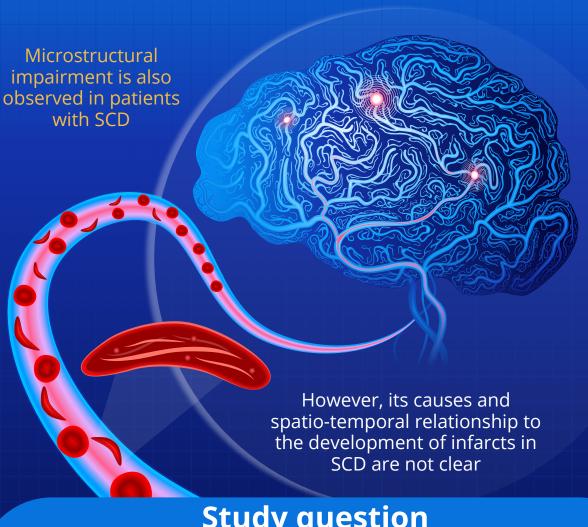
Cerebral Oxygen Metabolic Stress and **Microstructural Injury: Associations** with Cerebral Infarcts in Patients with **Sickle Cell Disease**

Cerebral infarcts are associated with hemodynamic and oxygen metabolic stress in patients with sickle cell disease (SCD)



Study question

What is the impact of hemodynamic and oxygen metabolic stress on white matter microstructure within normal-appearing white matter in adults with SCD?



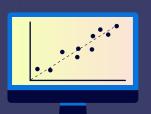
34 Adults with SCD



- Hemo-metabolic stress
 - Cerebral blood flow (CBF)
 - Oxygen extraction fraction (OEF)



- Mean diffusivity (MD)
- Fractional anisotropy (FA)
- Cerebral infarcts on FLAIR



Multivariable linear regression of patientand voxel-based associations

Adults with SCD have...



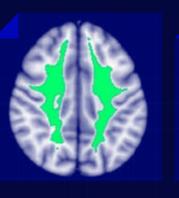
Elevated cerebral OEF was associated with microstructural impairment in SCD, but not in healthy controls

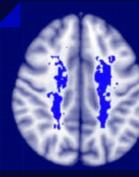
Spatial relationship

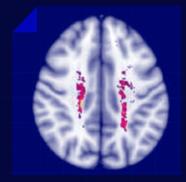
OEF

MD

Infarcts







Regions of OEF elevation include and surround regions of white matter microstructural injury, which, in turn, extend beyond regions of peak infarcts



Cerebral oxygen metabolic stress may be a precursor to microstructural injury and cerebral infarcts in patients with SCD