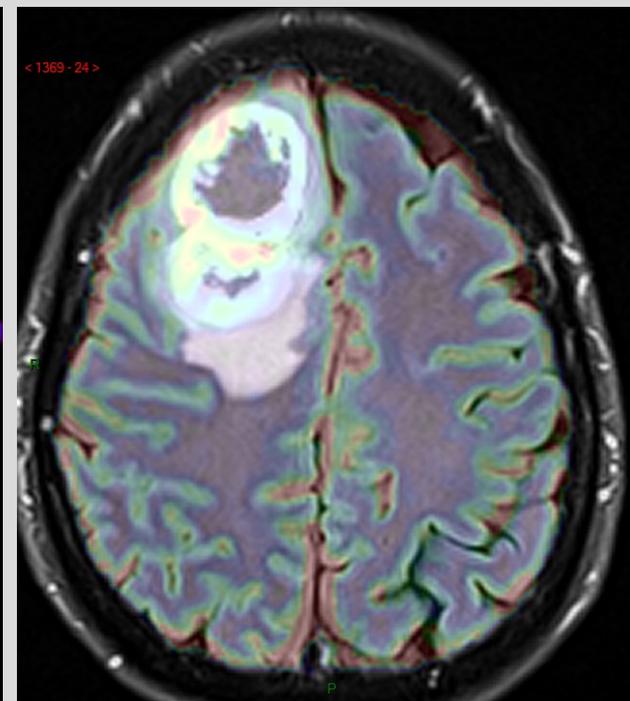




Pondération ?



Pondération ?



Pondération/particularisme ?