Real-Time, Non-Invasive Brain Metabolism

AWARD AMOUNT: $118,666

THE TEAM

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THE PROBLEM

Though it is a vital predictive sign of secondary injury, clinical diagnosis of absolute brain blood flow and oxygen consumption at the bedside is currently not possible. Available techniques are either severely flawed, pose significant risks to the patient’s condition or are otherwise impractical.

- Blood pressure does not reflect blood flow
- CT, PET, or MRI require transport
- Blood Velocity ≠ Blood Flow

Develop and validate an ultrasound-based non-invasive, portable, inexpensive device that measures two critical physiological parameters:

Quantify blood flow using three-dimensional ultrasound

Use photoacoustic visualization to quantify oxygen consumption

THE SOLUTION

Non-invasively measure brain blood flow and oxygen use

Bedside quantitative monitoring of cerebral oxygen consumption

Tell intensivists how much blood is actually entering the brain

Provide feedback to therapeutic hyperventilation and use of vasopressors

Validate in pre-clinical model where (invasive) absolute reference measurements are available

THE TECHNOLOGY