ヒト・バイオイメージング研究室

# HUMAN BIOIMAGING RESEARCH LAB

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**Research Overview:** Our research lab is dedicated to utilizing advanced techniques in diffusion, structural, and functional MRI to advance our knowledge of macro- and microstructural changes as well as network alterations in the brain. Our primary focus is on investigating these changes in neurological and psychiatric disorders, athletes, and conditions associated with aging and lifestyle factors.
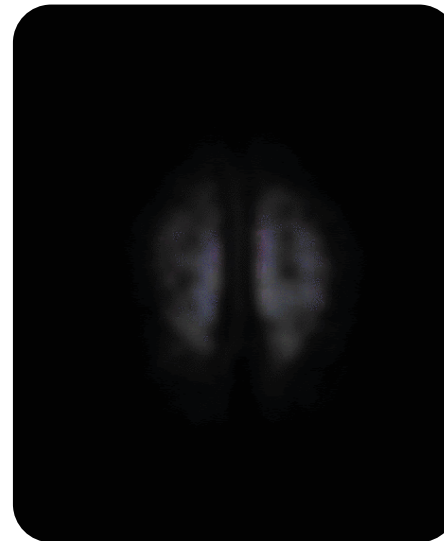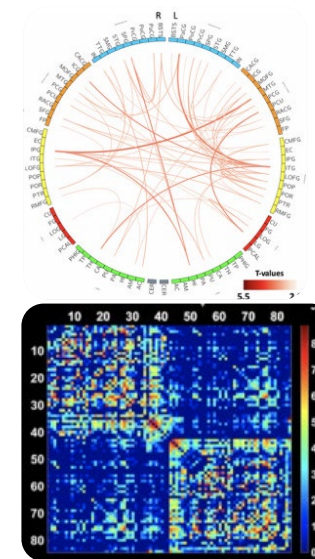
**Research flow:**
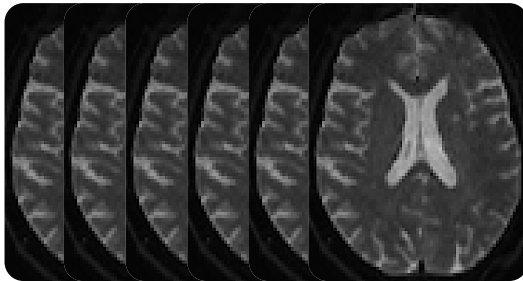
- Juntendo's patients & athletes data
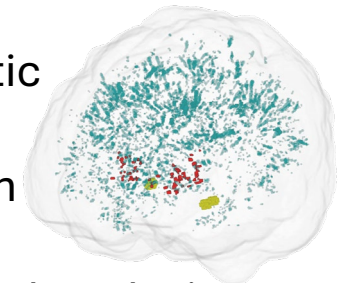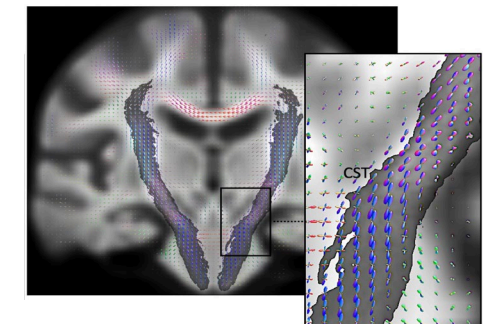- The Bunkyo Healh Study
- Open database:

Tractography

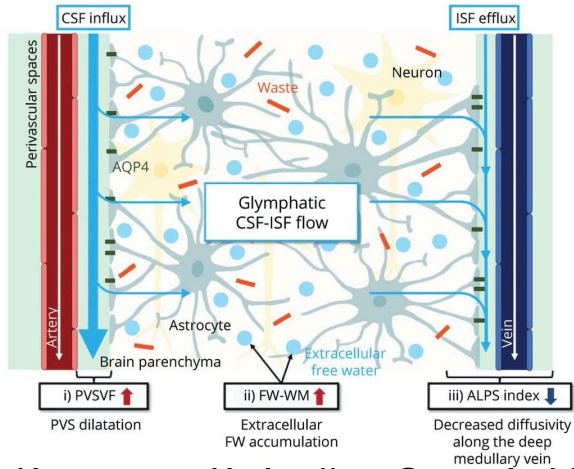Connectome

Glymphatic system evaluation

Fixel-based analysis

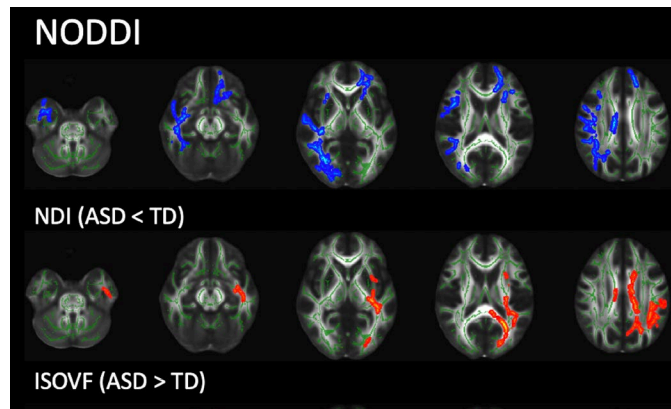MRI "BIG DATA"  biobank uk  →  Advanced diffusion models and analyses

## Research outputs:



**Glymphatic system evaluation:** Patients with Alzheimer's disease showed glymphatic dysfunction associated with Aβ deposition, neuronal damage, and cognitive impairment.
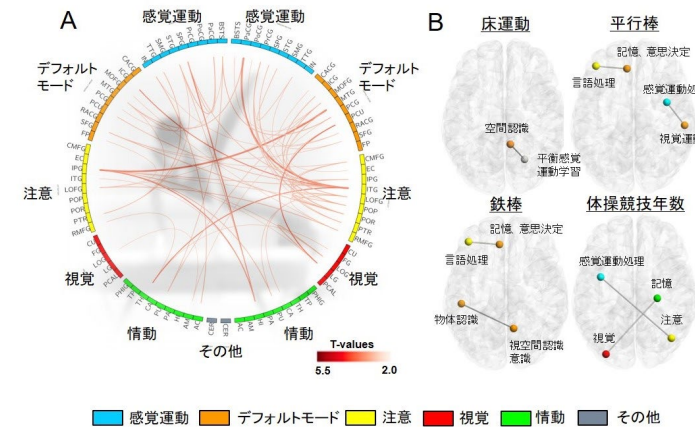
Kamagata K, Andica C, .. , Aoki S. Neurology 2022.



**Connectome analysis:** Increased brain neural networks observed in world-class gymnats compared to controls associated with gymnastic skills.

Tomita H, Kamagata K, Andica C, .. , Aoki S. J Neurosci Res 2021.



**Neurite orientation dispersion and density imaging analysis:** Decreased neurite density and neuroinflammation were demonstrated in the autism group compared with the typically developing group.
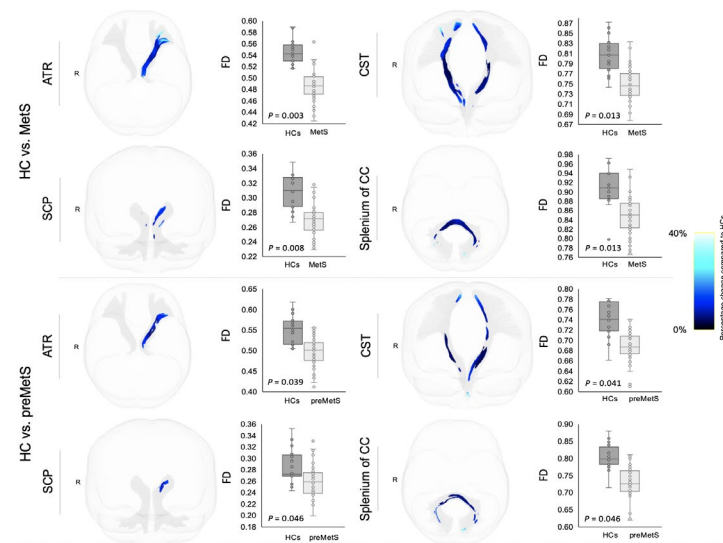
Andica C, Kamagata K, .. , Aoki S. Mol Autism 2021.



**Fixel-based analysis:** Individuals with metabolic syndrome showed axonal loss and atrophy, whereas individuals with premetabolic syndrome displayed early signs of axonal alterations.

Andica C, Kamagata K, .. , Aoki S. Mol Metab 2022.