VIII Congresso Regional de Histotecnologia
IBILCE/UNESP – São Jose Do Rio Preto – SP

MICROSCOPIA, MESOSCOPIA E MACROSCOPIA EM NEUROANATOMIA

Prof. Dr. Marcus Alexandre mendes Luz

Anatomia Humana e Anatomia Patológica
Faculdade de medicina - UNILAGO

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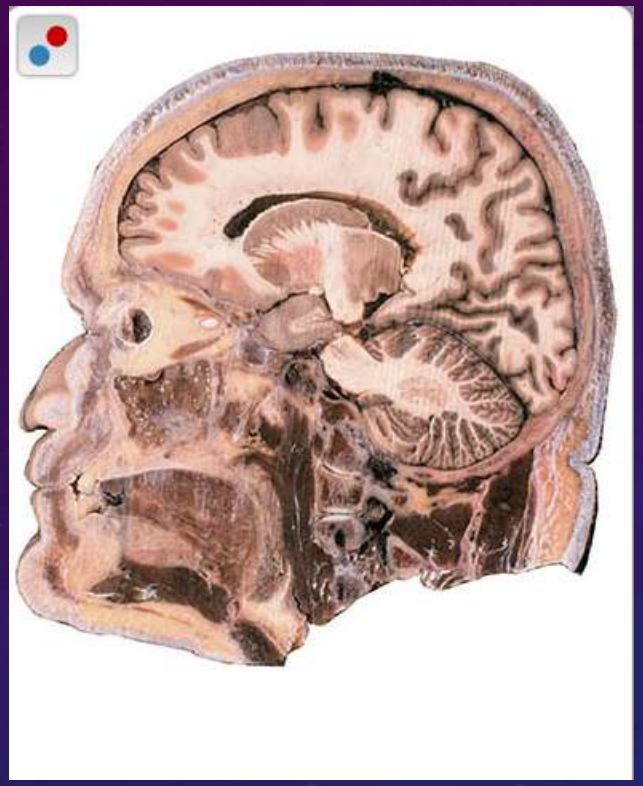

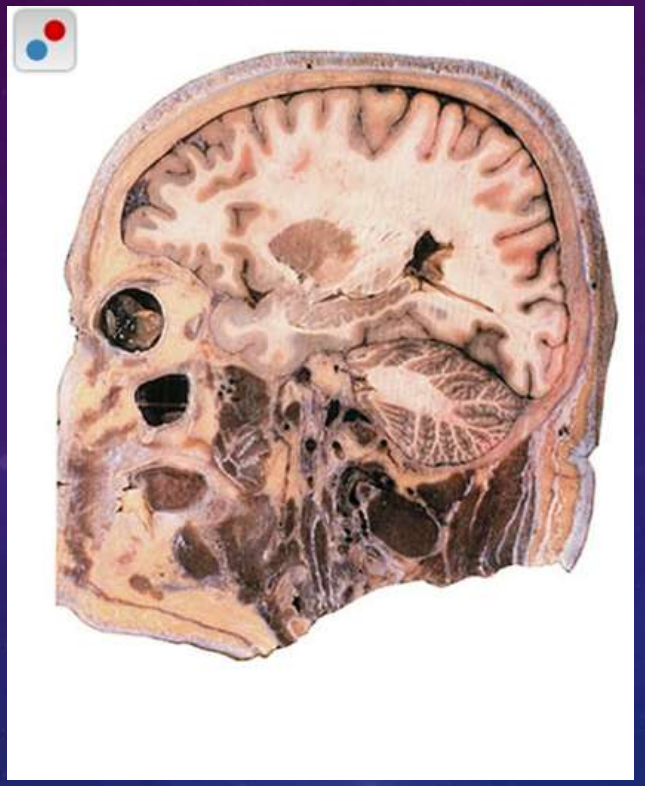

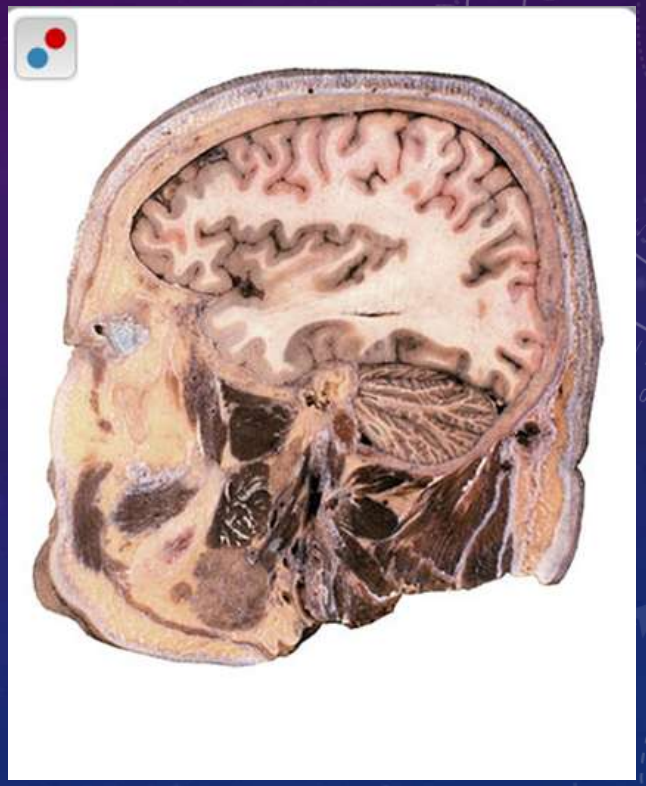

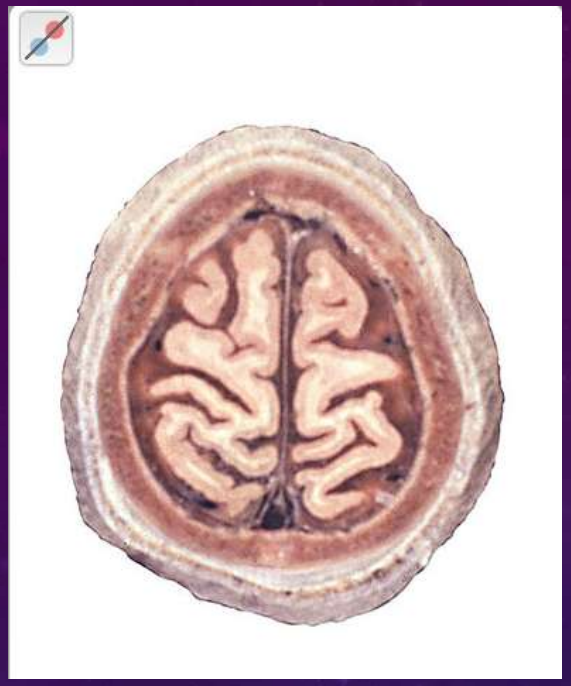
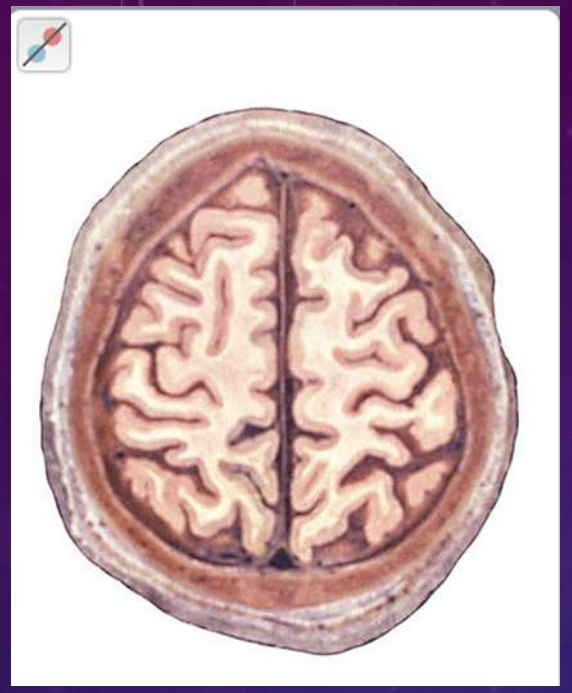



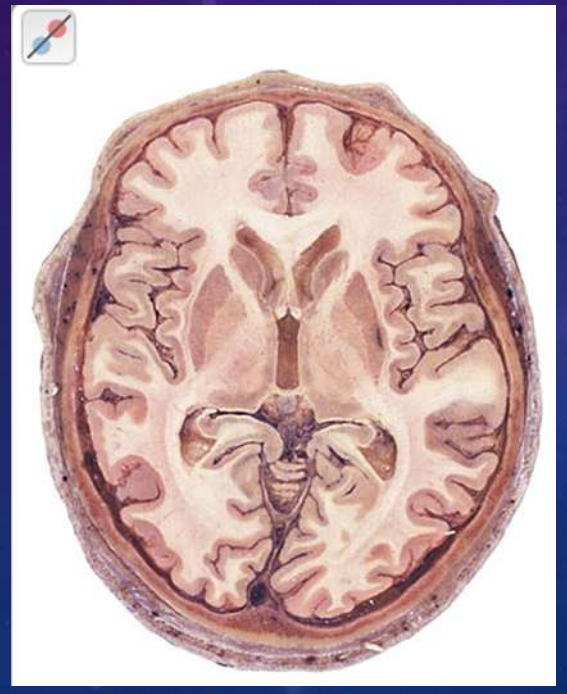
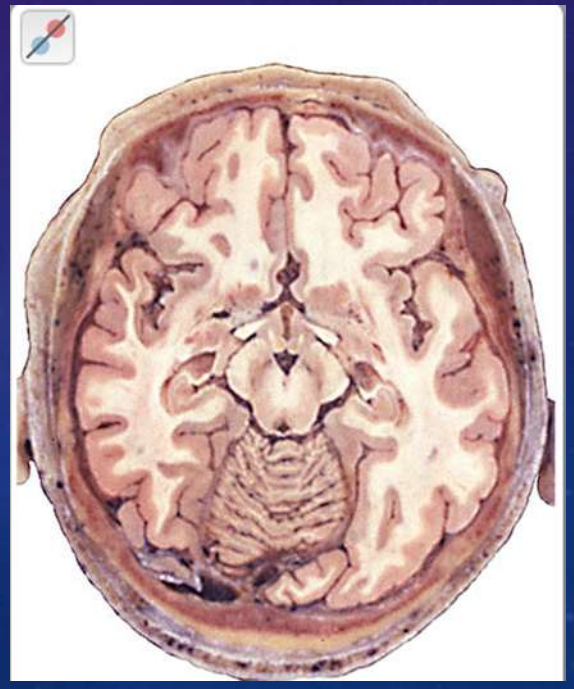
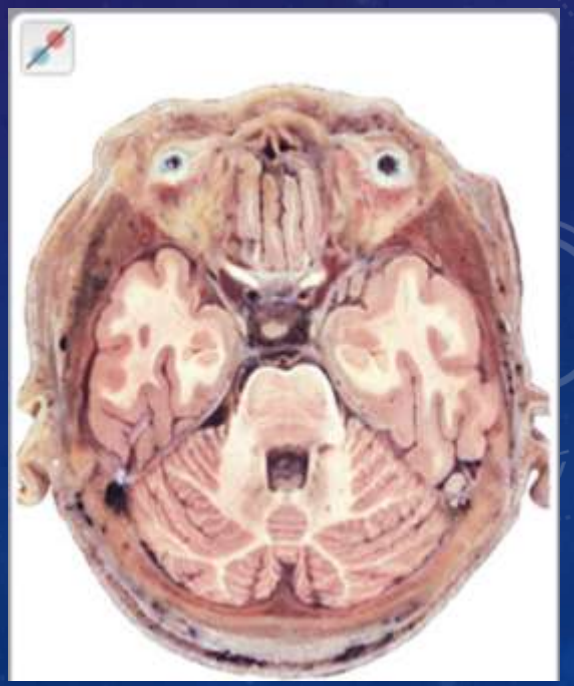

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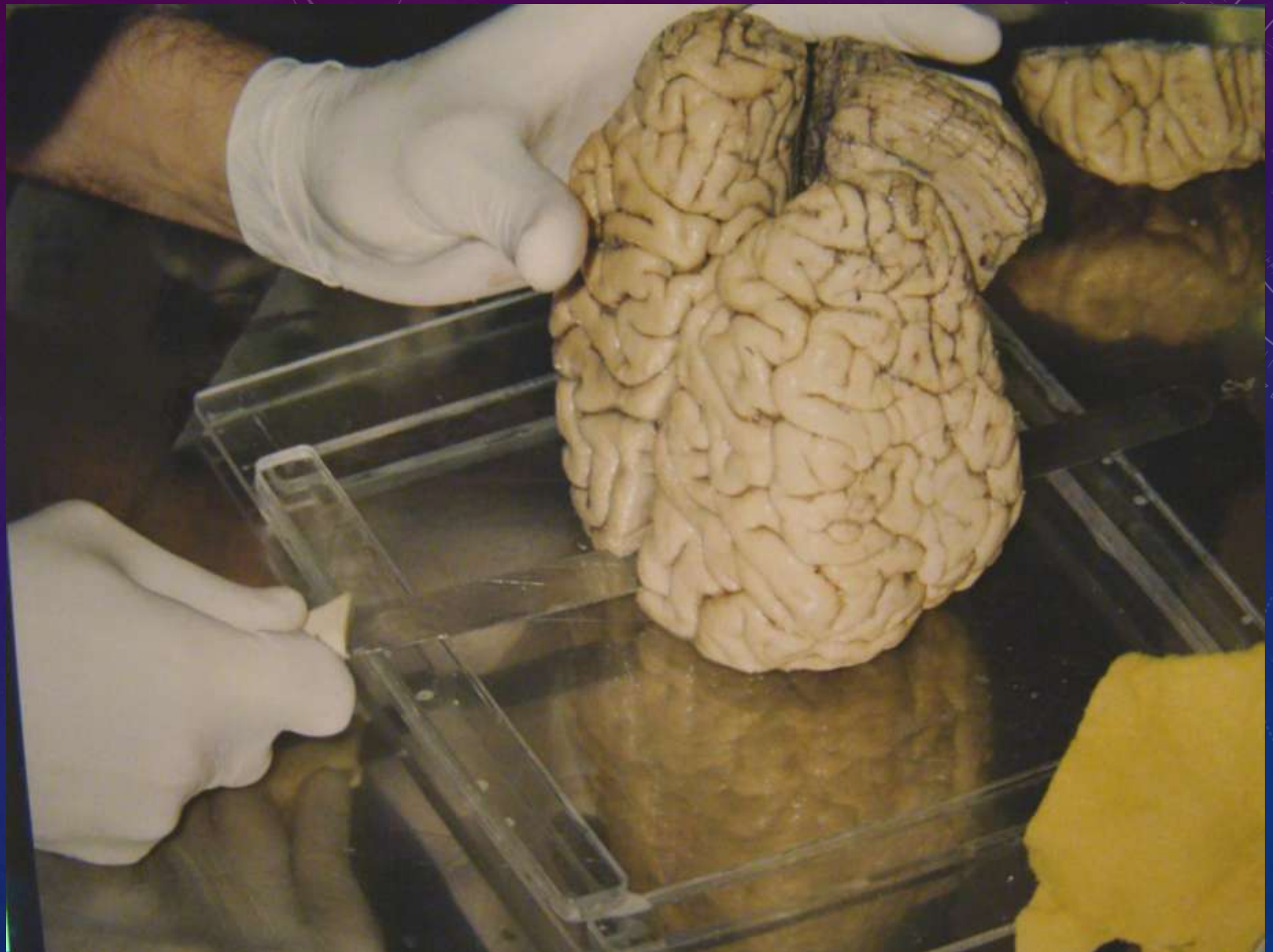
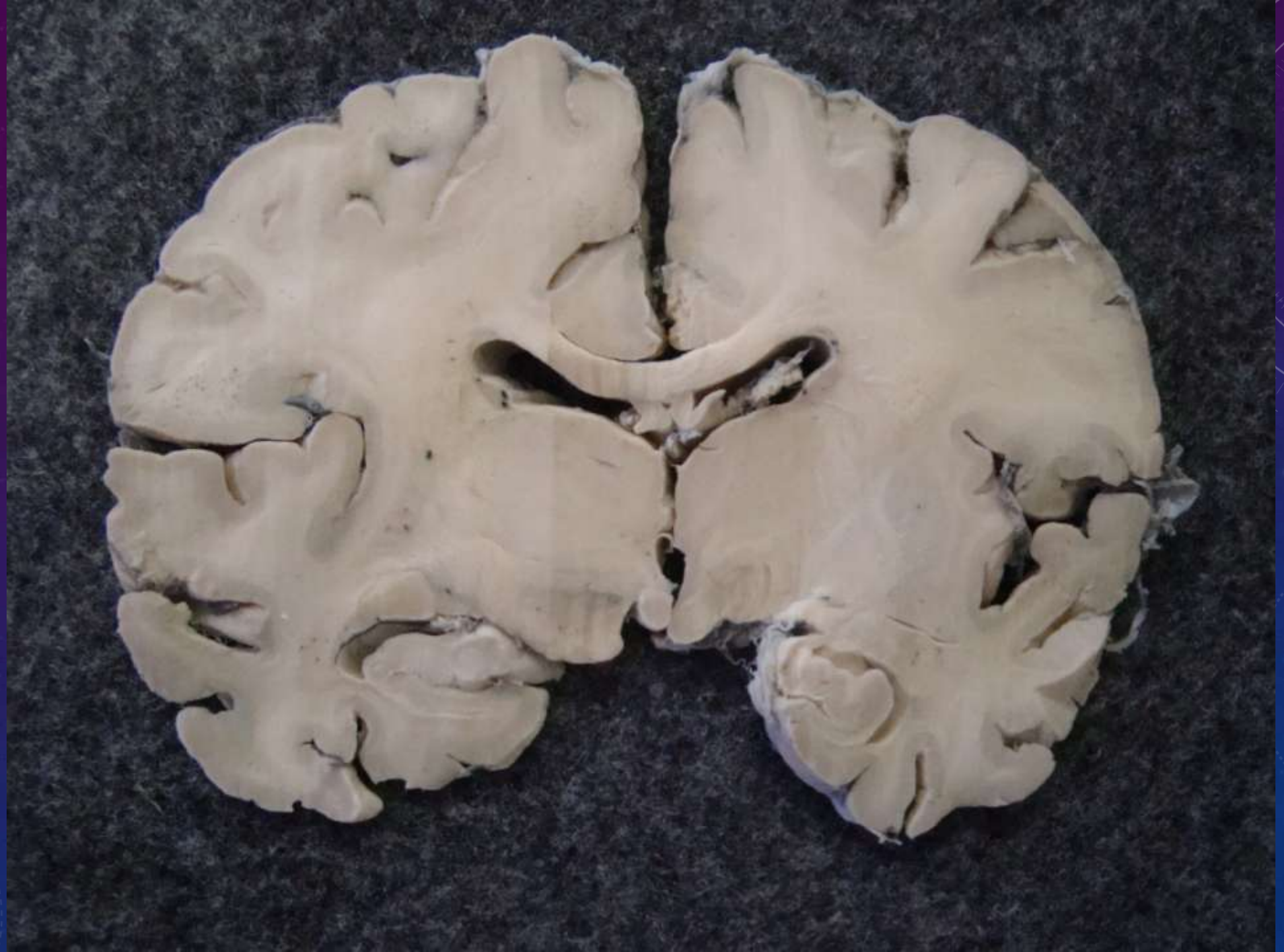




- **Barnard – Robert – Brown**

  (Rodrigues, H., 2005)

Le Masurier

Formol 10%

Solução de Mulligan (Sulfato de cobre)

Soluçâo de Cloreto férrico 1%

Solução de Ferrocianeto de potássio 1%

Preservação em Solução ácida de formol 10%

Resultados: Substância branca, branco; substância cinzenta, azul turquesa.

*Mulligan JH. A method of staining for macroscopic study. J Anat London, 65:472-476, 1931.

Fig 1. Foto de corte encefálico coronal passando pela comissura anterior, submetido a coloração de Barnard, Robert e Brown.

http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0004-282X2004000200016

http://anatpat.unicamp.br/neuroanatindex.html

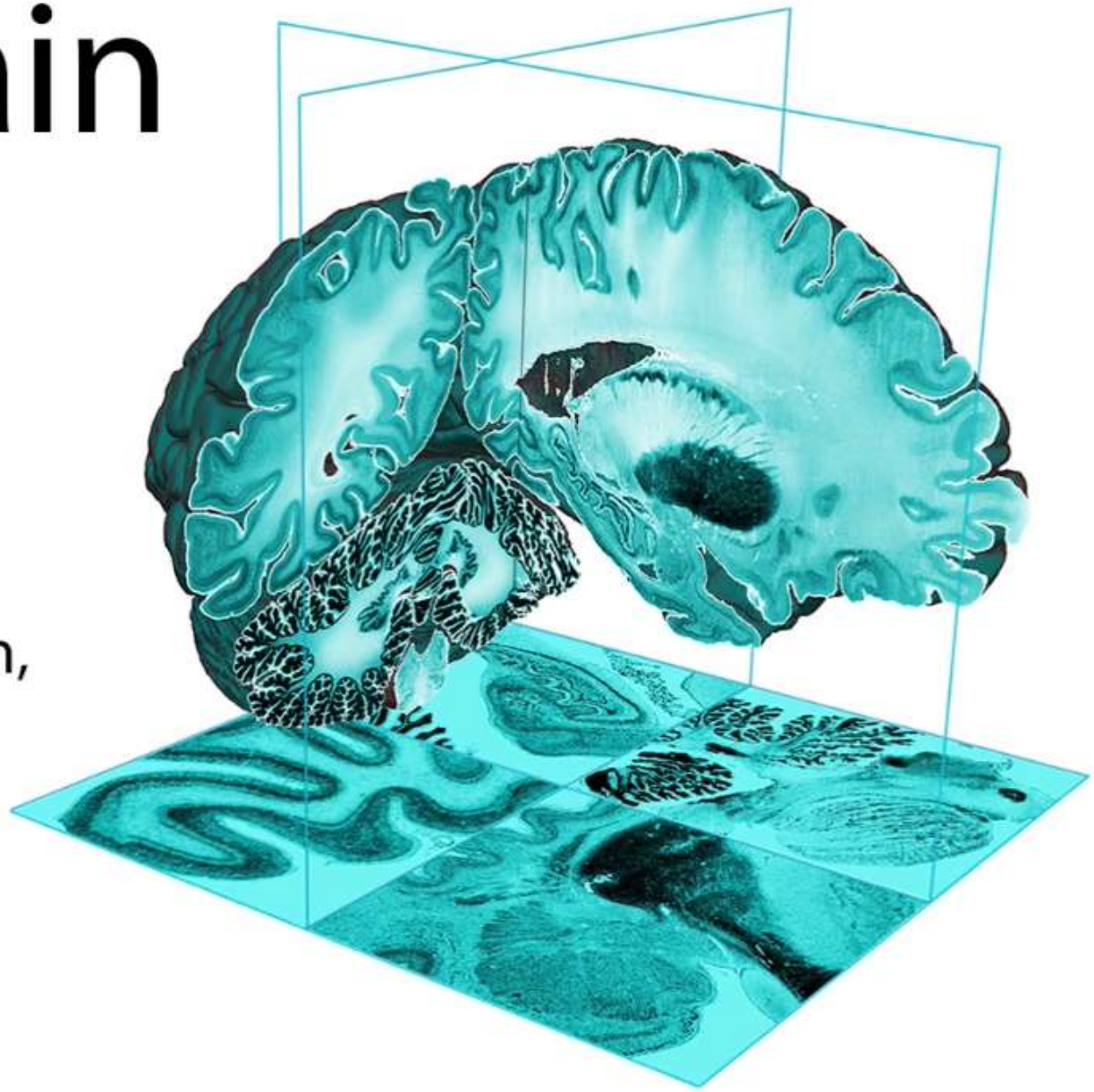
Loyez

http://anatpat.unicamp.br/neuroanatindex.html

Loyez

The BigBrain

- 65-year-old male
- 7,404 20-µm-thick coronal sections
- 10x10 μm^2 in-plane resolution, downsampled to 20 μm^3 isotropic resolution
- ~1 Tbyte storage



BigBrain: An Ultrahigh-Resolution 3D Human Brain Model

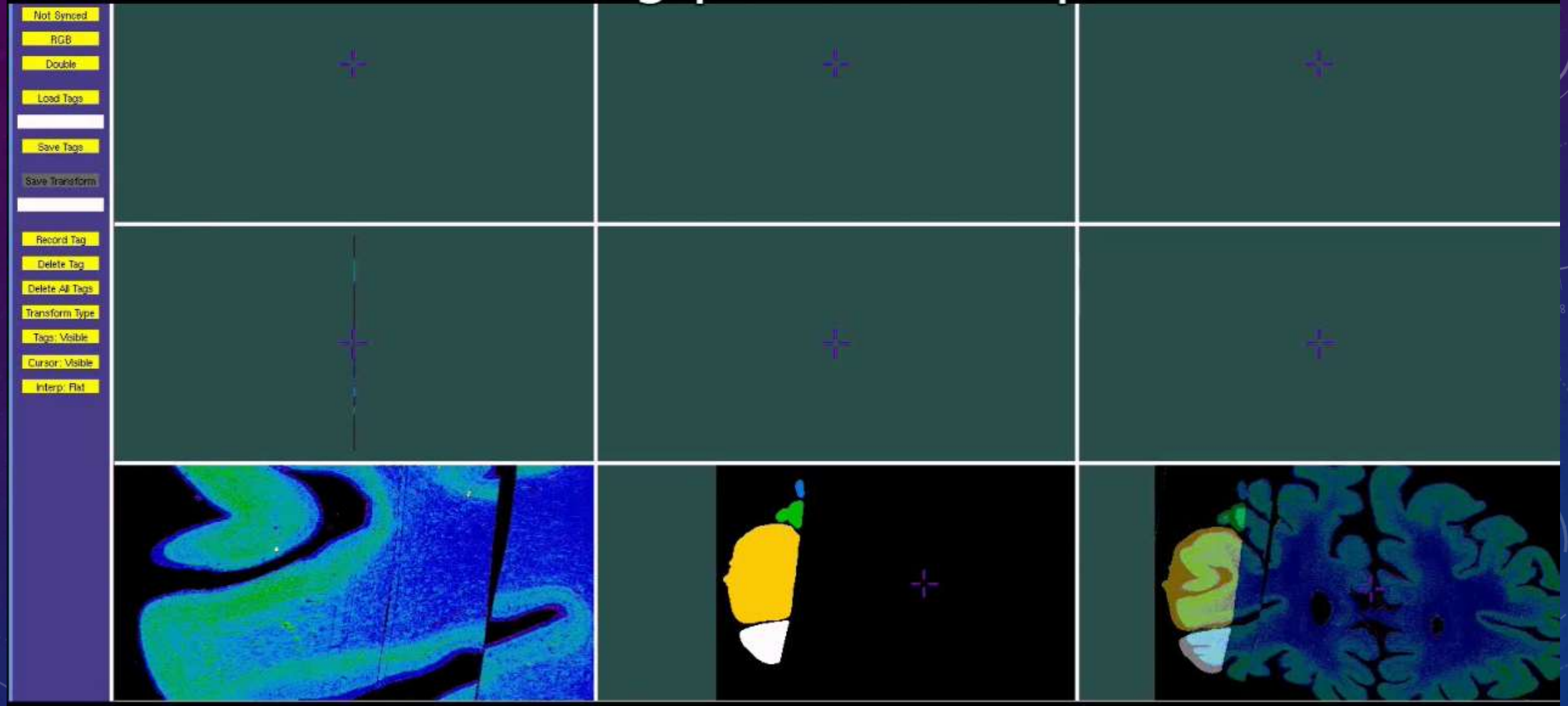
Katrin Amunts, Claude Lepage, Louis Borgeat, Hartmut Mohlberg, Timo Dickscheid, Marc-Étienne Rousseau, Sebastian Bludau, Pierre-Louis Bazin, Lindsay B. Lewis, Ana-Maria Oros-Peusquens, Nadim J. Shah, Thomas Lippert, Karl Zilles, Alan C. Evans.

Science, v. 340, pp. 1472-1475, 2013

https://bigbrain.loris.ca/images/media/BBvideo_HBM.mp4

https://bigbrain.loris.ca/images/media/BBvideo_HBM.mp4

Stitching pieces to repair



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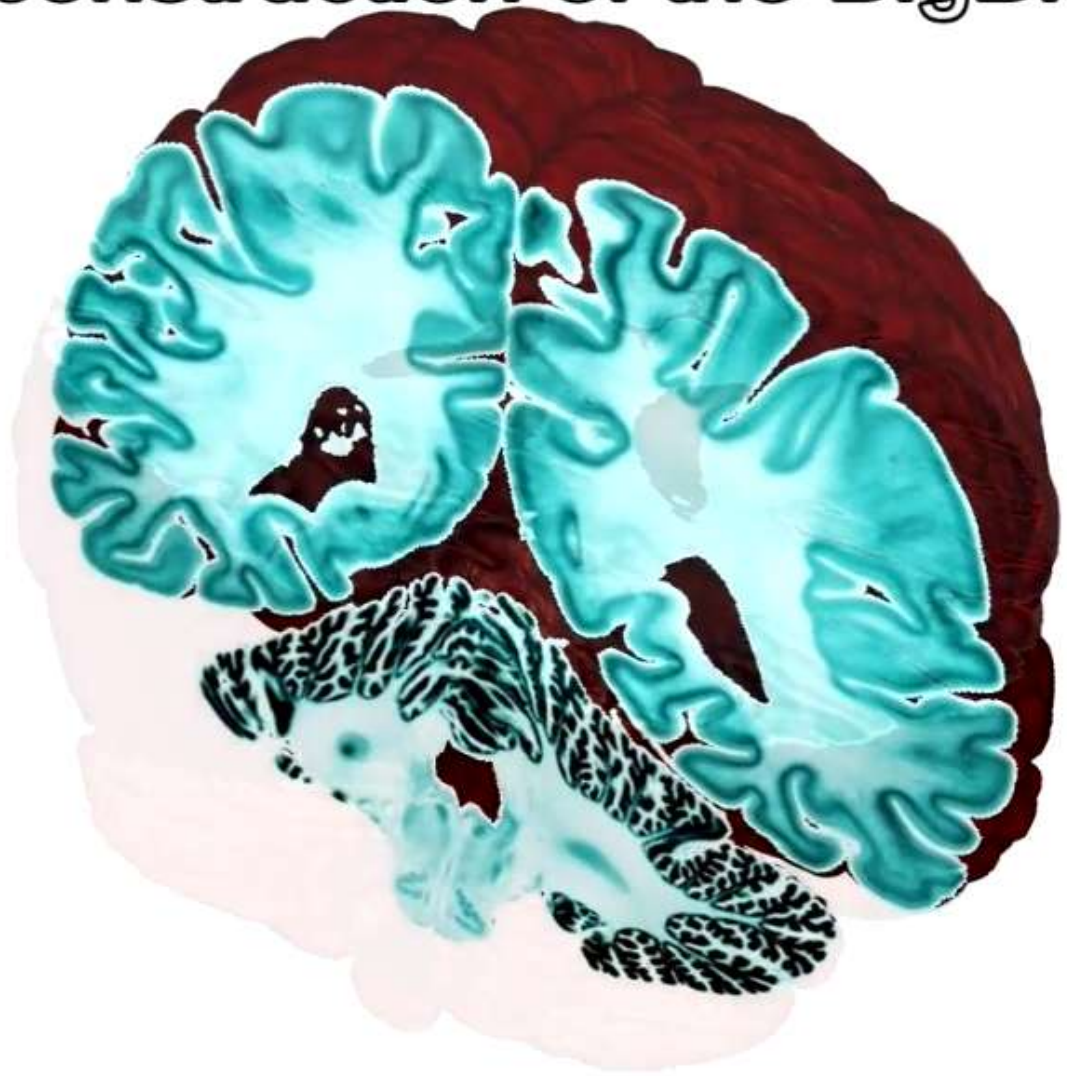
https://bigbrain.loris.ca/images/media/BBvideo_HBM.mp4

3D Reconstruction of the BigBrain



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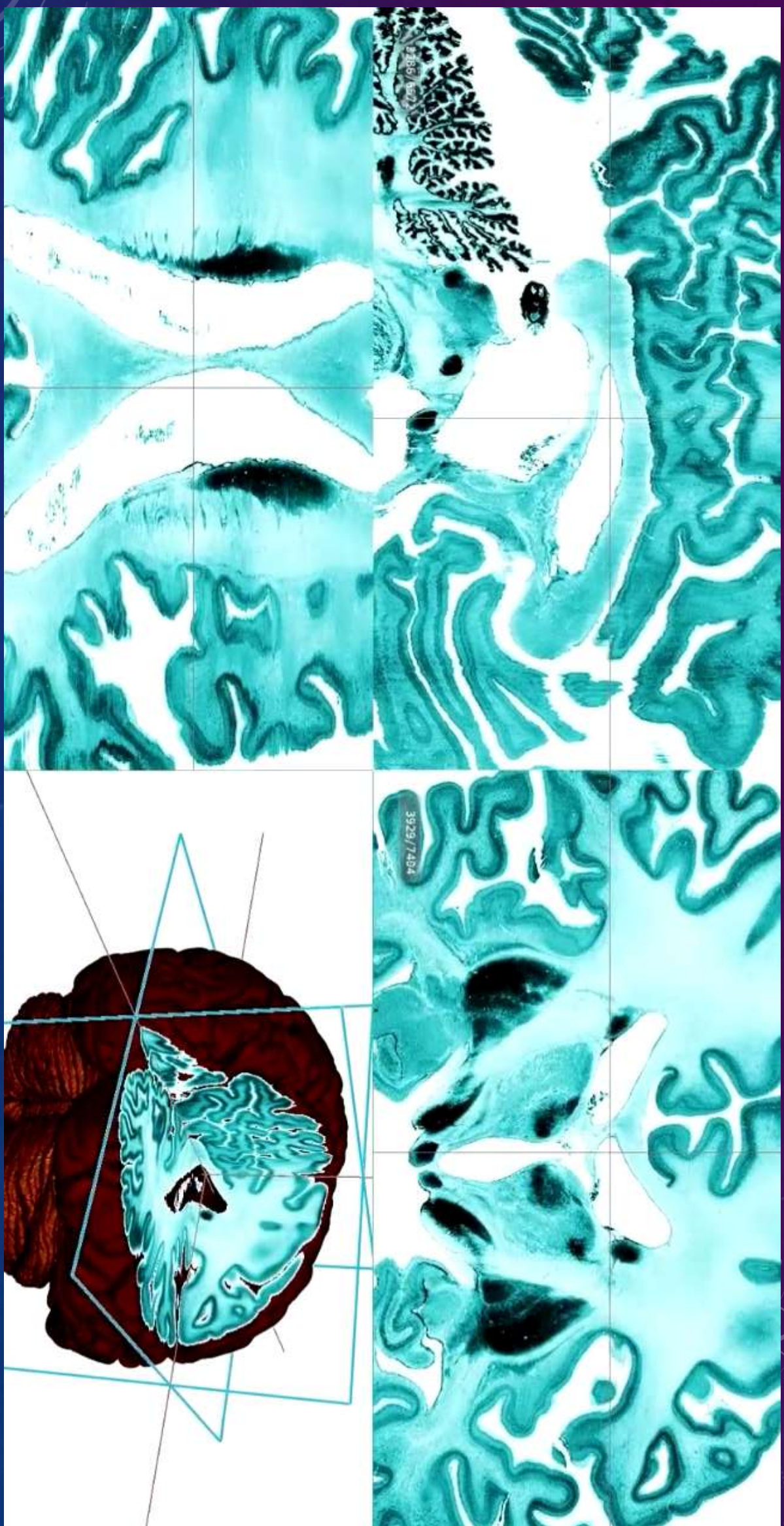

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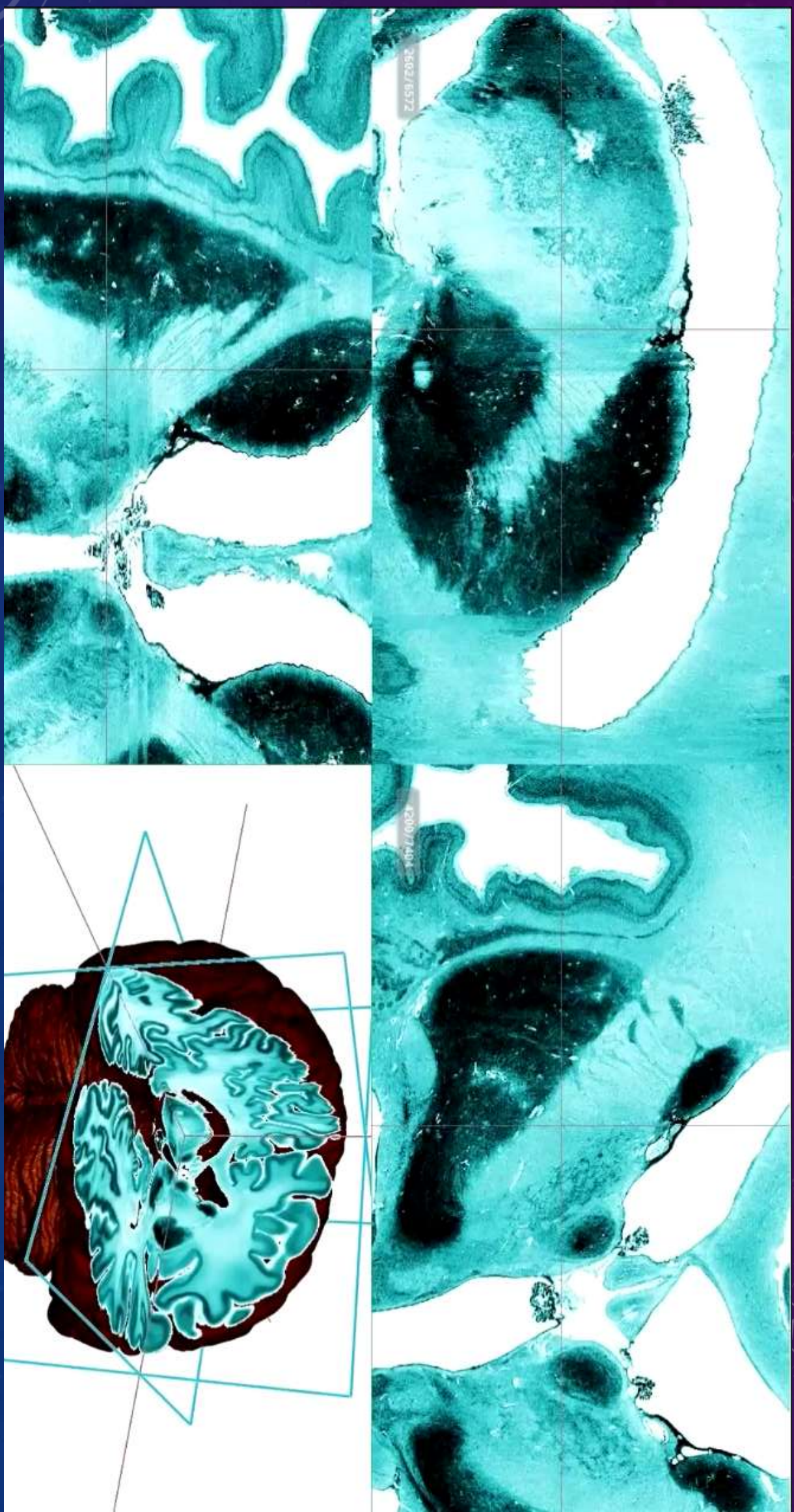

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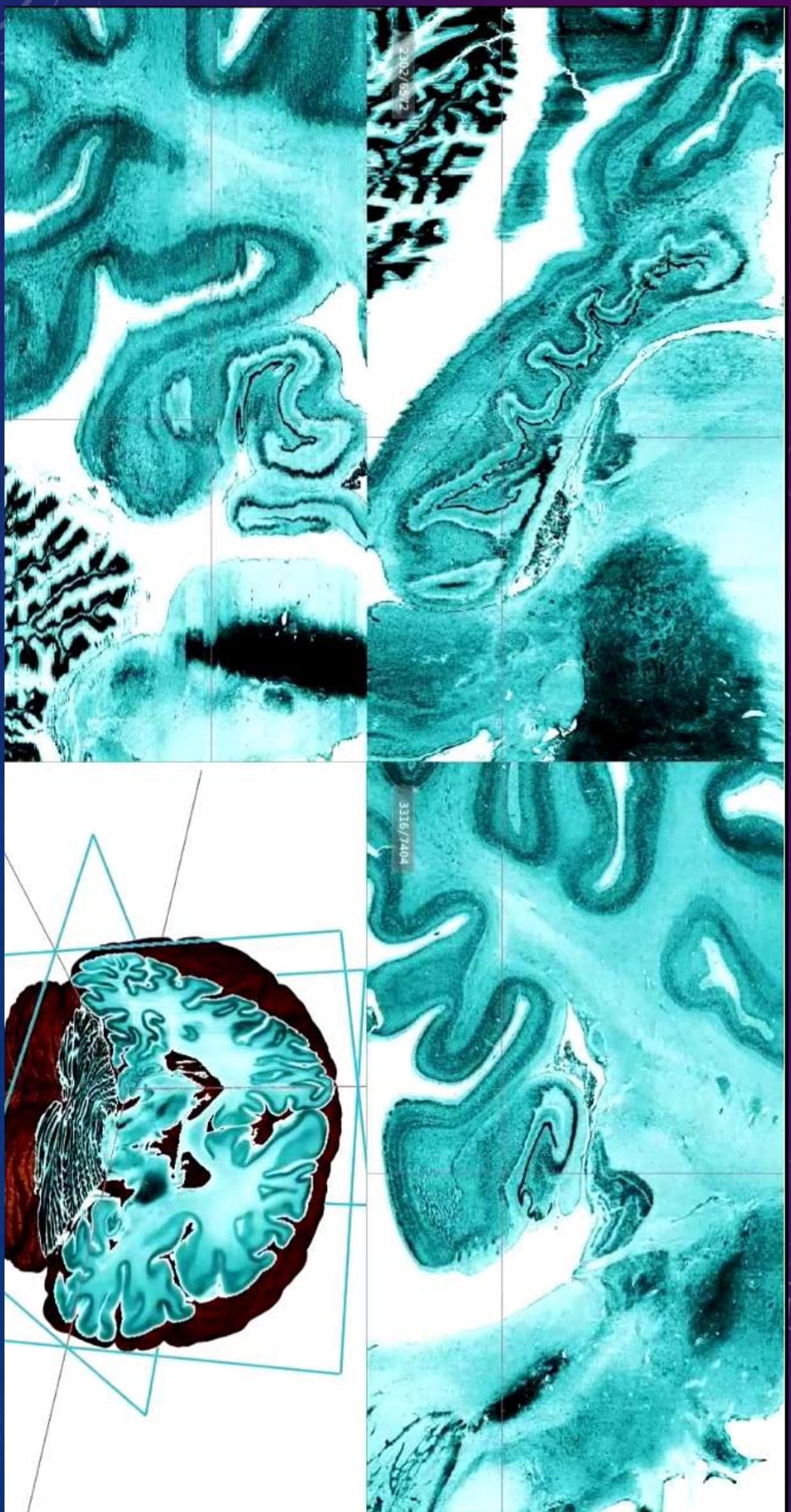

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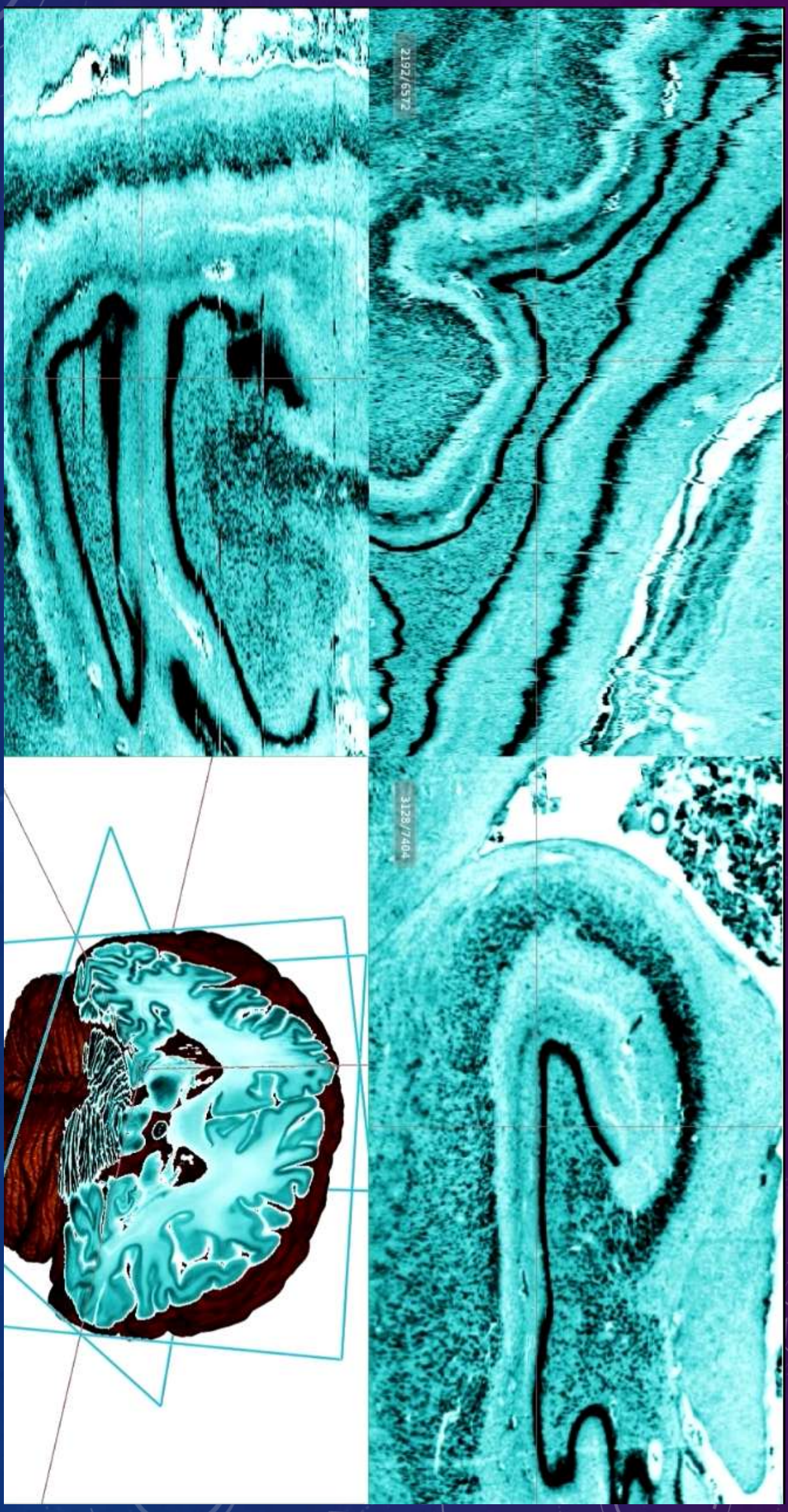

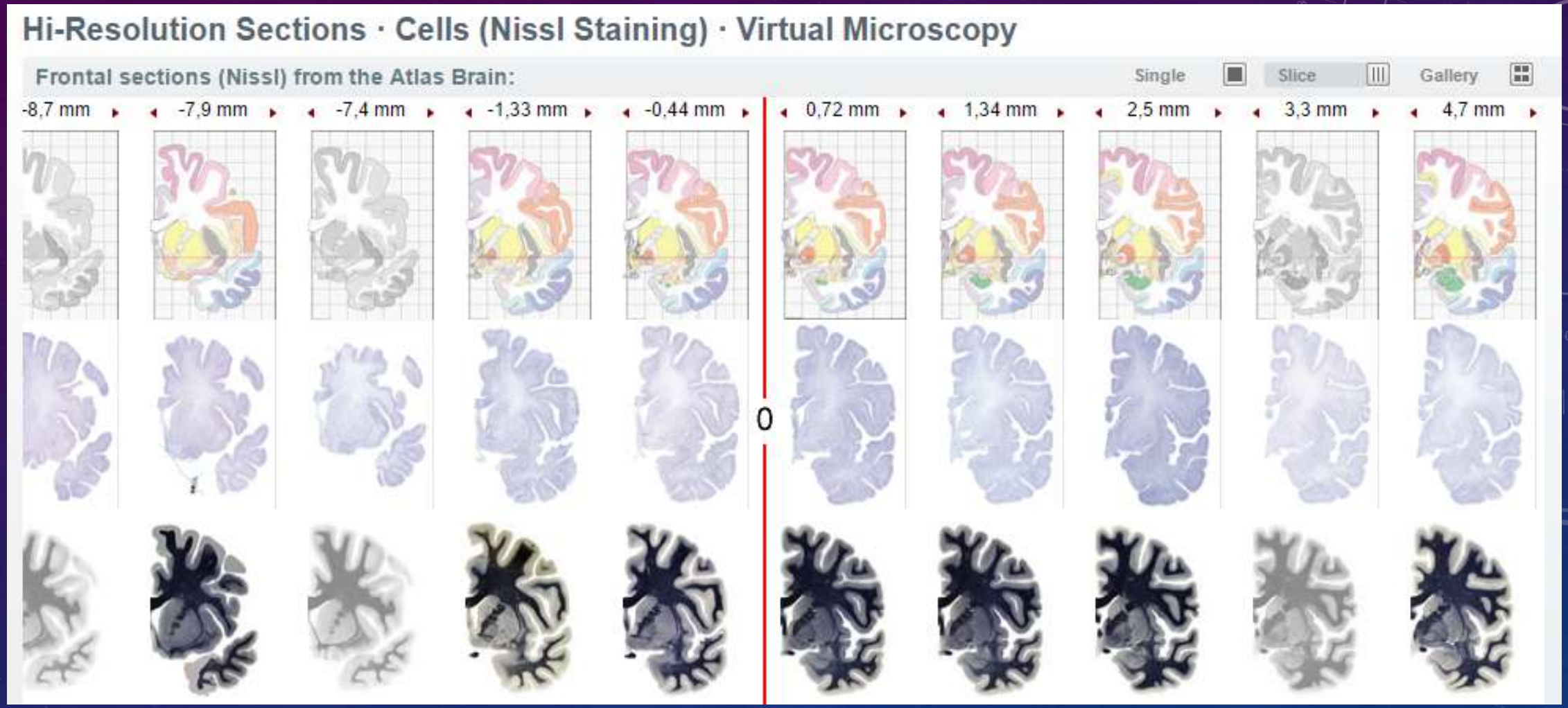

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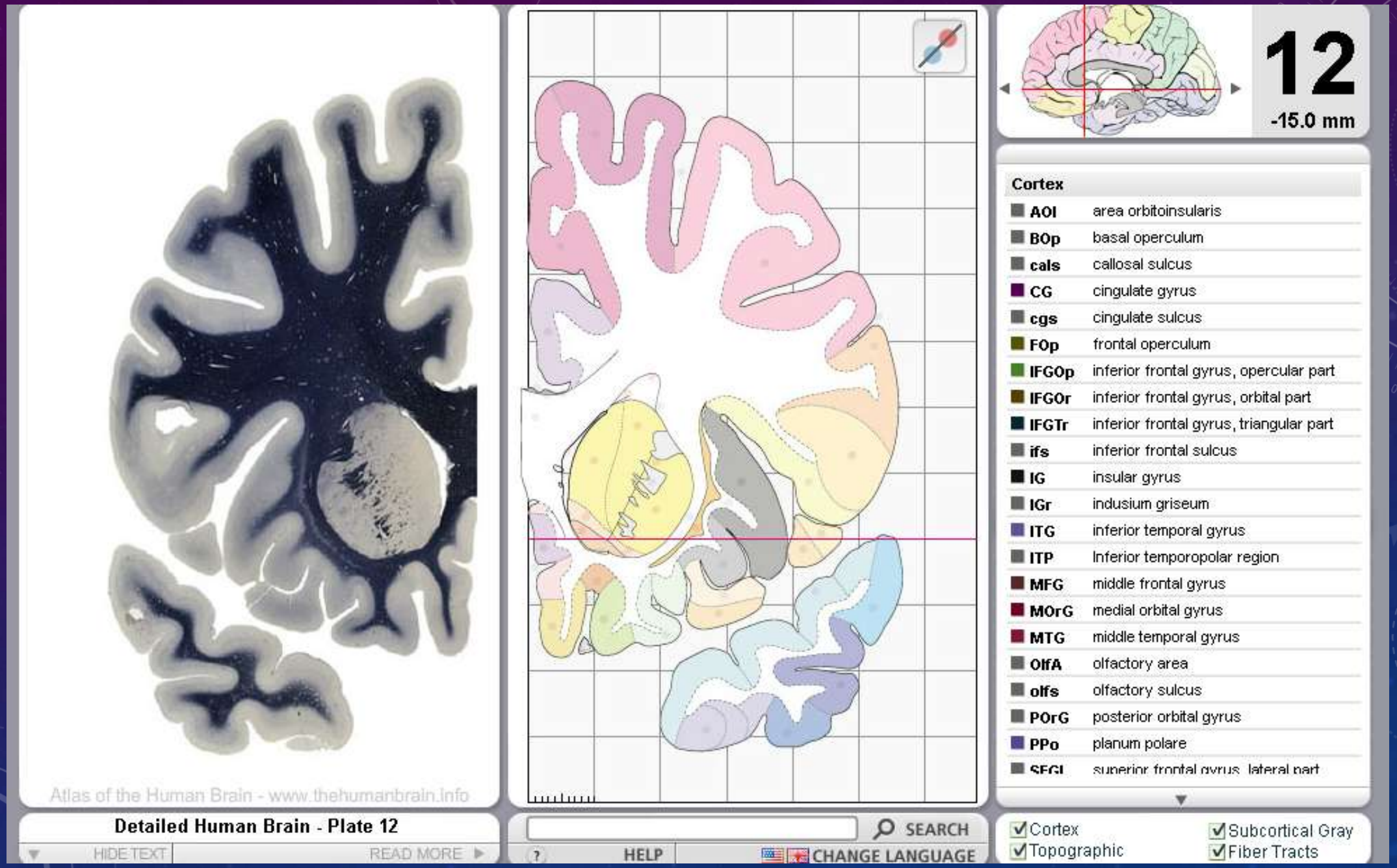

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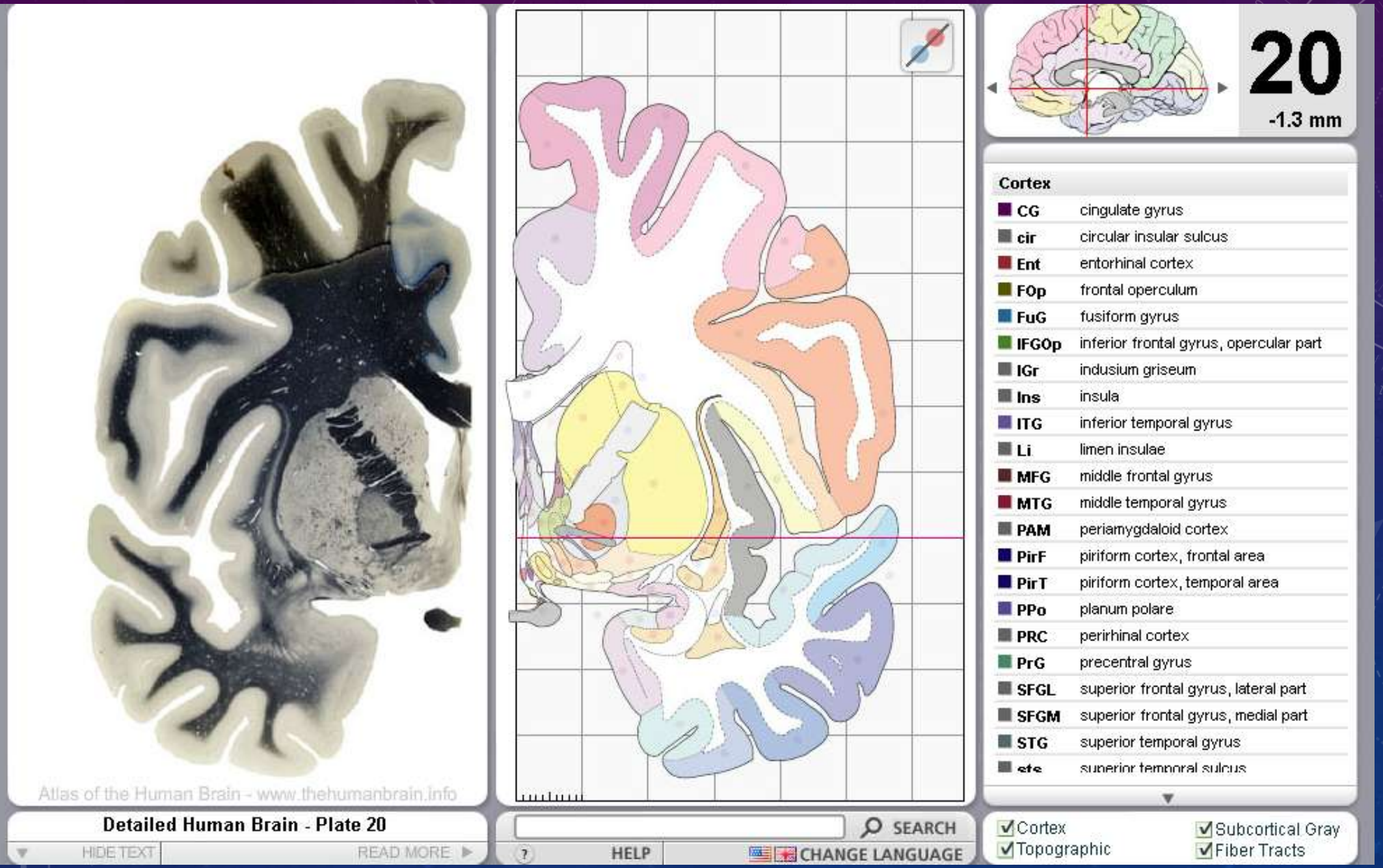

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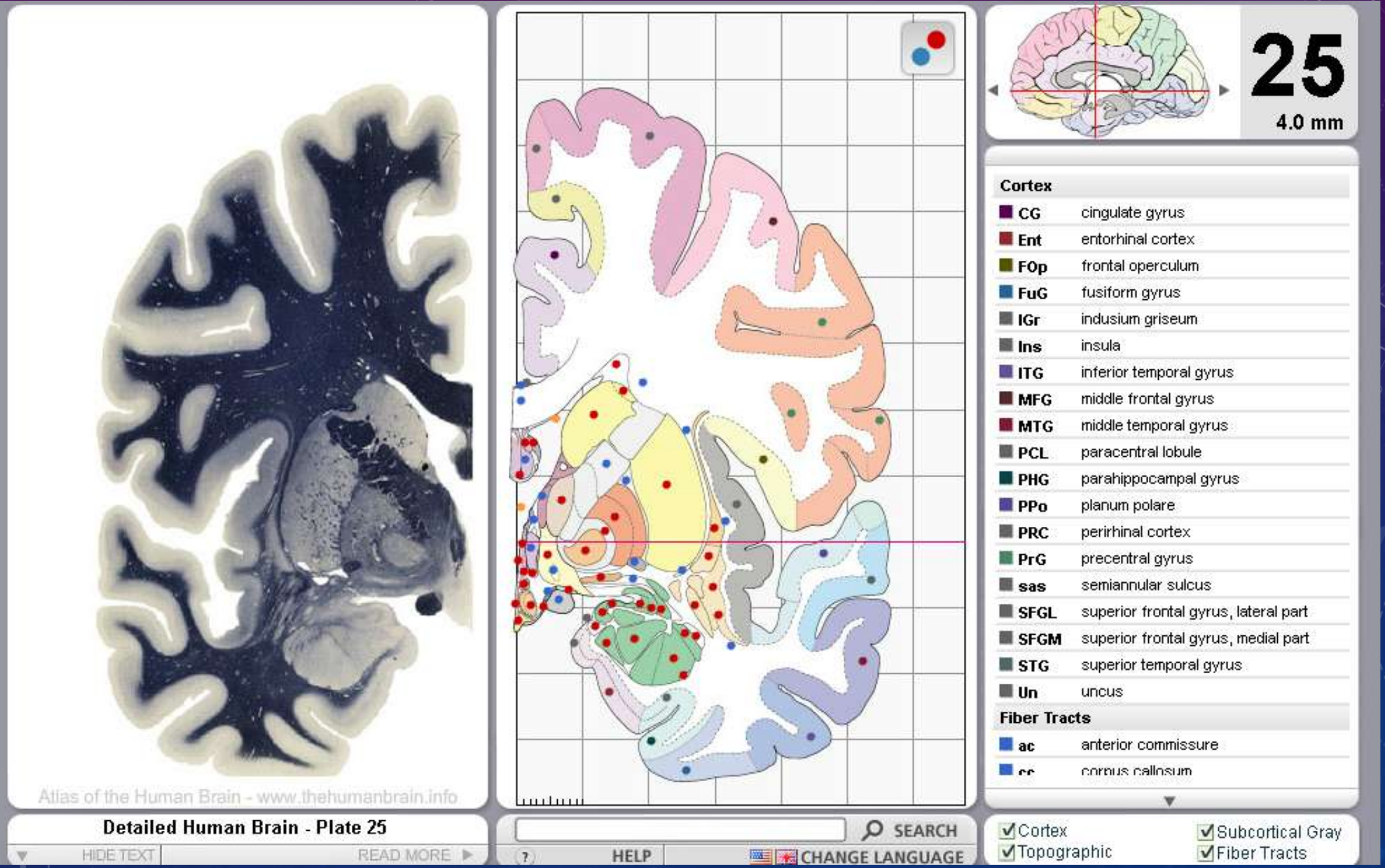

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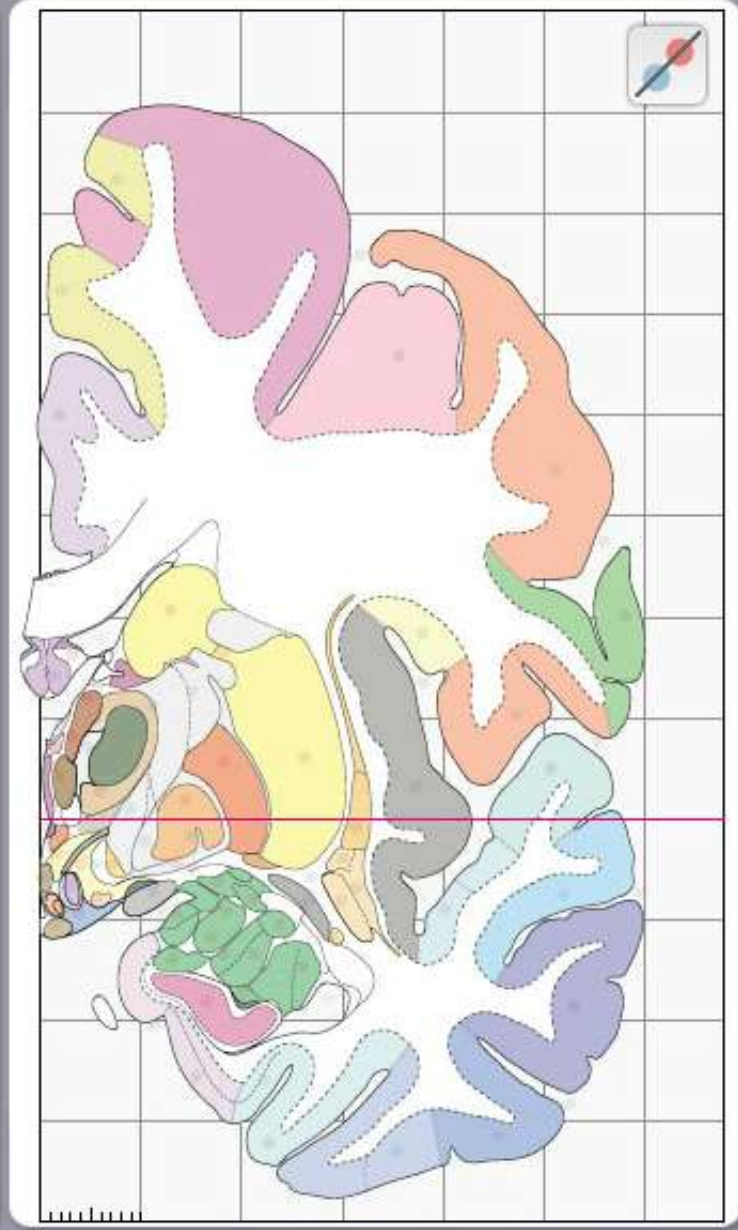


28

8.0 mm

Cortex	
ce	central sulcus
CG	cingulate gyrus
cir	circular insular sulcus
Ent	entorhinal cortex
FOp	frontal operculum
FuG	fusiform gyrus
Ins	insula
ITG	inferior temporal gyrus
its	inferior temporal sulcus
lf	lateral fissure
MFG	middle frontal gyrus
MM	medial mamillary nucleus, medial part
MTG	middle temporal gyrus
PCL	paracentral lobule
PCL	paracentral lobule
PHG	parahippocampal gyrus
PoG	postcentral gyrus
PPo	planum polare
PRC	perirhinal cortex
PrG	precentral gyrus
Pu	putamen
sas	semiannular sulcus

Detailed Human Brain - Plate 28

HIDE TEXT READ MORE

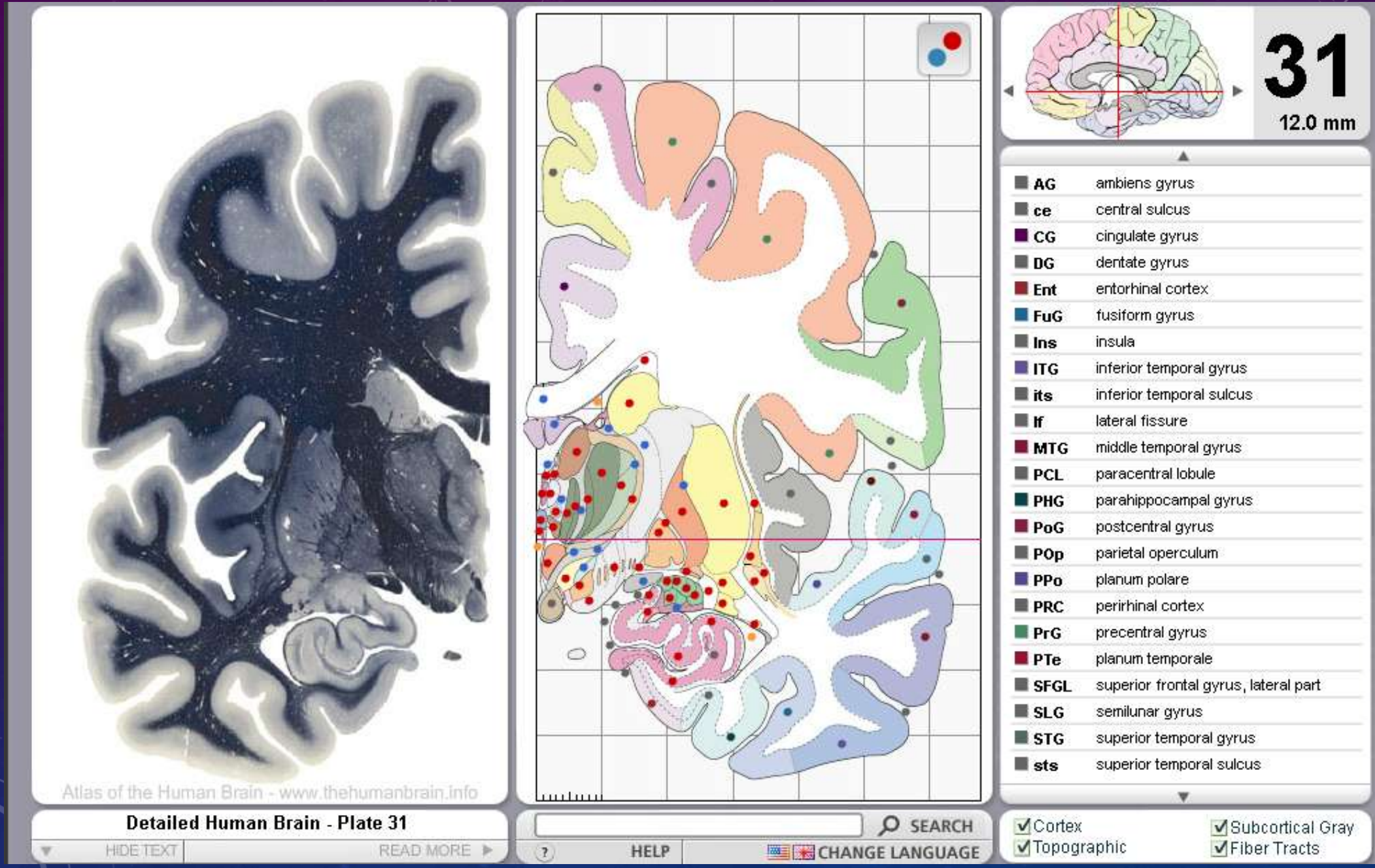
SEARCH

HELP CHANGE LANGUAGE

Cortex Subcortical Gray

Topographic Fiber Tracts

http://www.thehumanbrain.info/brain/bn_brain_atlas/brain.html



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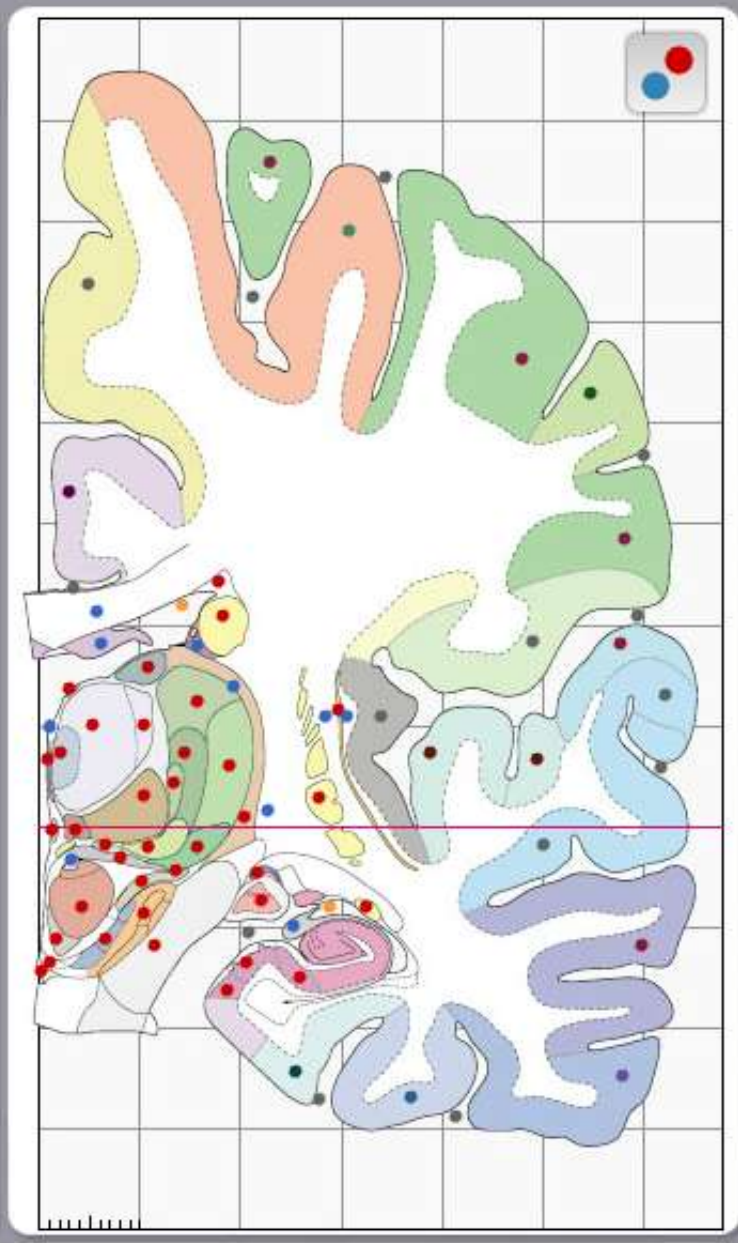

40

23.9 mm

Cortex	
ce	central sulcus
CG	cingulate gyrus
cos	collateral sulcus
cp	cerebral peduncle
FuG	fusiform gyrus
his	hippocampal sulcus
IGr	indusium griseum
Ins	insula
ITG	inferior temporal gyrus
lf	lateral fissure
lots	lateral occipitotemporal sulcus
LV	lateral ventricle
MTG	middle temporal gyrus
PCL	paracentral lobule
PHG	parahippocampal gyrus
pocs	postcentral sulcus
PoG	postcentral gyrus
POp	parietal operculum
PrG	precentral gyrus
PrS	presubiculum
PTe	planum temporale
PV	paraventricular thalamic nucleus

Detailed Human Brain - Plate 40

HIDE TEXT READ MORE

SEARCH

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Cortex Subcortical Gray

Topographic Fiber Tracts

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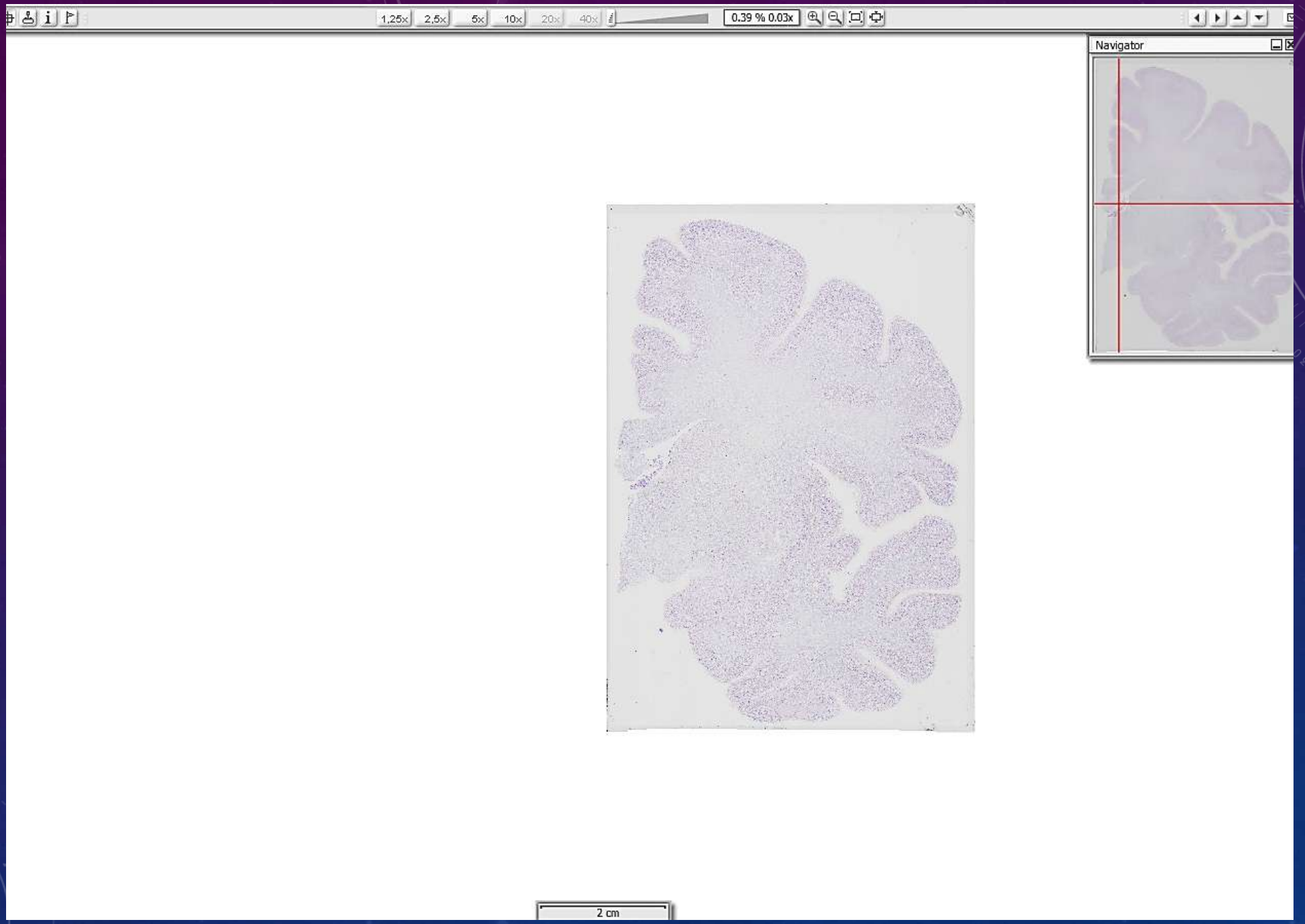

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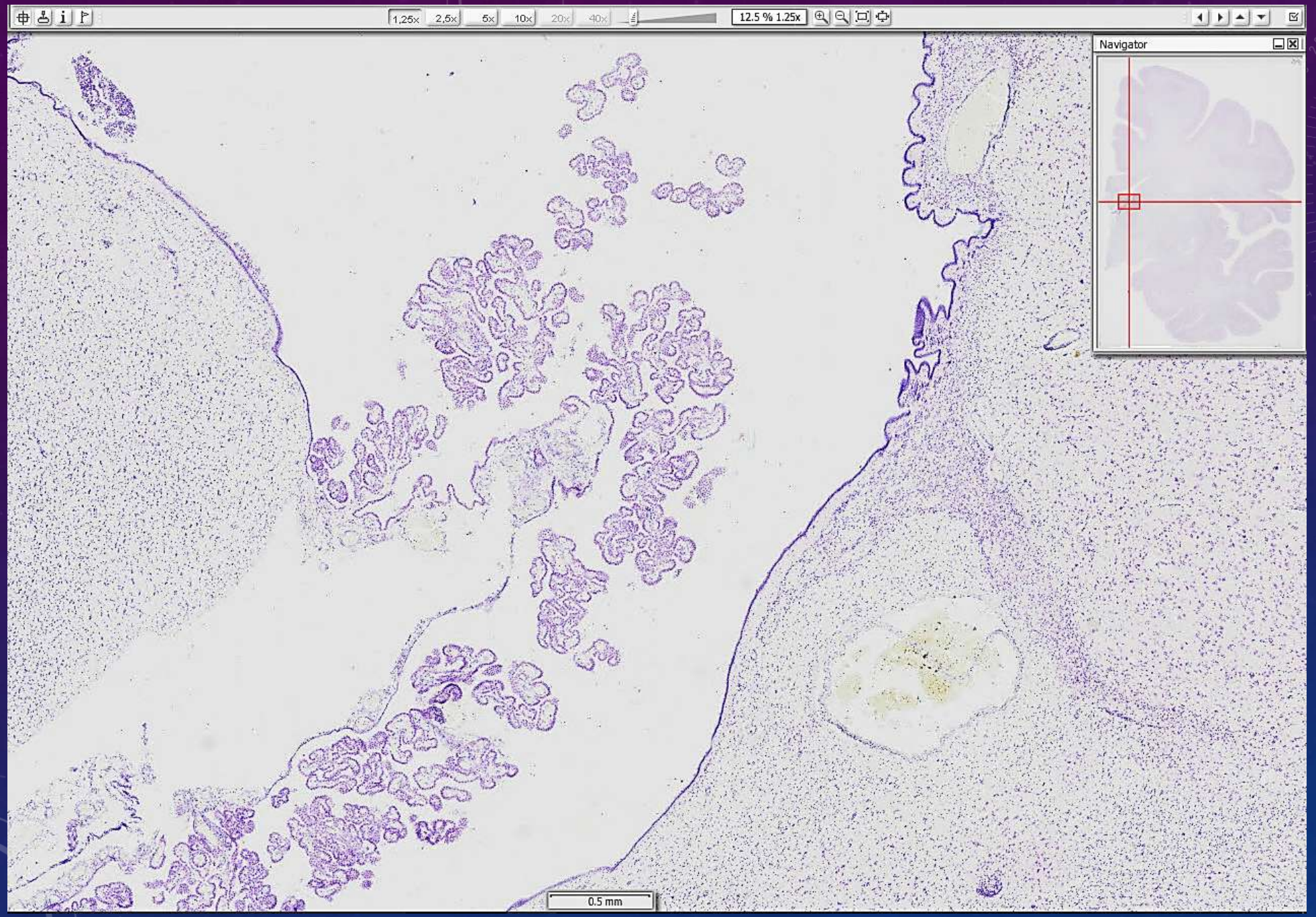

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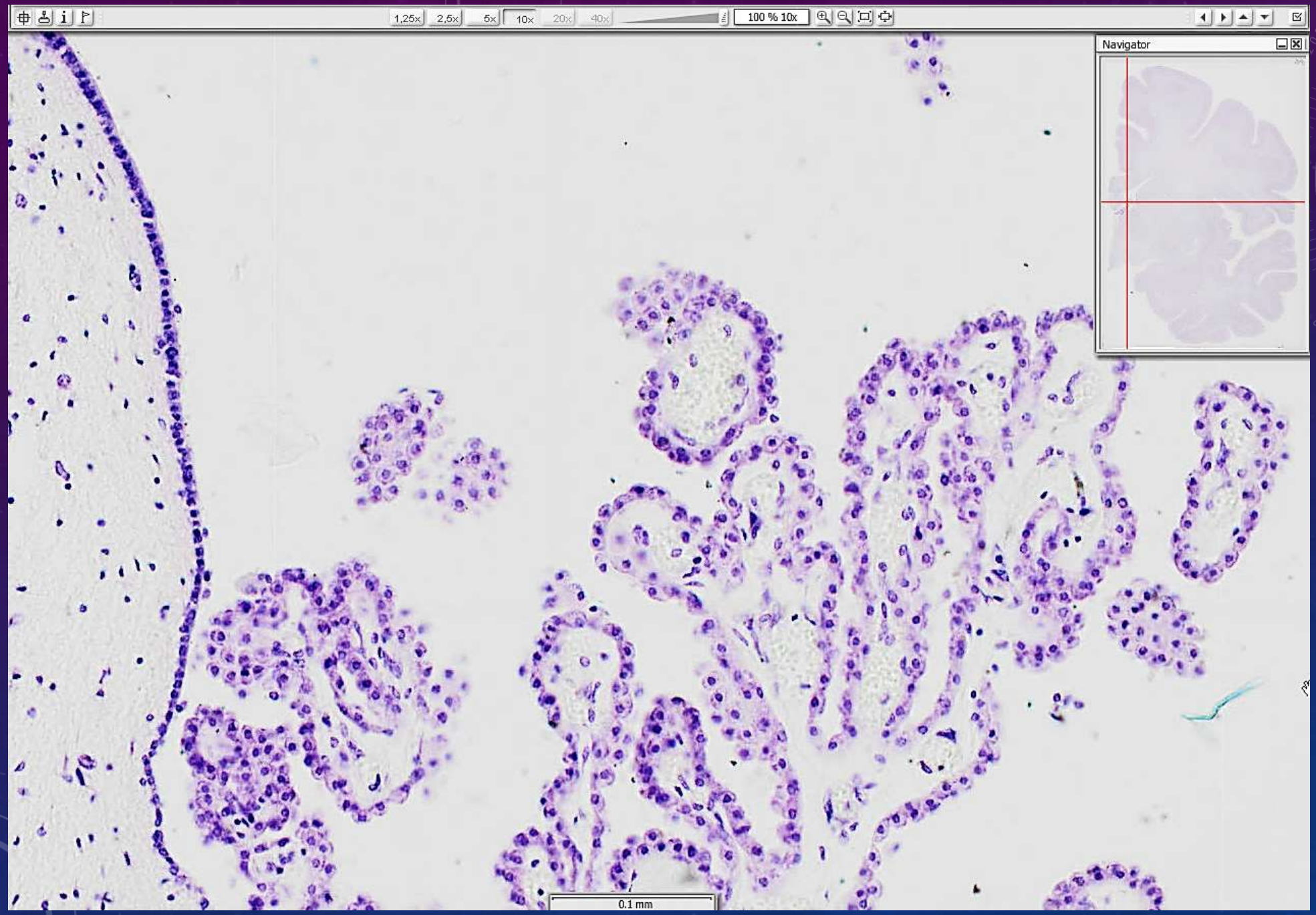

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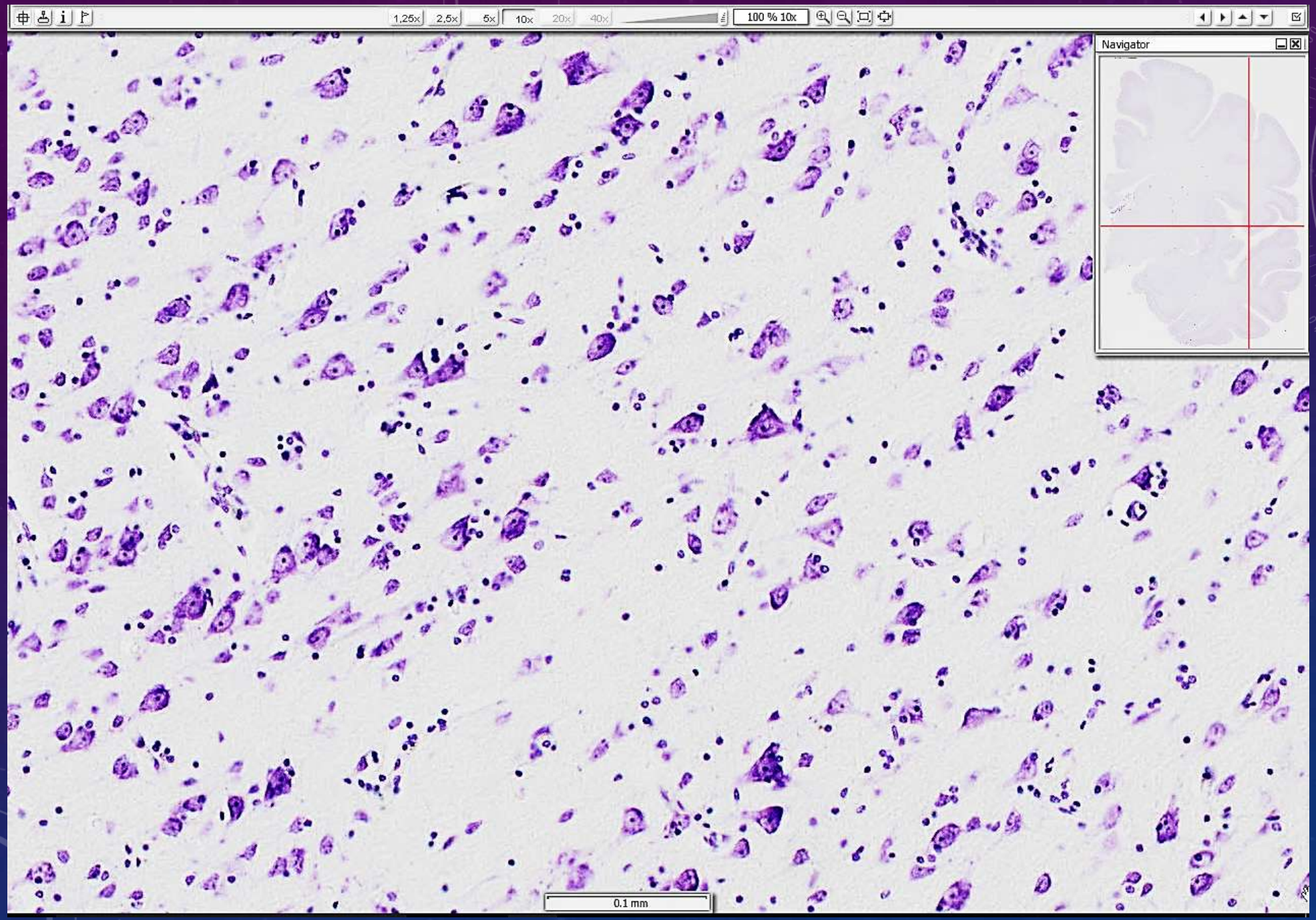

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Histoquímica Clássica

- Cajal: Neurônios, astrócitos, nervos.
- Golgi (Impregnação cromo-argêntea): neurônios-Purkinje, astrócitos.
- Hortega: astrócitos, micróglia, oligodendrócitos.
- Galocianina, Tionina, Nissl (Violeta Cresil): Substância de Nissl
- Holtzer: Fibras da glia, glia
- Hematoxilina Férrica Lopez: Mielina
- Weigert-Pal: Mielina
- LFB: Mielina

- **Luxol-fast-blue - Nissl (Klüver-Barrera) para mielina e neurônios.** (http://anatpat.unicamp.br/tecnicashistologicas.html#t27a)

Luxol-fast-blue 0,1%
Luxol-fast-blue MBS 0,1 g.
Etanol 95% 100 ml.
Dissolver o corante no álcool. Acrescentar 0,5 ml de ácido acético 10% por 100 ml de solução.

Cresil – violeta 0,1%
Cresil violeta 0,1 g.
Água destilada 100 ml.
Imediatamente antes do uso, adicionar 15 gotas de ácido acético a 10%. Filtrar antes do uso.

Carbonato de lítio 0,05 %
Carbonato de lítio 0,05 g.
Água destilada 100 ml.

Procedimento:

1. Corar pela solução de Luxol fast blue durante a noite em estufa a 56%.
Etanol 95 %.
2. Lavar em água destilada.
3. Diferenciar com carbonato de lítio, cerca de 30 segundos.
Continuar a diferenciação em álcool 70% e ir agitando gentilmente até que a diferença entre substância branca e cinzenta fique nítida.
Monitorar a mudança cromática à microscopia
4. Corar por solução de cresil violeta 6 min.
5. Desidratar rapidamente.
6. Montar

Resultados : mielina – azul turquesa; neurônios – azul violeta.

- **Nissl (Violeta Cresil)**

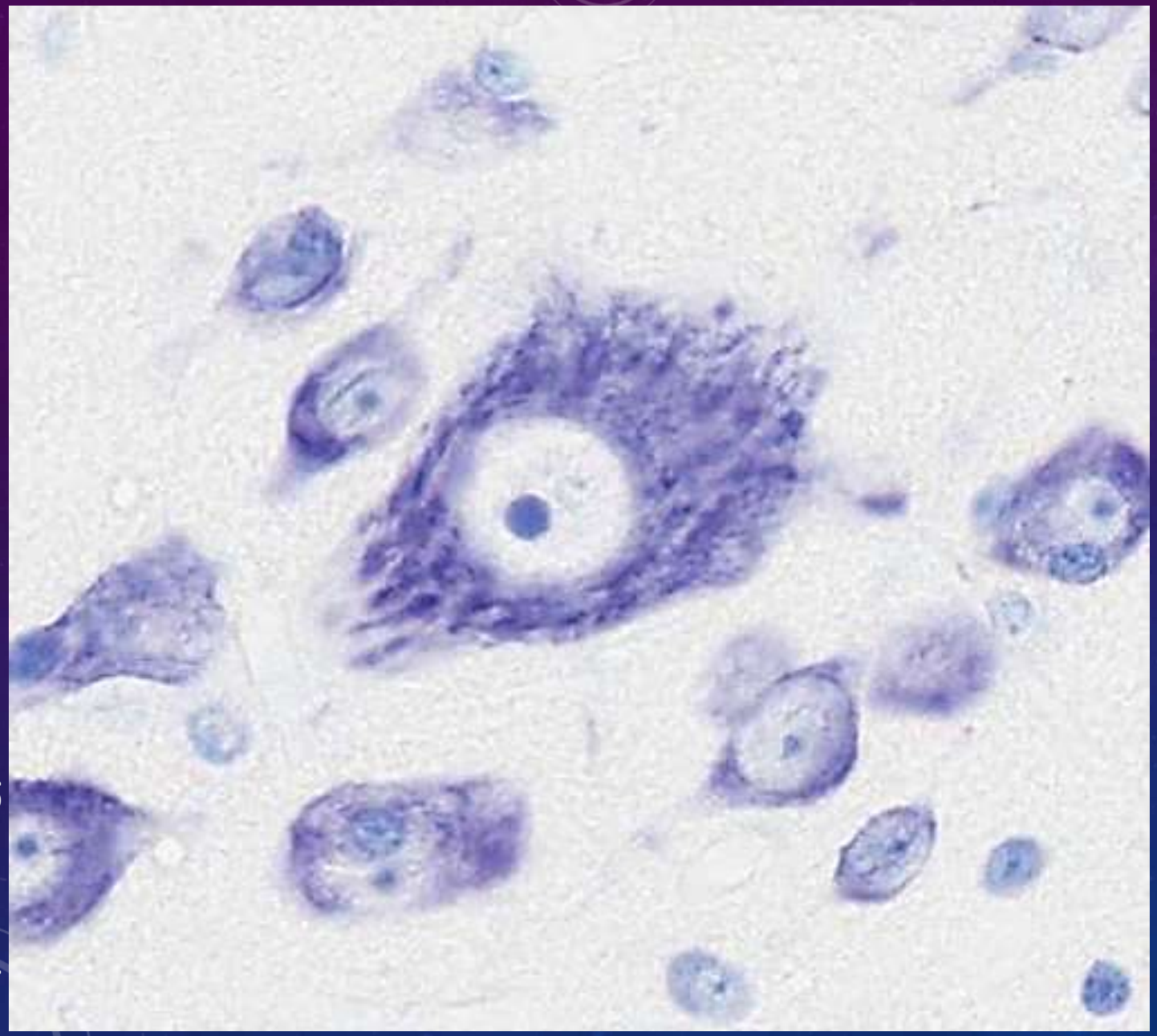
(http://www.neurofisiologia.unifesp.br/protocolonissl.htm)

1. Xilol I - H_2O destilada: 2 minutos
2. Corante cresil violeta: 2 a 7 minutos (controlar o tempo pela cor)
3. H_2O destilada : 5 mergulhos
4. Álcool 50º: 5 mergulhos
5. Álcool 70º: 5 mergulhos
6. Diferenciador (Ac. Acético 1% etanol) – 1 mergulho
7. Álcool 70º : 1 minuto até Xilol II
8. Montar

OBS: Hematoxilina de Harris por 5 minutos, lavar bem em água corrente até sair o excesso de corante, diferenciar em álcool e ácido (250 mL de álcool 70% + 2,5 mL de acido clorídrico), passar rápido nesse diferenciador. Lavar bem em água corrente e passar para eosina alcoólica por 3 minutos. Desidratar.

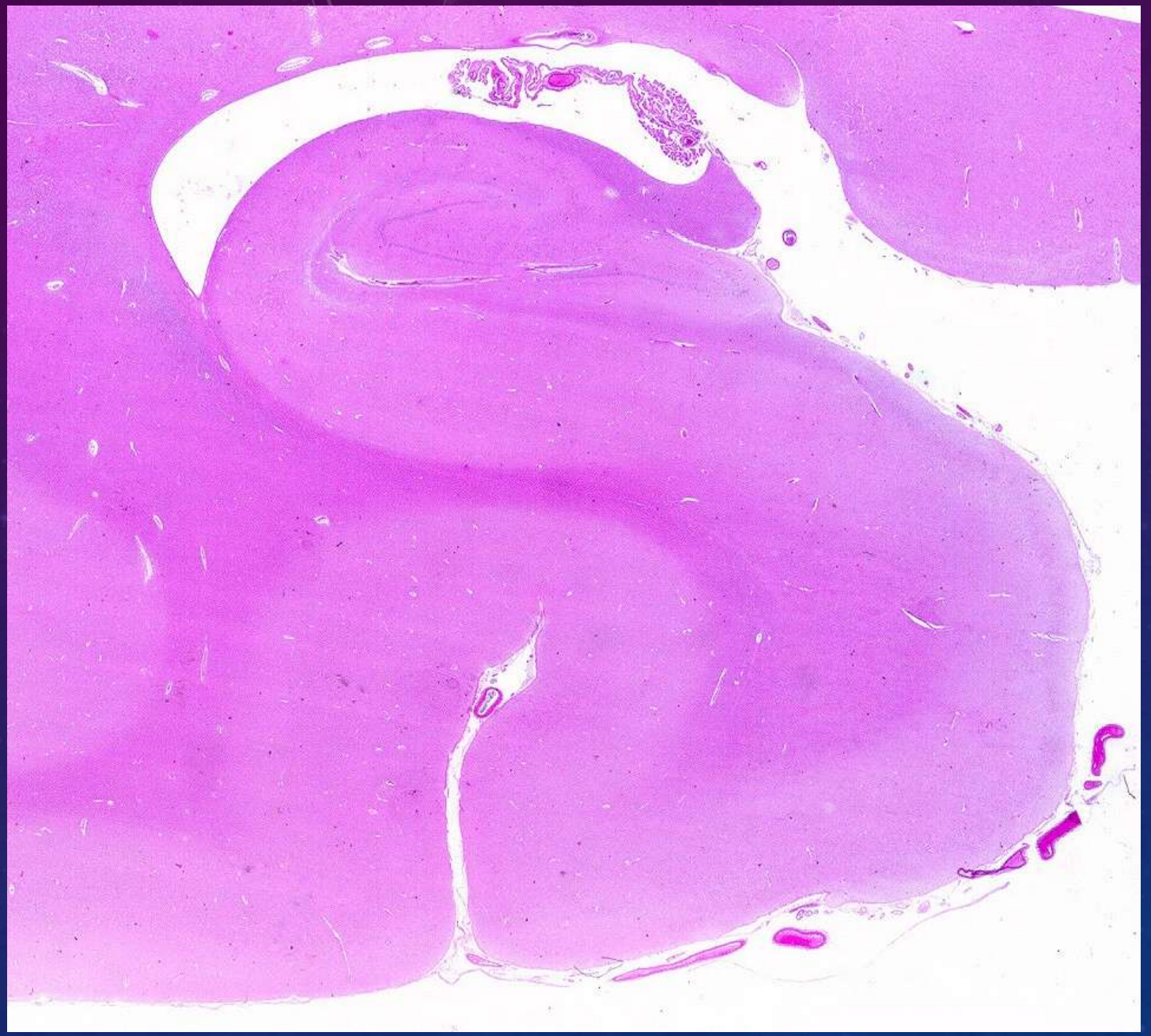
Resultados: Neurônios, violeta.

http://histologylab.ccnmtl.columbia.edu/lab05/brain.html



Nissl

http://anatpat.unicamp.br/neuro1.html



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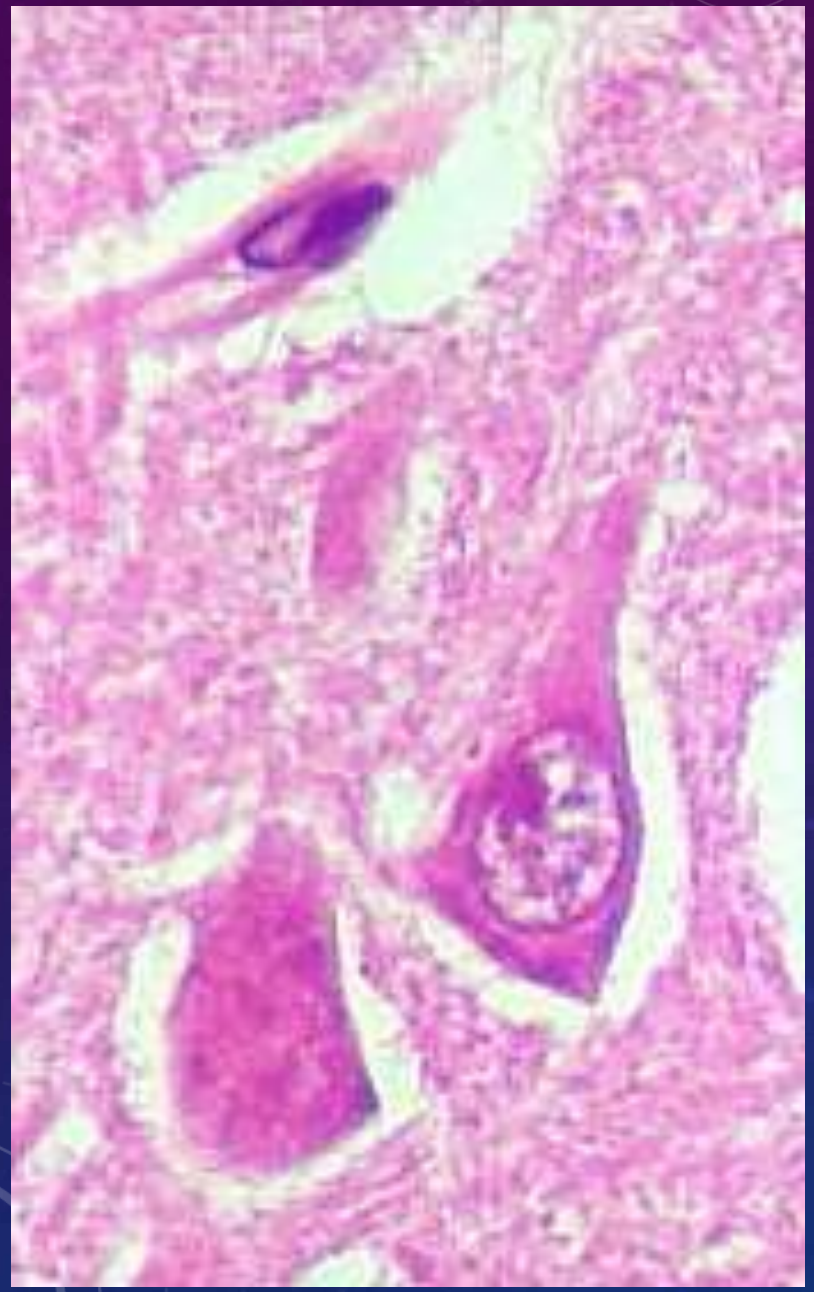
LFB



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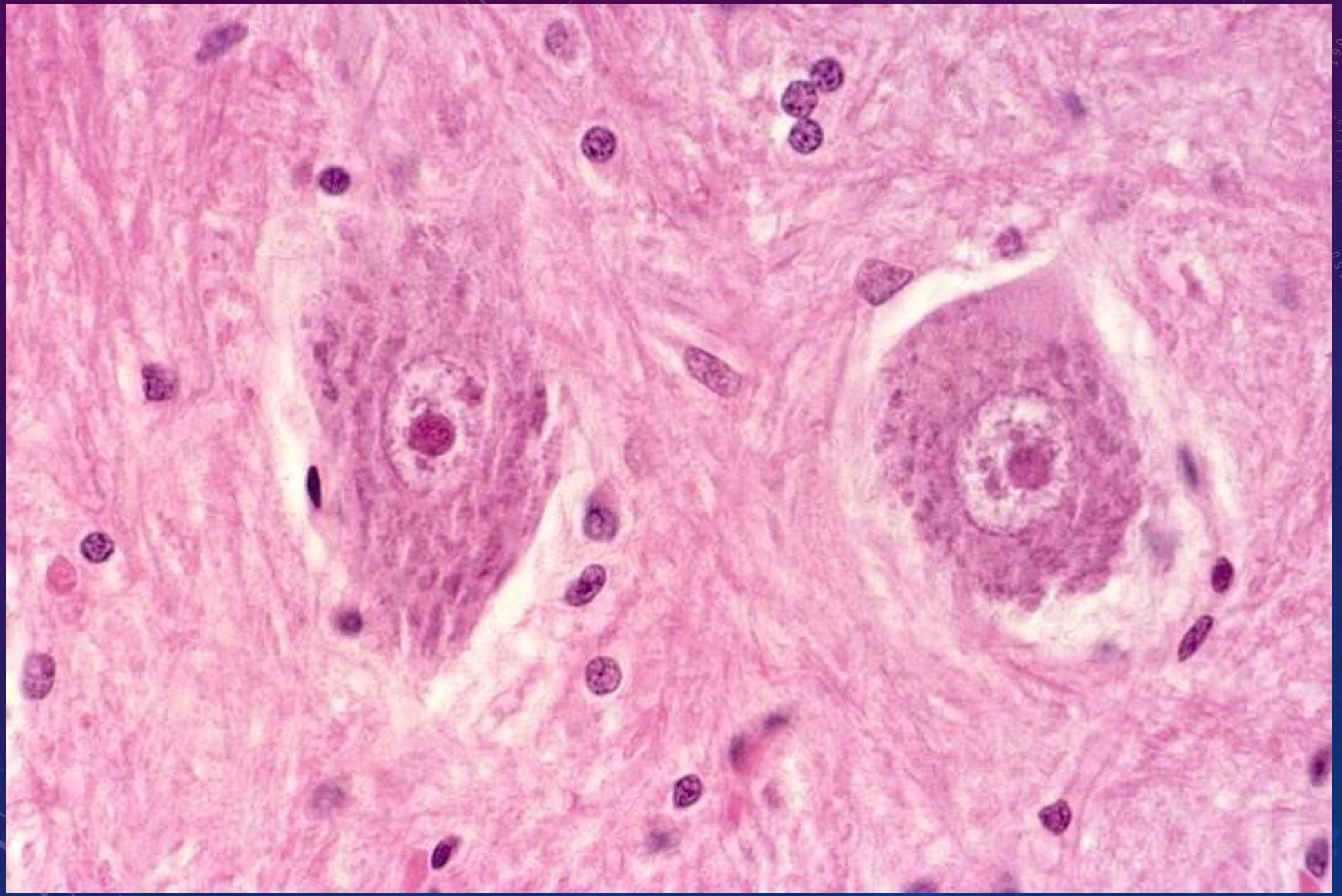
LFB

LFB+N



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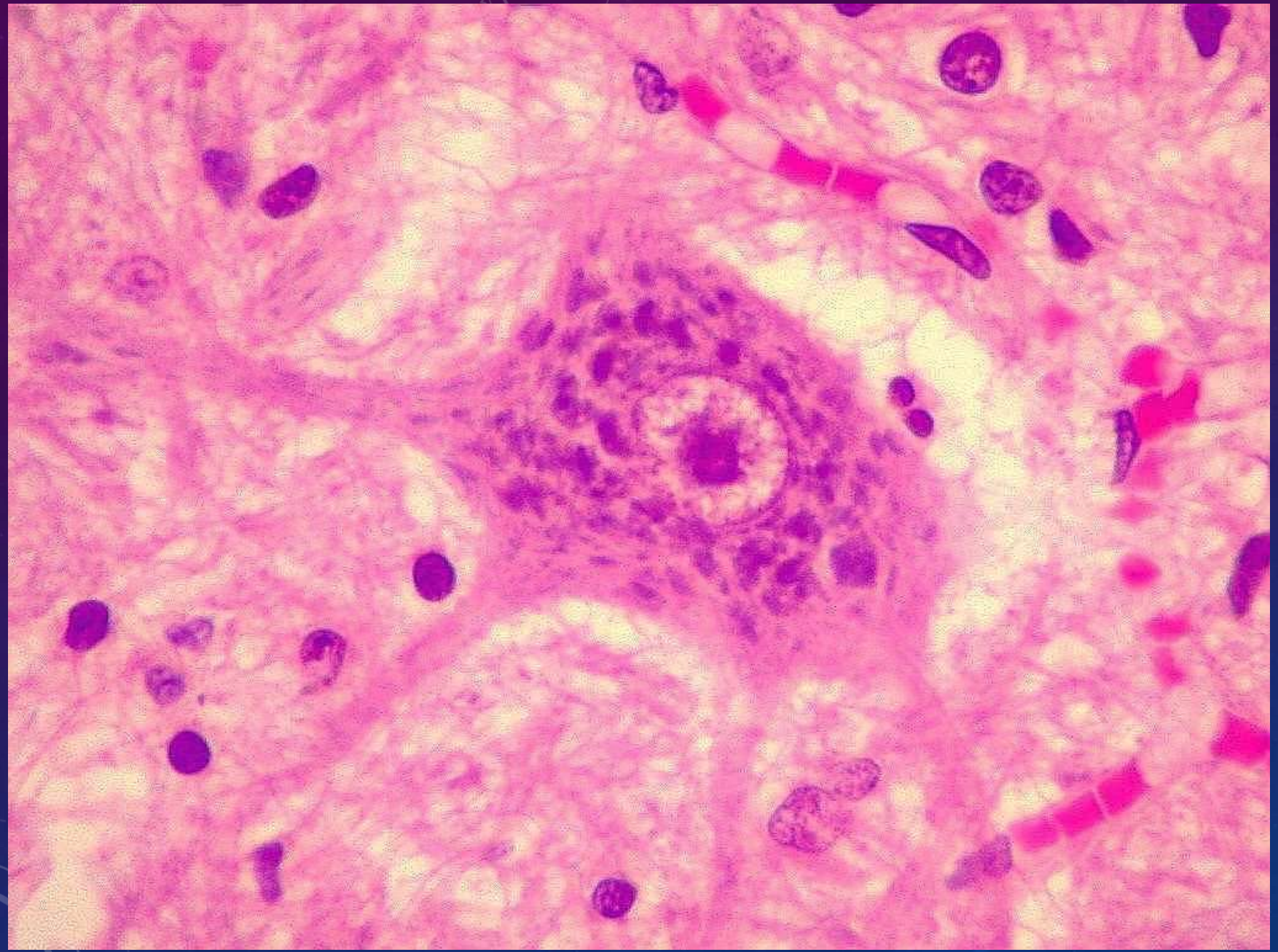

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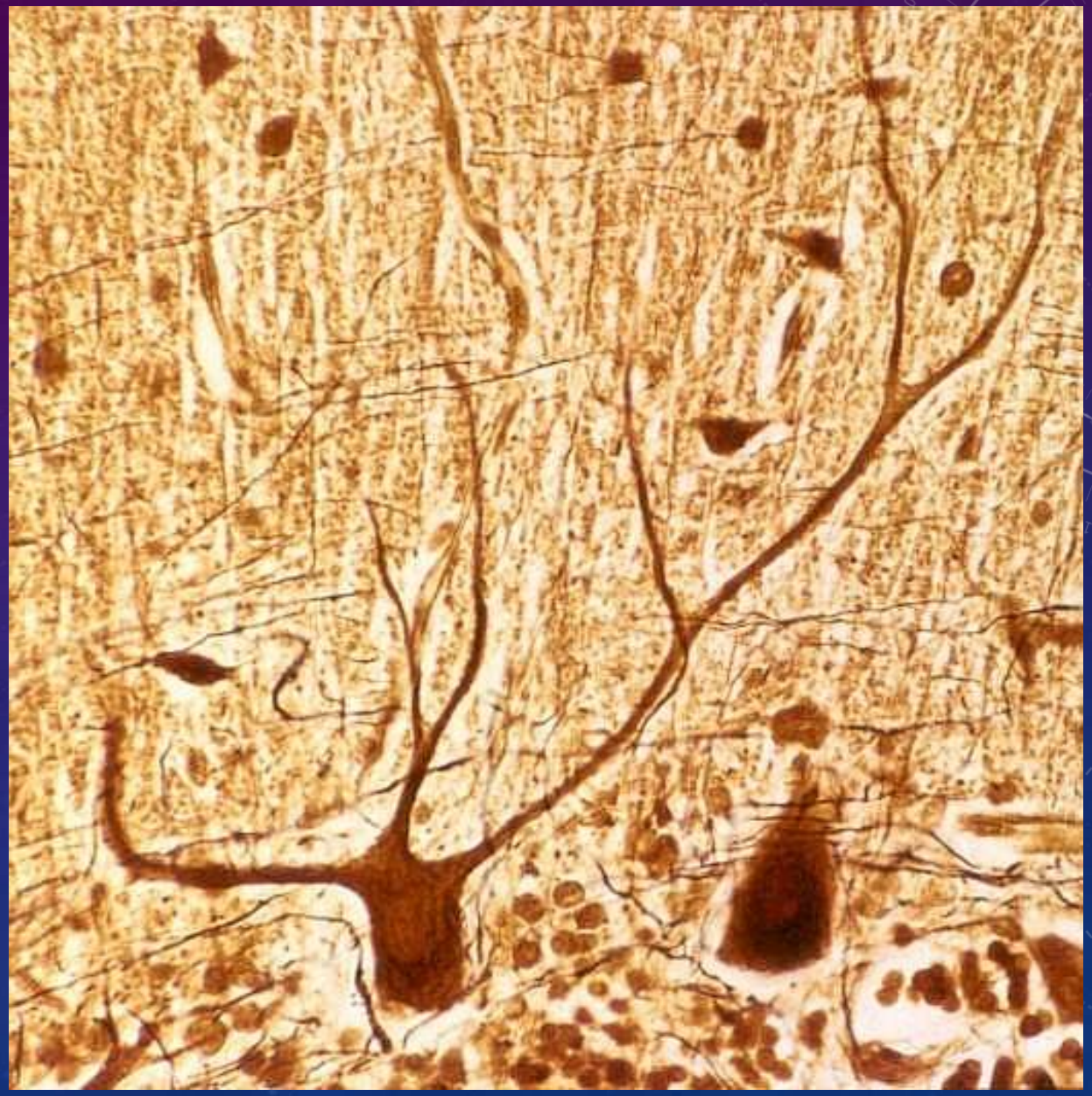
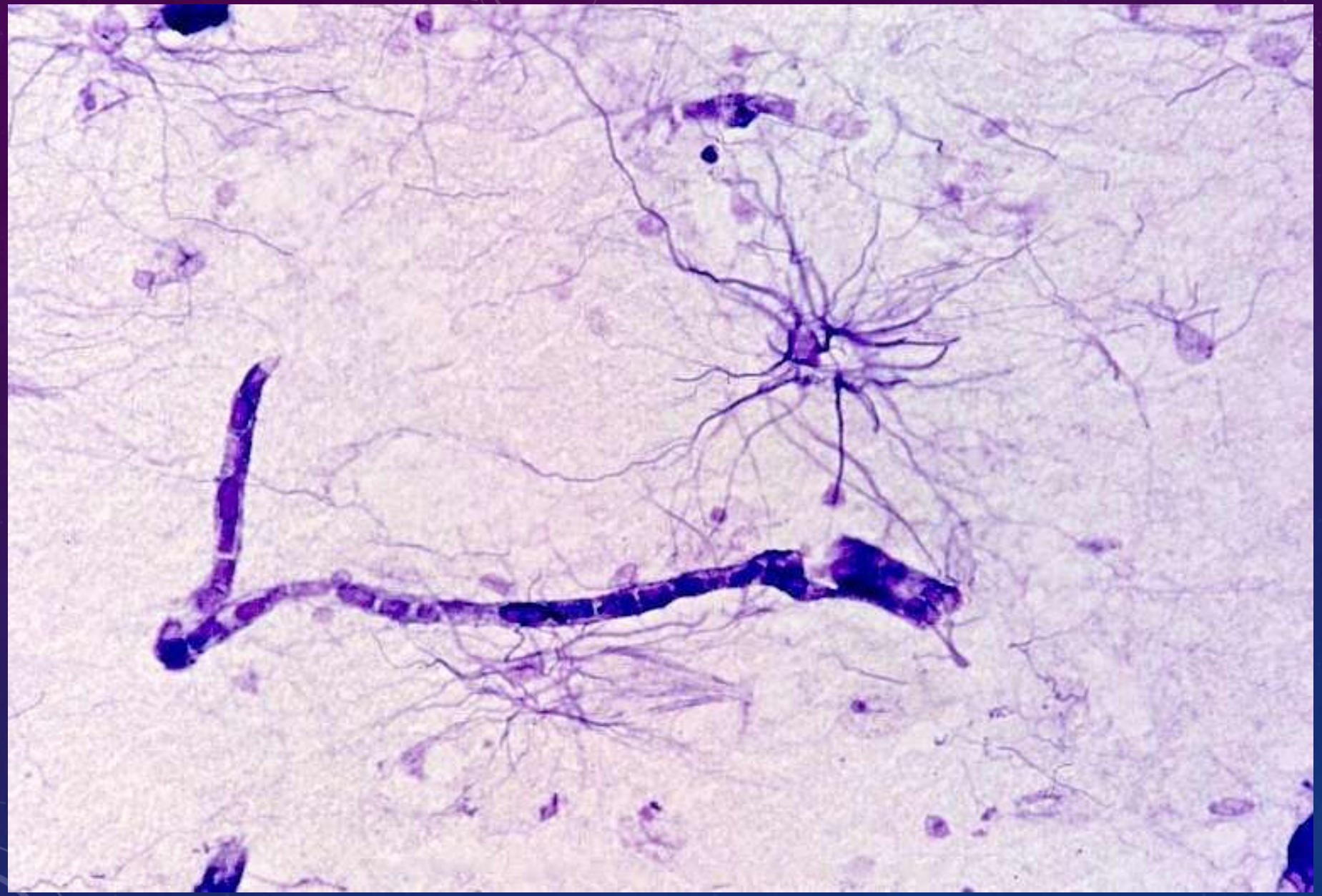
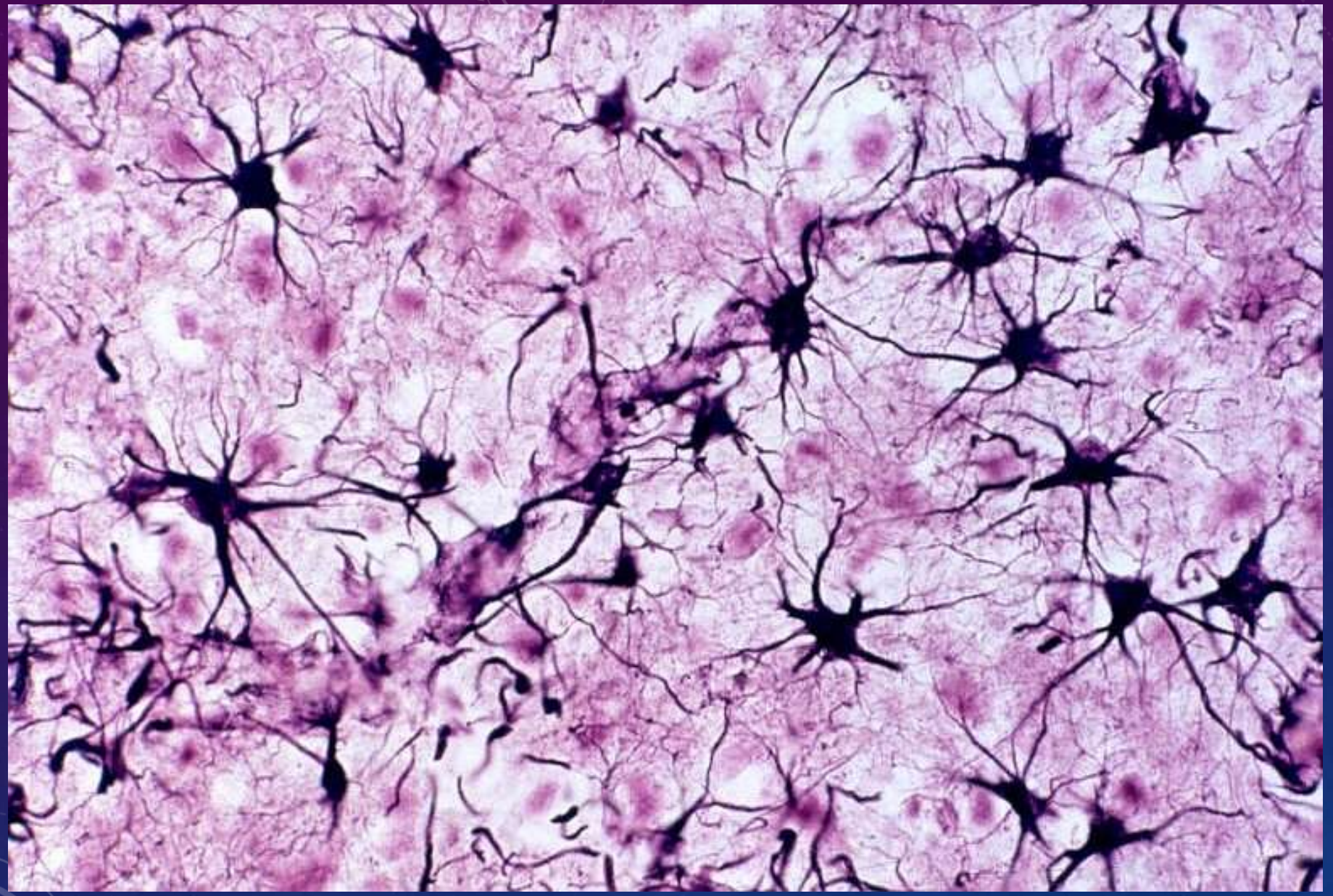


Cajal

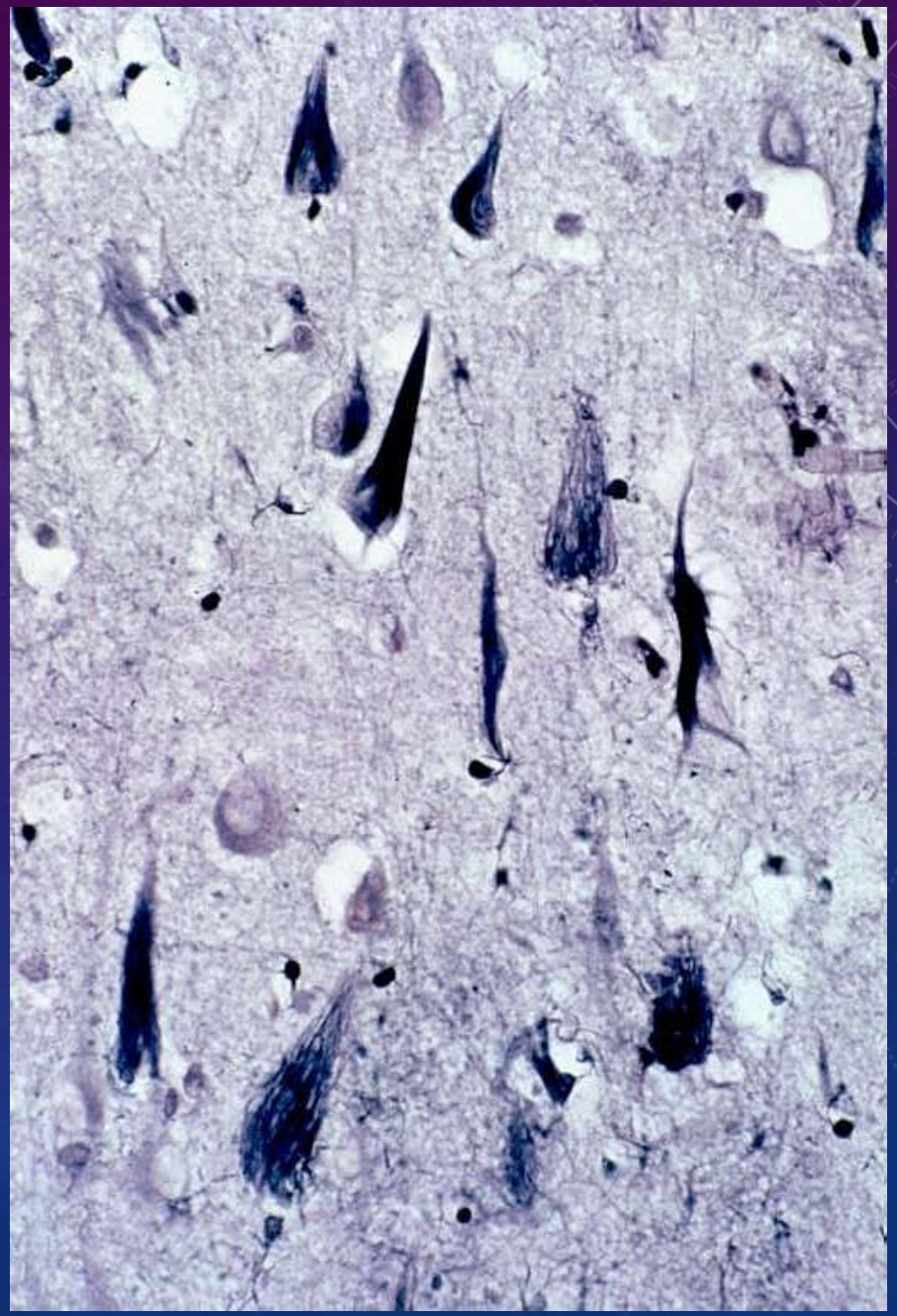


Holtzer



Cajal

Vermelho Congo



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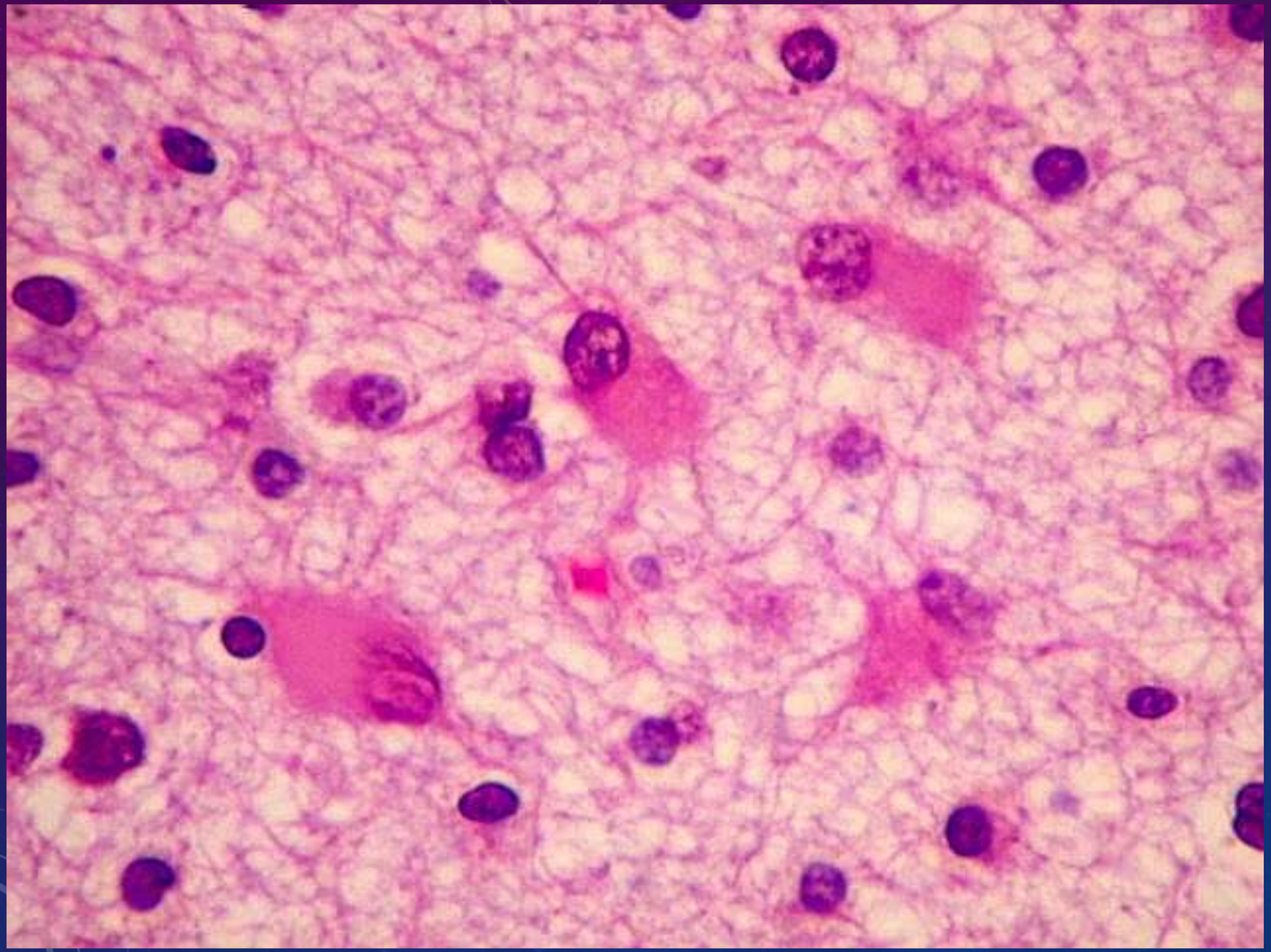

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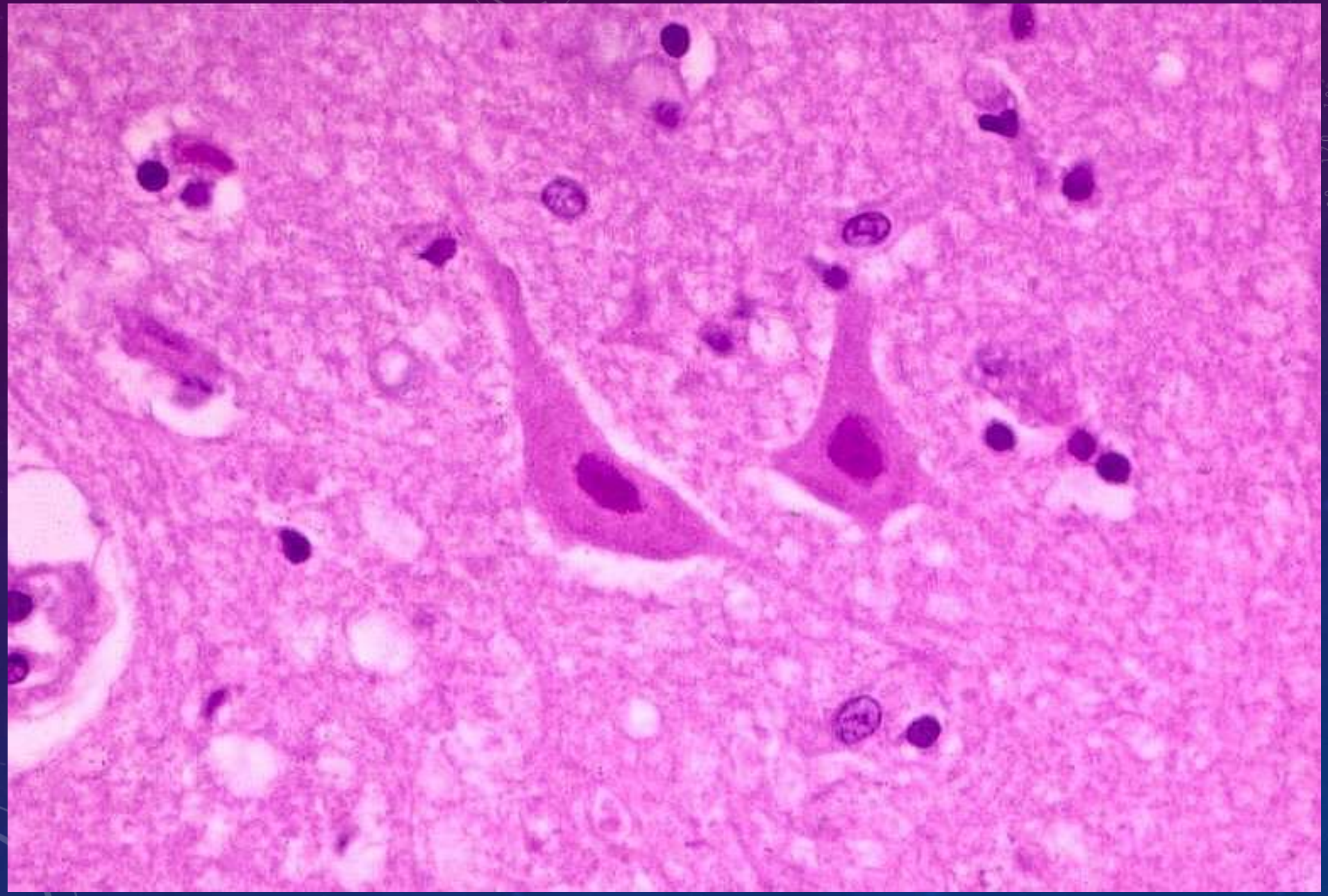

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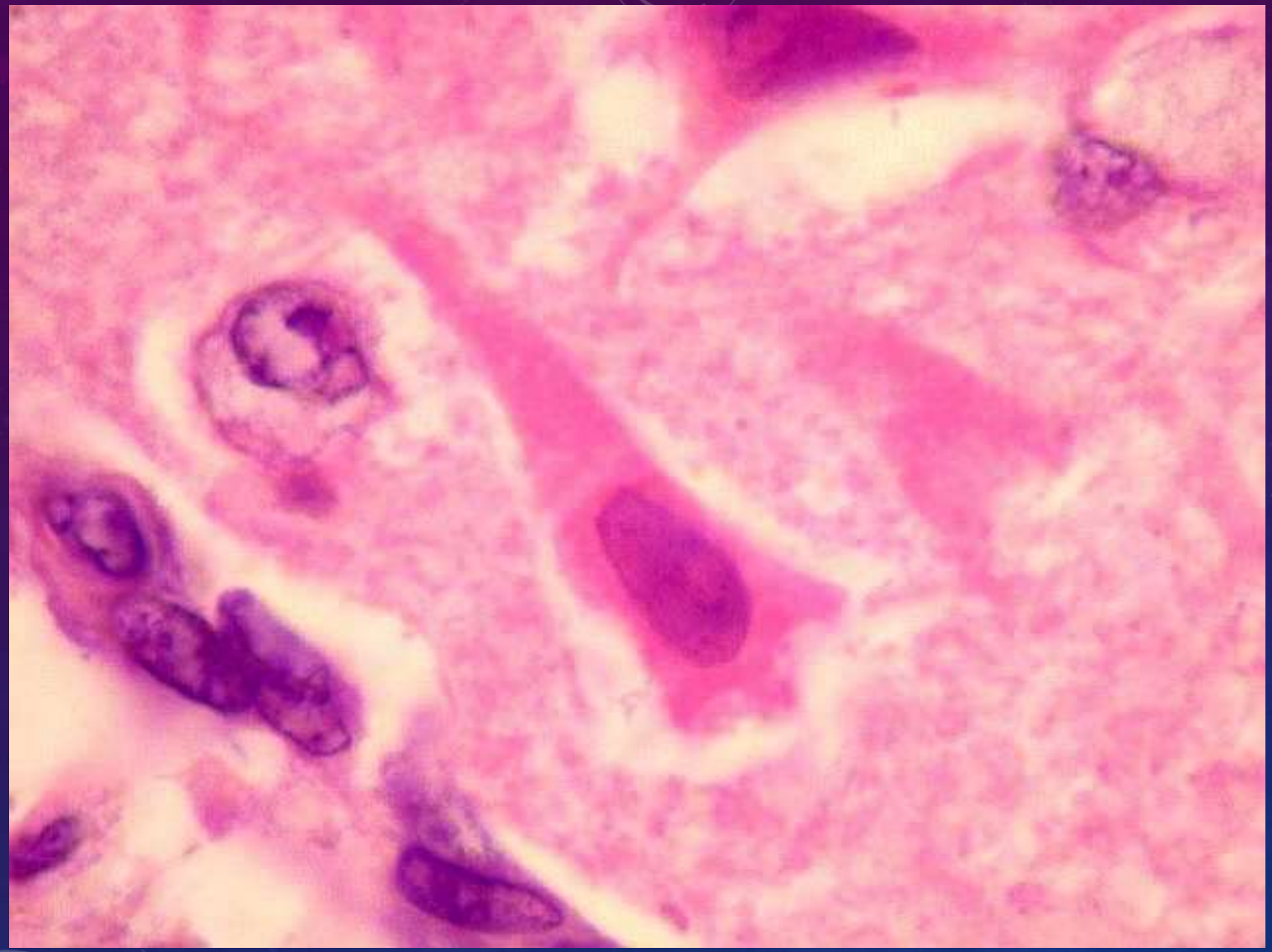

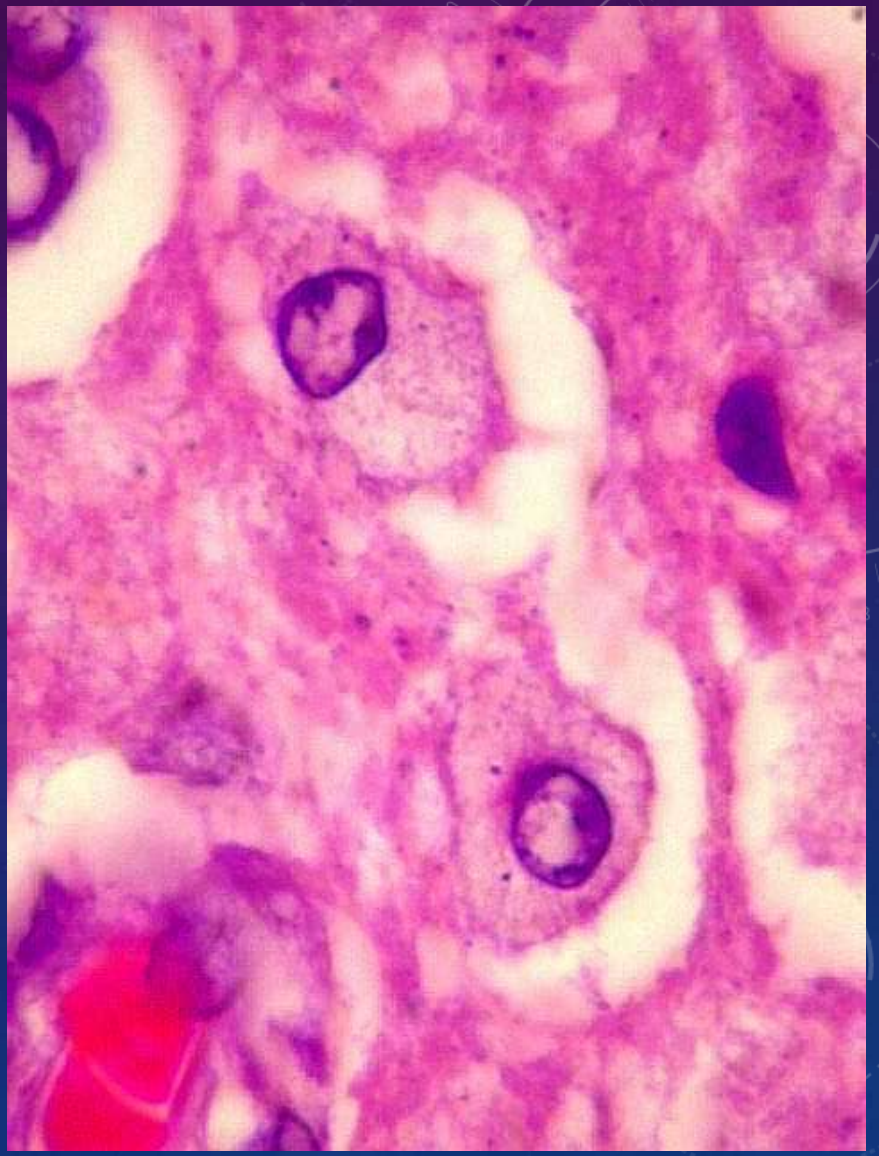

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- http://www.thehumanbrain.info/brain/bn_brain_atlas/brain.html