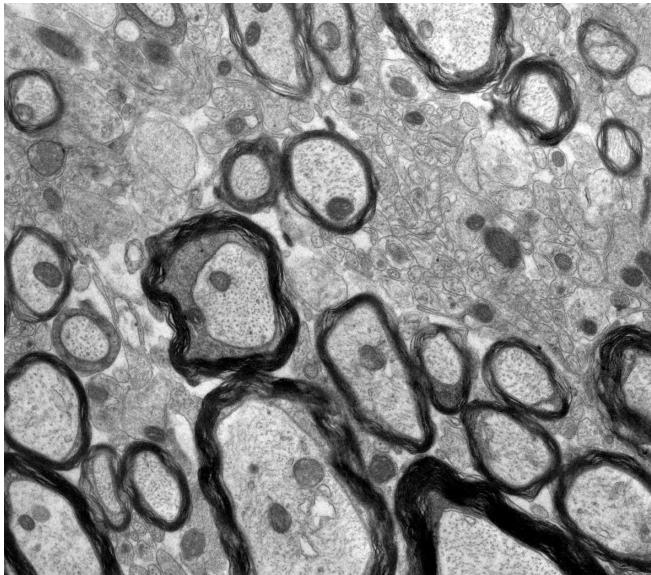


DATABLITZ: QUAND LA CLINIQUE RENCONTRE LA RECHERCHE FONDAMENTALE CHU DE LIÈGE

SAMEDI 17 DÉCEMBRE 2022 AUDITOIRE LÉON FRÉDÉRICQ



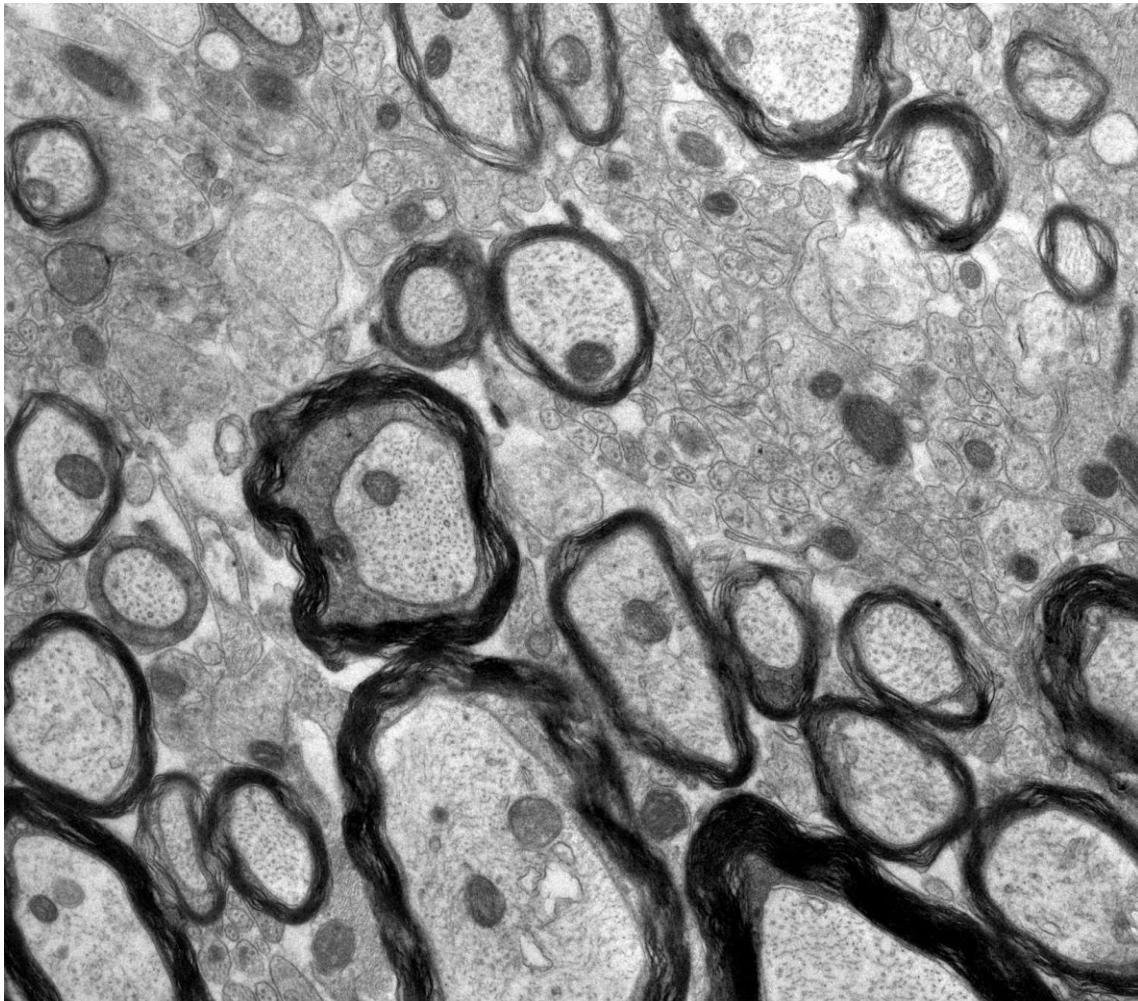
**MULTIMODAL
QUANTIFICATION OF
BRAIN
MICROSTRUCTURE
AND SYNAPTIC
DENSITY IN MS
PATIENTS**

Solène DAUBY & Emilie LOMMERS



LA LIBERTÉ DE CHERCHER





MULTIMODAL QUANTIFICATION OF BRAIN MICROSTRUCTURE AND SYNAPTIC DENSITY IN MS PATIENTS

Solène DAUBY & Emilie LOMMERS

WORK PLAN

- MULTIPLE SCLEROSIS
- NON-CONVENTIONAL IMAGING
 - 3T & 7T Q-MRI
 - PET-SV2A
- Q-MRI & PET STUDIES @ CRC

MULTIPLE SCLEROSIS

- In **Belgium**: +- 14 000 affected people → +- 1/1000
- 2nd cause of young adult **acquired disability**, after traffic accident
- **Young people**: average age at diagnosis 30
- **Treatable** disease
 - « Time is brain (and spinal cord, and optic nerve...) »

MULTIPLE SCLEROSIS

- Inflammatory demyelinating & neurodegenerative disease of CNS

=> INFLAMMATION

=> DEMYELINATION

=> AXONAL LOSS

=> SYNAPTIC LOSS

- Follow-up



Clinical examination

Imaging



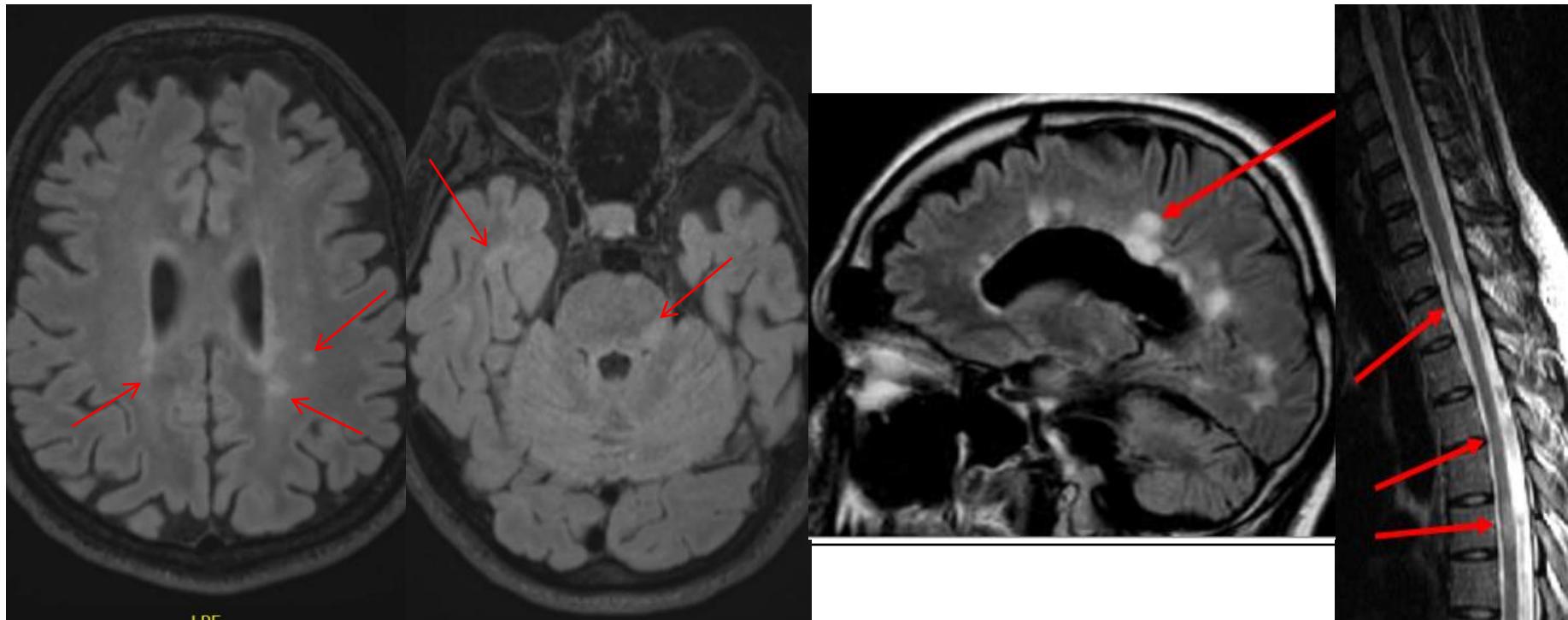
MULTIPLE SCLEROSIS

- Follow-up



Clinical examination

Imaging



MULTIPLE SCLEROSIS: PHYSIOPATHOLOGY

Pathological phenomenon

INFLAMMATION

DEMYELINATION

AXONAL LOSS

SYNAPTIC LOSS

Measurable parameters of interest

IRON

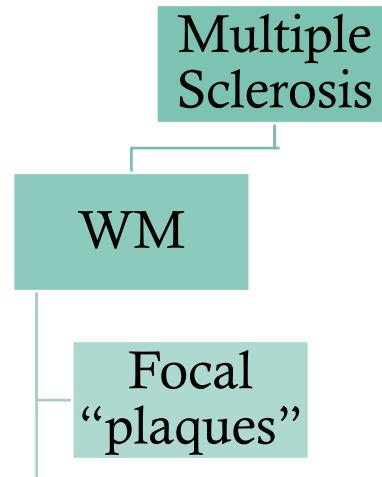
MYELINE

SYNAPSES

Blood
BIOMARKERS

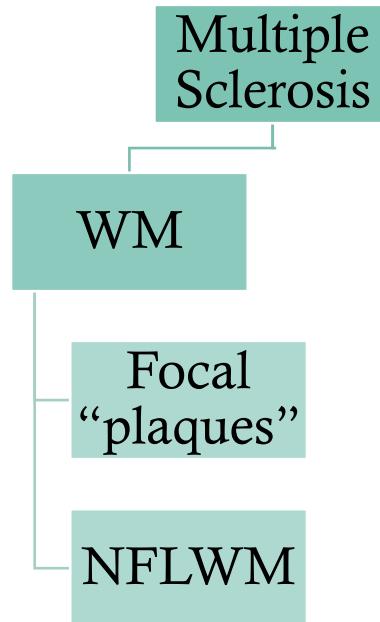
MULTIPLE SCLEROSIS: RATIONALE OF OUR STUDIES

1- WEAK correlation: conventional imaging ~~↔~~ clinical status!



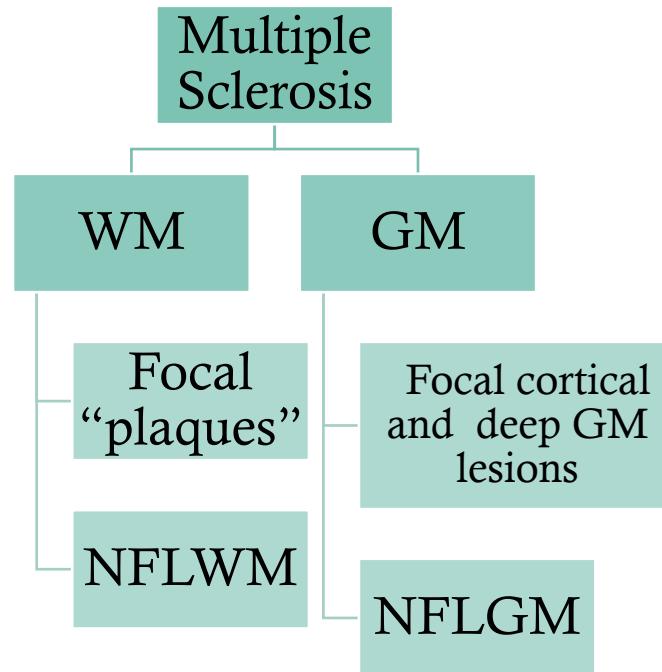
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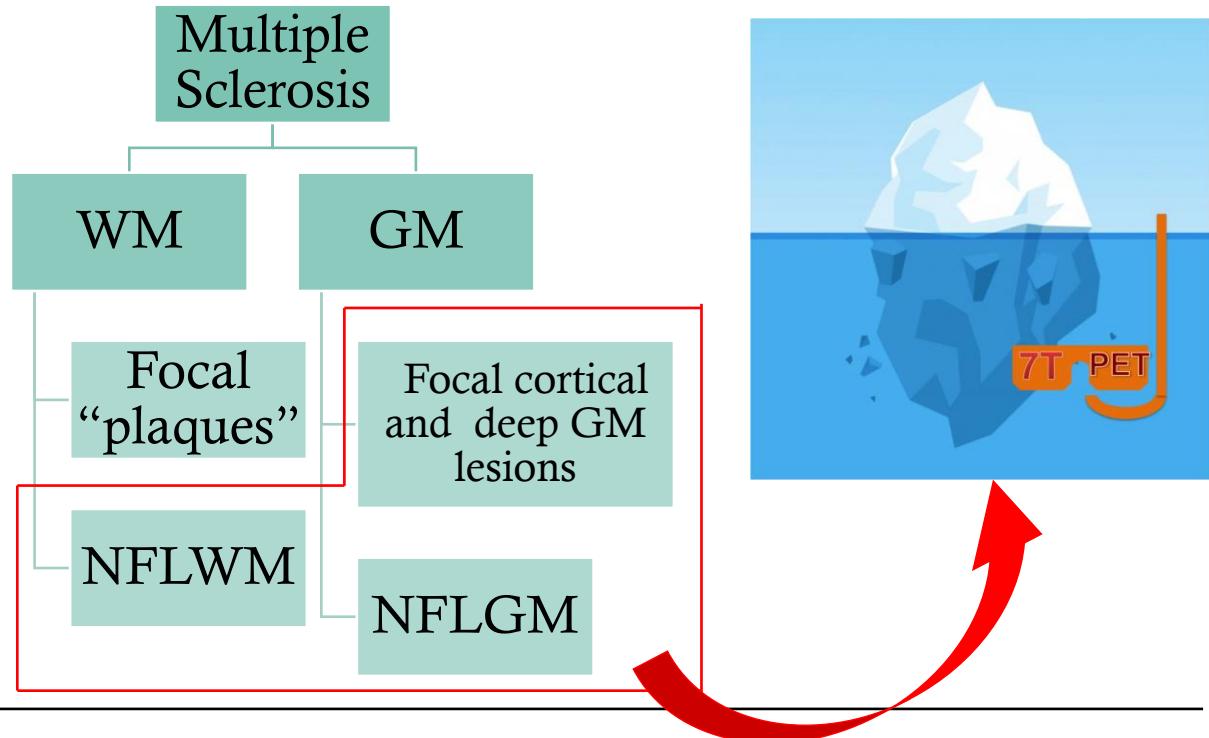
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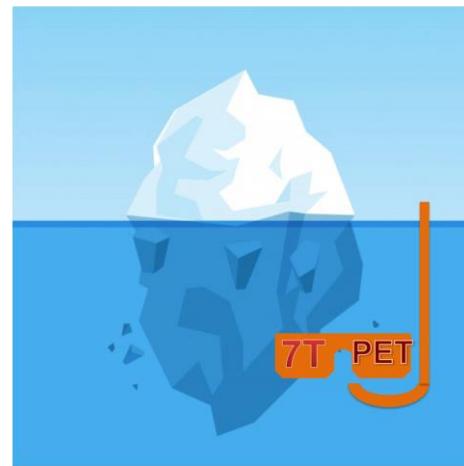
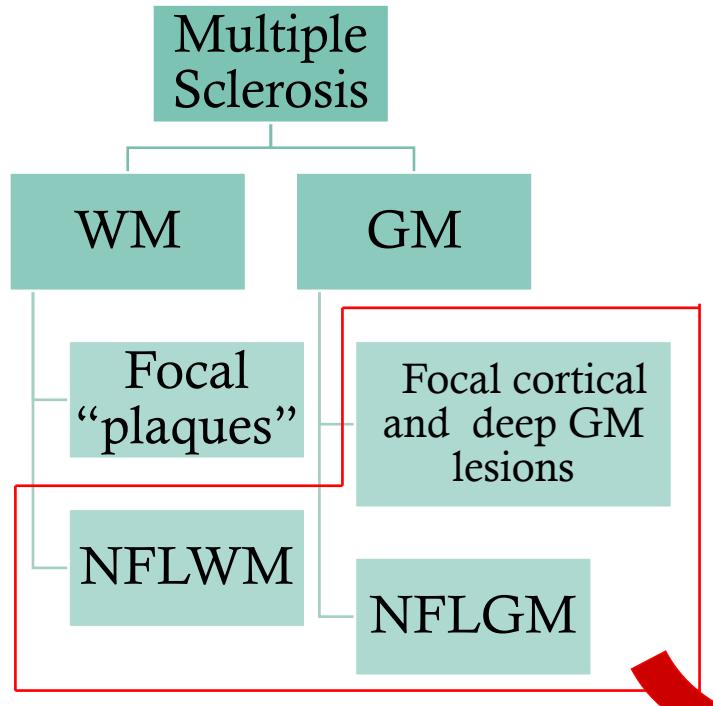
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MULTIPLE SCLEROSIS: RATIONALE OF OUR STUDIES

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2- need for
QUANTIFICATION

WORK PLAN

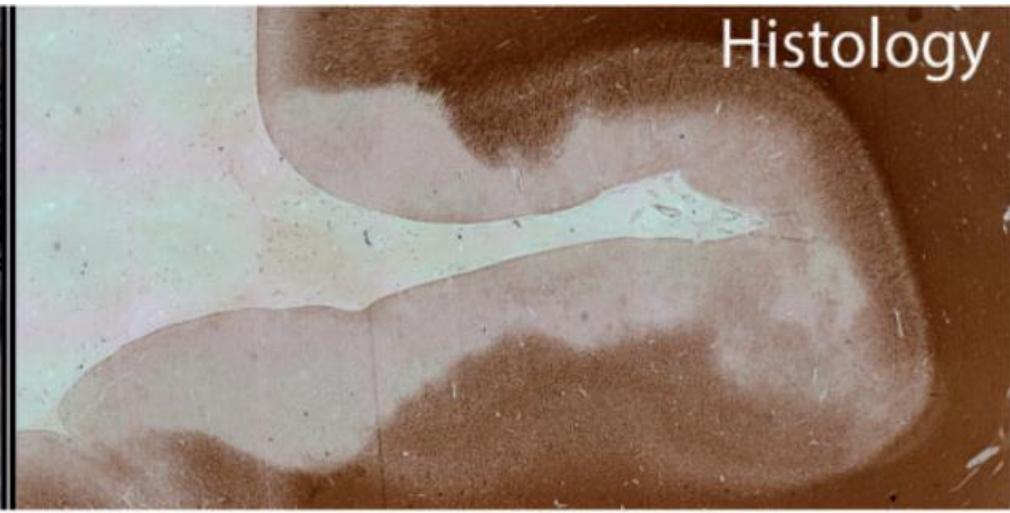
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NON CONVENTIONAL IMAGING: 3T-7T Q-MRI

7T



3T



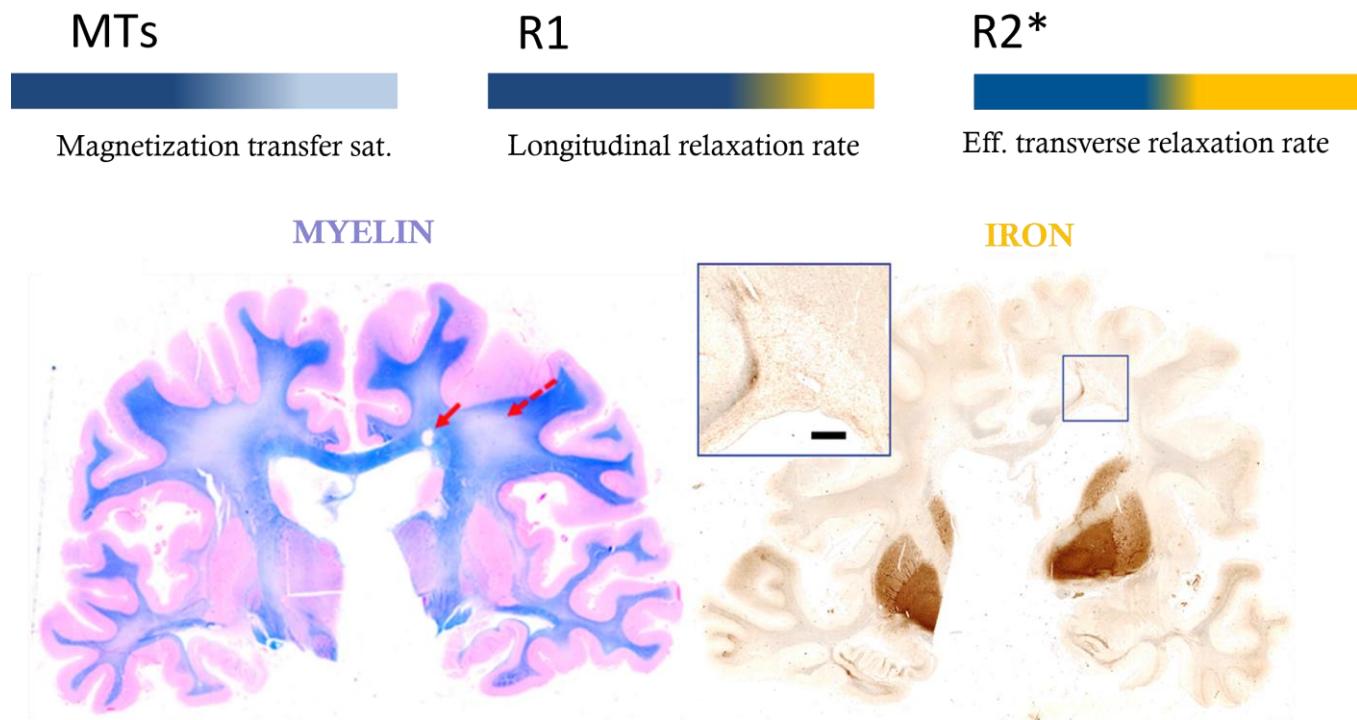
NON CONVENTIONAL IMAGING: 3T - 7T Q-MRI

- Parameters:

MT, R1, R2*

- *q-information:*

myelin, iron



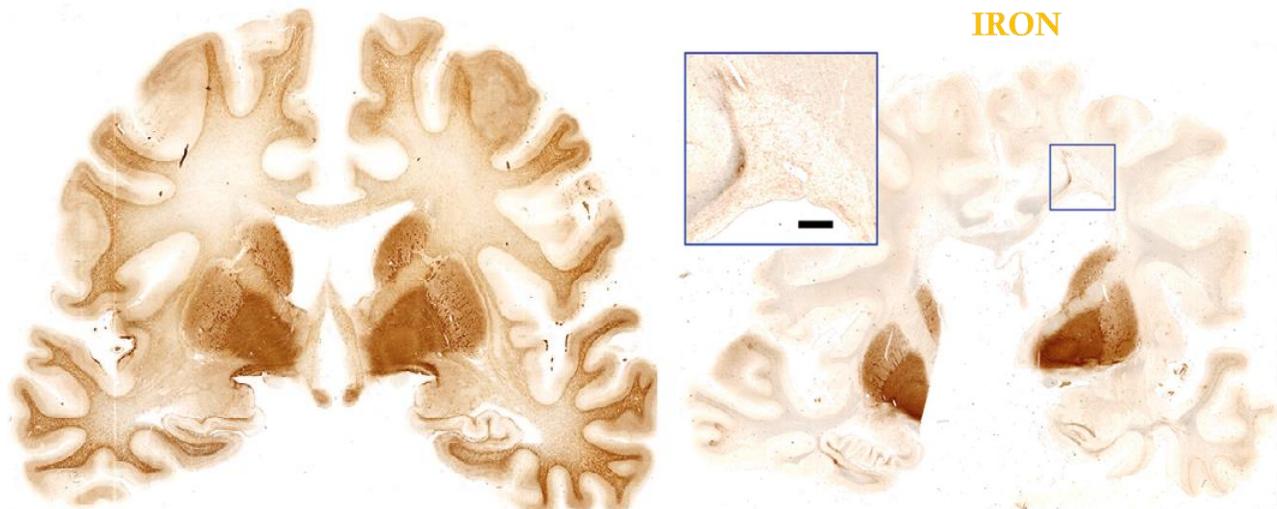
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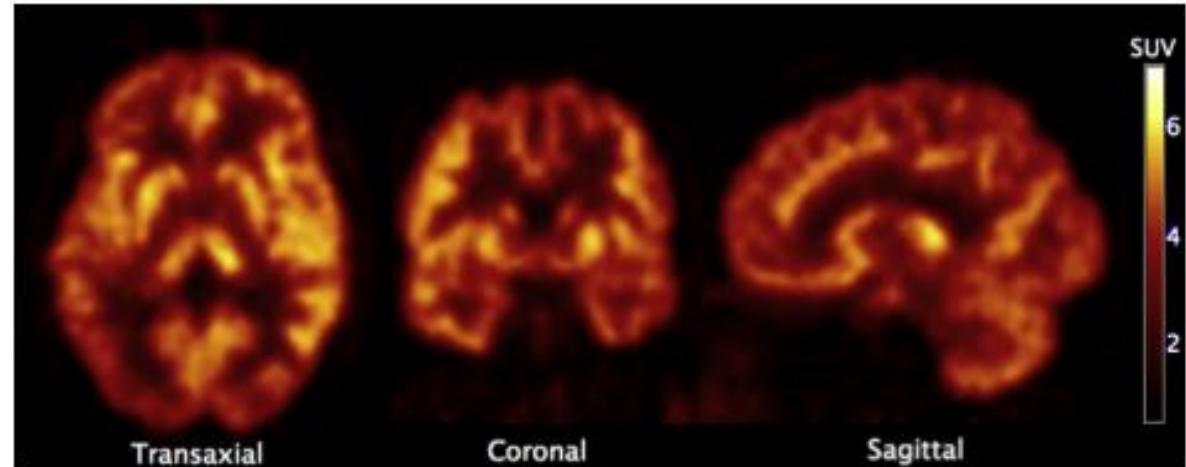
- *q-information:*

myelin, iron



NON CONVENTIONAL IMAGING: PET SV2A

- Target: SV2 protein
 - Ubiquitous protein involved in vesicle trafficking
 - Expression in synapses
 - $[^{18}\text{F}]\text{-UCB-H}$ as imaging agent
- *q-information*: synaptic density

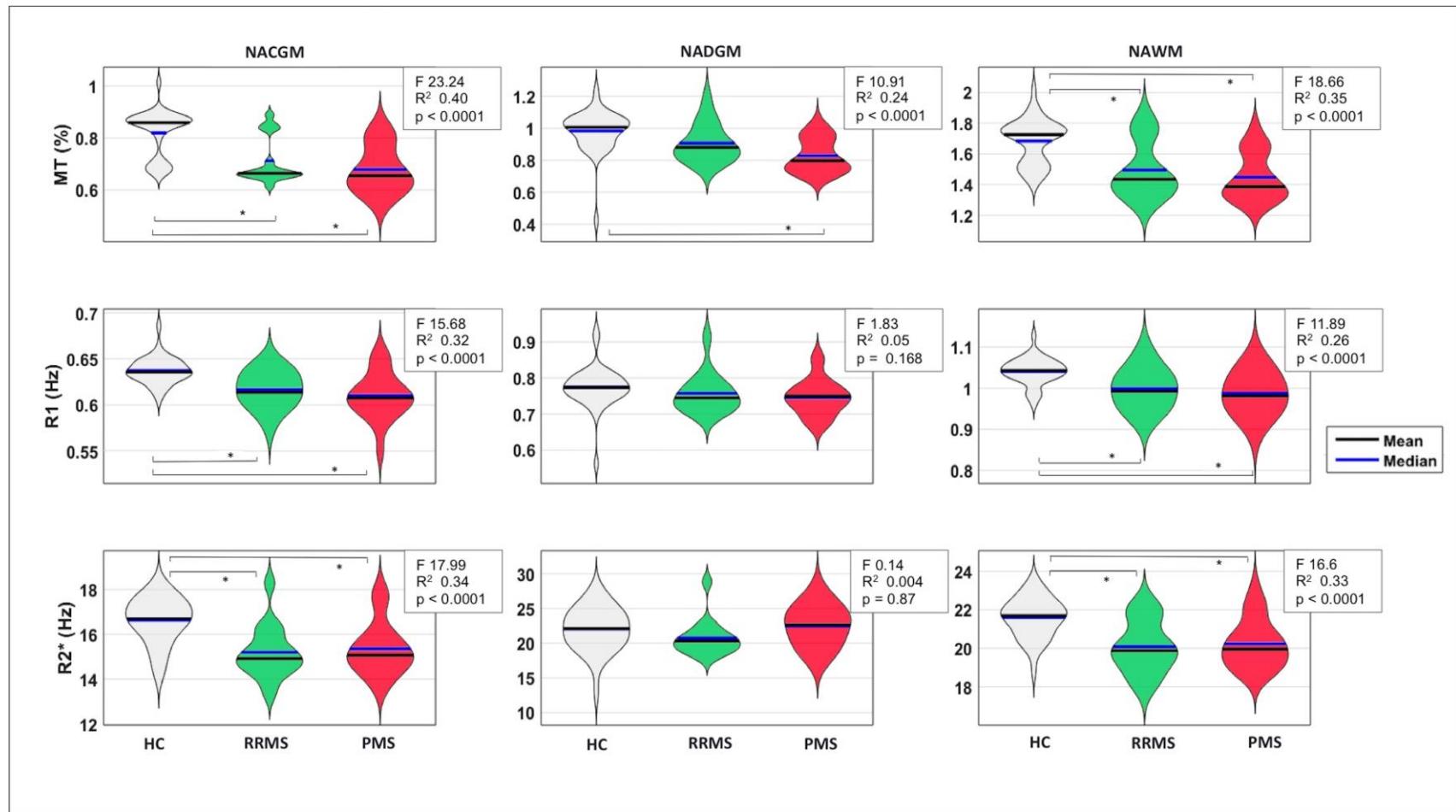


Bahri et al. 2017

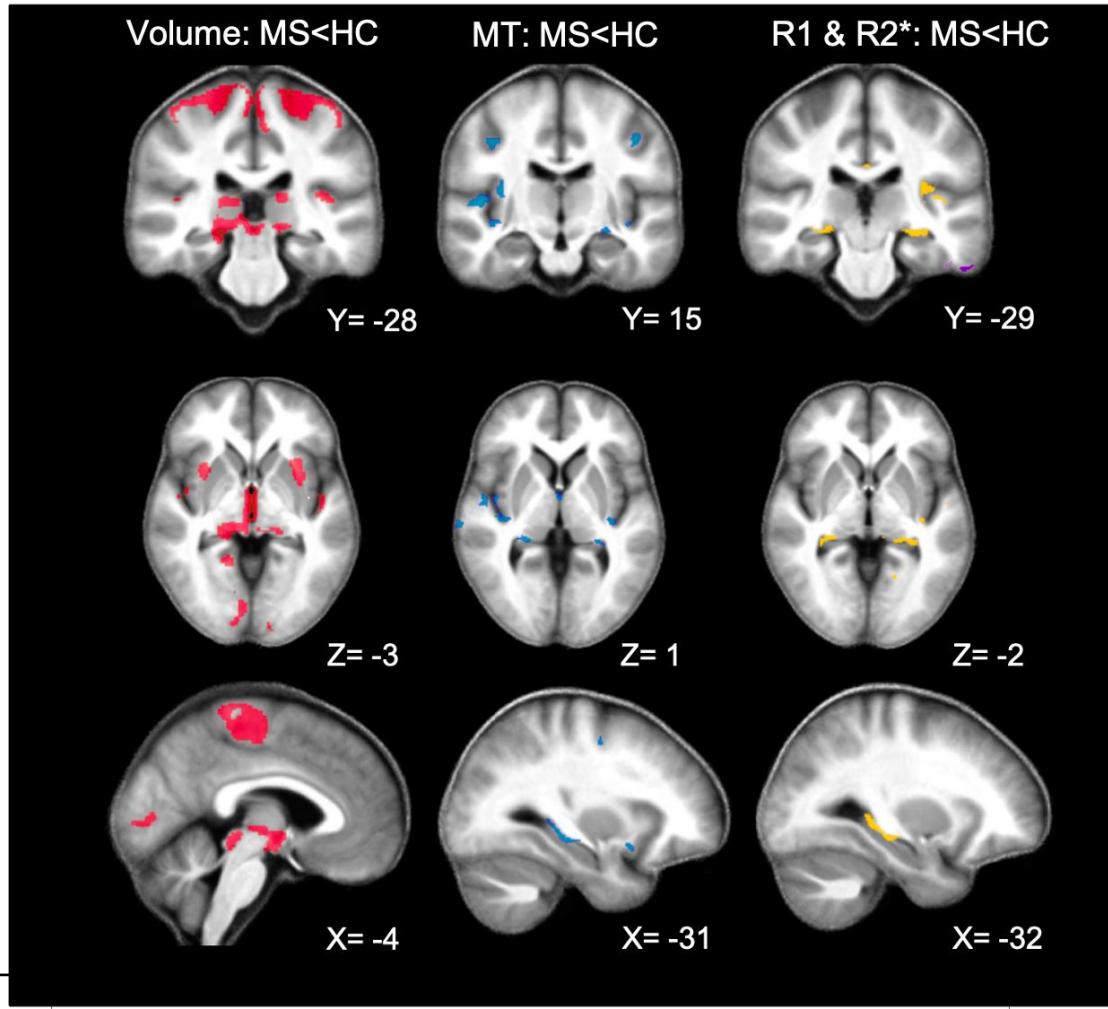
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Q-IMAGING STUDIES: Q-MRI 3T



Q-IMAGING STUDIES: Q-MRI 3T

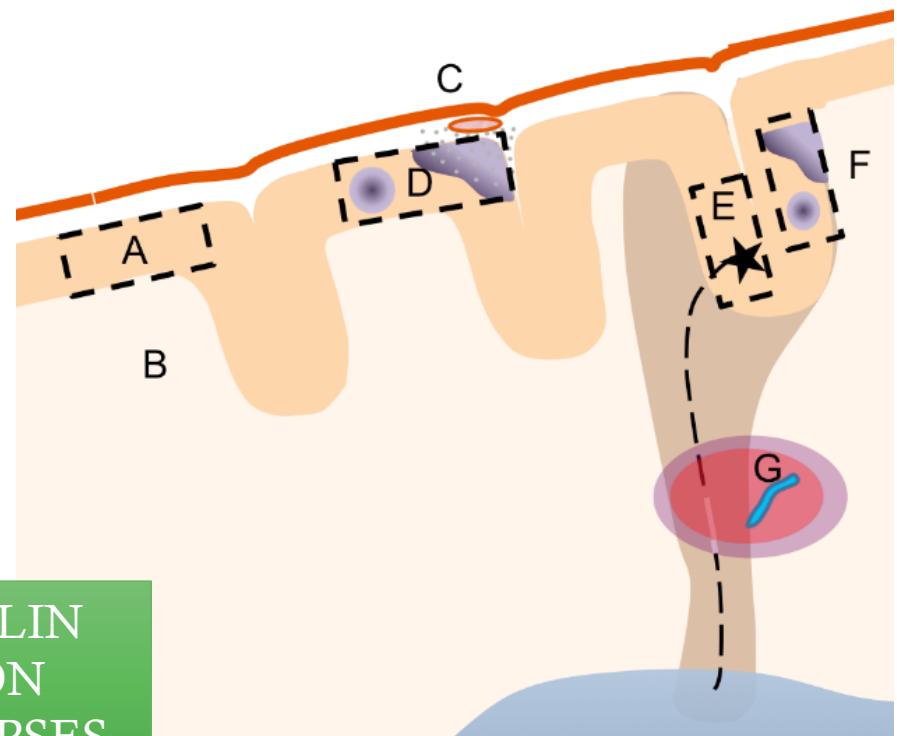


Q-IMAGING: MS7TSV2A STUDY

- Focus on ***CORTICAL PATHOLOGY***

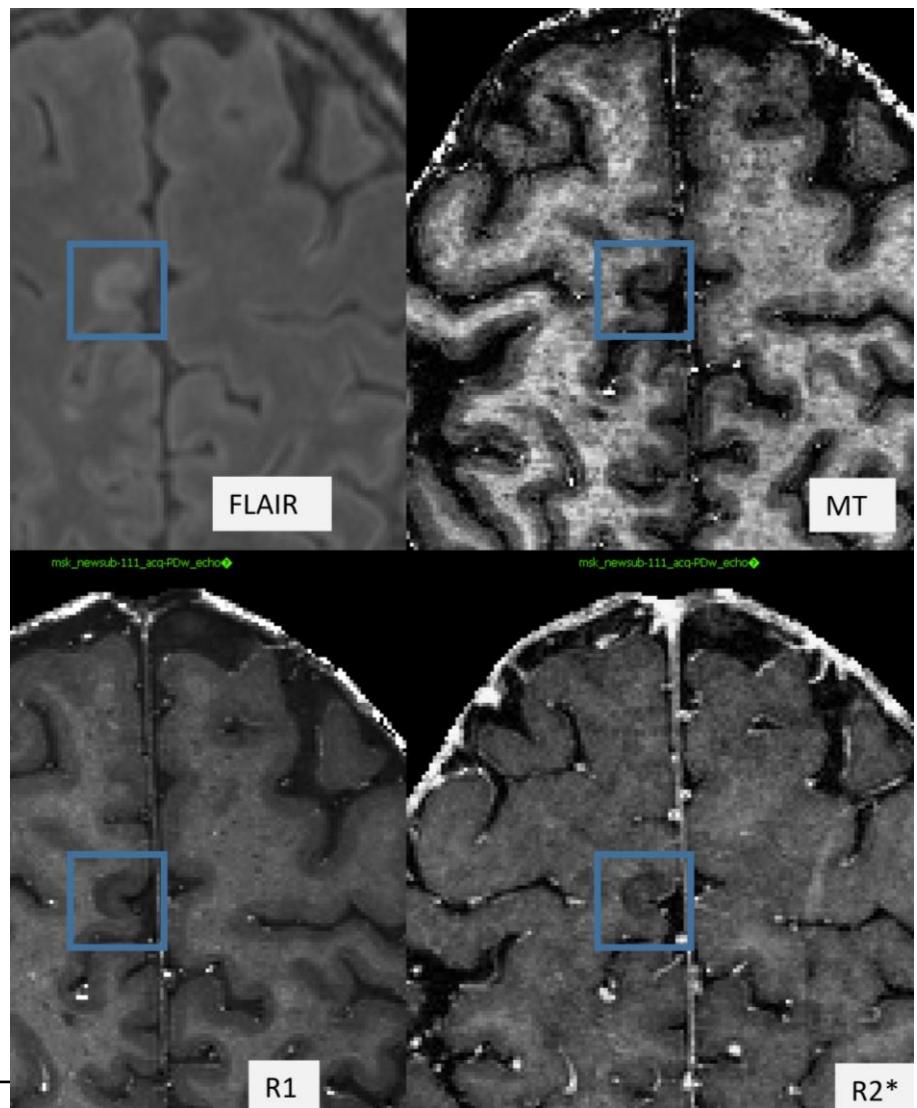
CGM	Above plaque	NOT above plaque
Focal cortical lesion	FCL/PL+ (F)	FCL/PL- (D)
Cortex without focal lesion	NFCL/PL+ (E)	NFCL/PL- (A)

⇒ MYELIN
⇒ IRON
⇒ SYNAPSES



Q-IMAGING: MS7TSV2A STUDY

- Focus on ***CORTICAL PATHOLOGY***



Merci pour votre attention

