Miniaturized Head-Mounted Optical Coherence Tomography Imaging System For Brain Imaging In Freely Moving Animals

Tech ID: 34690 / UC Case 2025-877-0

BRIEF DESCRIPTION

A lightweight, head-mounted OCT system enabling real-time, high-resolution brain imaging in freely moving small animals.

FULL DESCRIPTION

This invention is a miniaturized, lightweight head-mounted OCT device that enables noninvasive, real-time brain imaging in freely moving small animals without anesthesia or restraint. It supports structural, Doppler, and angiographic OCT, with advanced features like a MEMS scanning mirror, rotary fiber joint, and modular holders for flexible imaging depths—offering a stable, versatile platform for neuroscience and neurovascular research.

SUGGESTED USES

- Neuroscience and disease modeling: Enables studies of brain structure, function, and neurovascular disorders
- Functional vascular insights: Supports investigation of neurovascular coupling, blood flow dynamics, and vascular network mapping.
- Therapeutic and behavioral applications: Facilitates drug testing, treatment evaluation, and cognitive/behavioral research with real-time imaging in freely moving animals.

ADVANTAGES

- Weighs ≤1.5 g to avoid behavioral interference, with interchangeable holders for varied imaging depths and cranial windows.
- Supports structural/Doppler/angiography OCT with real-time imaging up to 200 kHz and ≥100 Hz frame rates.
- Rotary fiber joint reduces motion artifacts; fabricated using standard optics with 3D-printed/CNC housings for affordability.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

CATEGORIZED AS

- **Imaging**
  - Medical
  - Molecular
  - Other
- **Medical**
  - Devices
  - Imaging
  - Research Tools
- **Sensors & Instrumentation**
  - Analytical
  - Scientific/Research
- **Veterinary**
  - Diagnostics
  - Other

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