

Imaging astrocyte reactivity using gluCEST MRI

AIM

Imaging reactive astrocytes with Glutamate Chemical Exchange Saturation Transfer (gluCEST) MRI

METHODS

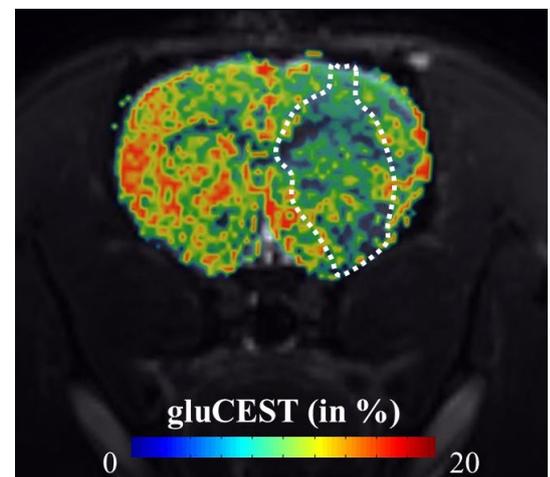
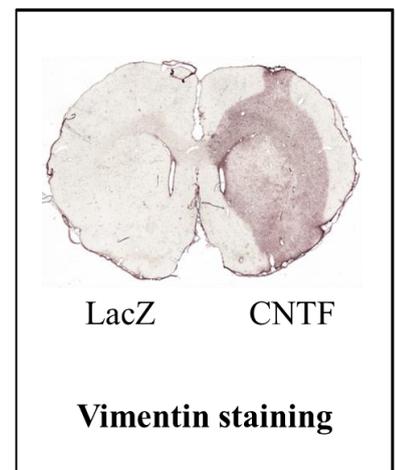
- Rat model of astrocyte reactivity induced by lentiviral vector encoding for expression of Ciliary NeuroTrophic Factor (CNTF)
- In vivo CEST imaging of glutamate (gluCEST) at 11.7T
- Postmortem validation using vimentin staining (revealing reactive astrocytes)

RESULTS

- Glutamate as measured by gluCEST MRI is decreased in the lentivirus-injected region
- The region with vimentin+ reactive astrocytes closely matches the region exhibiting lower gluCEST contrast

CONCLUSION

- gluCEST MRI provides non-invasive detection of astrocyte reactivity
- gluCEST maps glutamate distribution with 300 μ m in-plane resolution
- CEST has a high potential for preclinical and clinical investigations

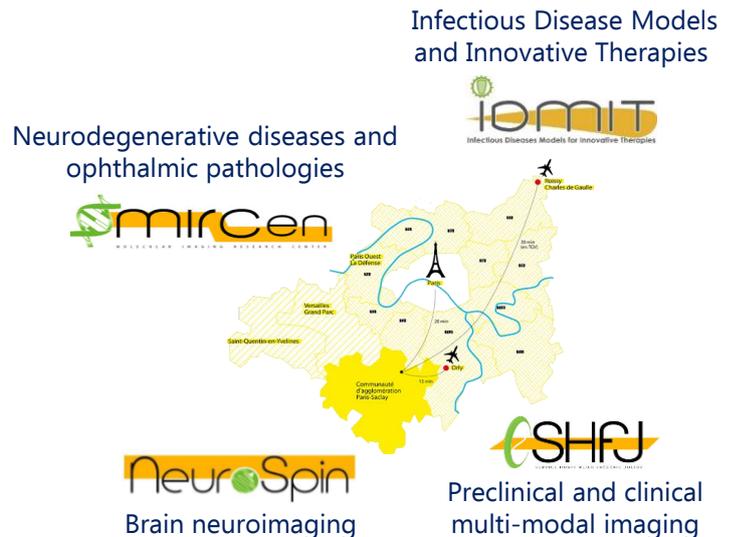


GluCEST image acquired at 11.7T in rat model of astrocytic activation. Lower glutamate levels were found in the striatum displaying activated astrocytes (CNTF) compared to the control striatum (LacZ).

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