

Small Animal Cerebral Blood Flow Imaging Platform

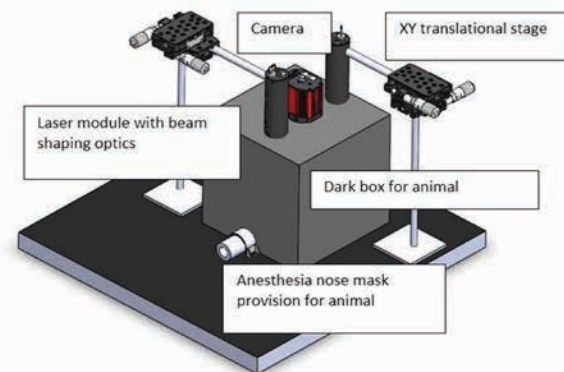
Problem Statement: The researchers have developed a small animal cerebral blood flow (CBF) imaging platform based on Multi speckle diffuse correlation spectroscopy (M-DCS) that they developed in-house at IIT Bombay. The system comprises a laser with necessary scanning optics to scan the brain and a camera to capture intensity speckles which are then post-processed to get 2-D and 3-D cerebral blood flow distributions. Employing a camera for DCS gives a very cost-effective and compact deep tissue imaging system by allowing high-density parallel detection of several speckles. The team envisages developing the necessary algorithm to visualise the CBF as an image and its quantified flow. The potential use of the system can be to monitor the effect of a drug on post-stroke reperfusion or functional activation studies in small animal models.

Uniqueness of the Solution: The system is based on a new method developed in the lab called Multi speckle diffuse

correlation spectroscopy (M-DCS). The researchers have already published the proof of concept. Their work is the first indigenous attempt to develop a small animal imaging platform focused on cerebral blood flow. Currently, no national players are present, except laser speckle imaging systems which differ from what the solution proposes.

Current Status of Technology: The proof of concept is achieved and published. The researchers have deployed and tested the system in the relevant environment (in mice). They have identified the needed components to build the system with an approximate budget.

Societal Impact: Diseases like Parkinson's, Alzheimer's and stroke are increasing in India, prompting necessary drug developments. The proposed platform can be a low cost and compact solution for preclinical studies towards this purpose. The researchers are also



scaling this technology to adapt it for longitudinal bedside monitoring of cerebral blood flow in human patients. The low-cost technology can also boost research work for drug discovery/testing and functional activation/cognitive studies in academia and industry.

Patent(s): Filed

Relevant Industries: Healthcare; Digital Health Monitoring, Research.

Faculty: Prof. Hari M Varma, Biosciences & Bioengineering.