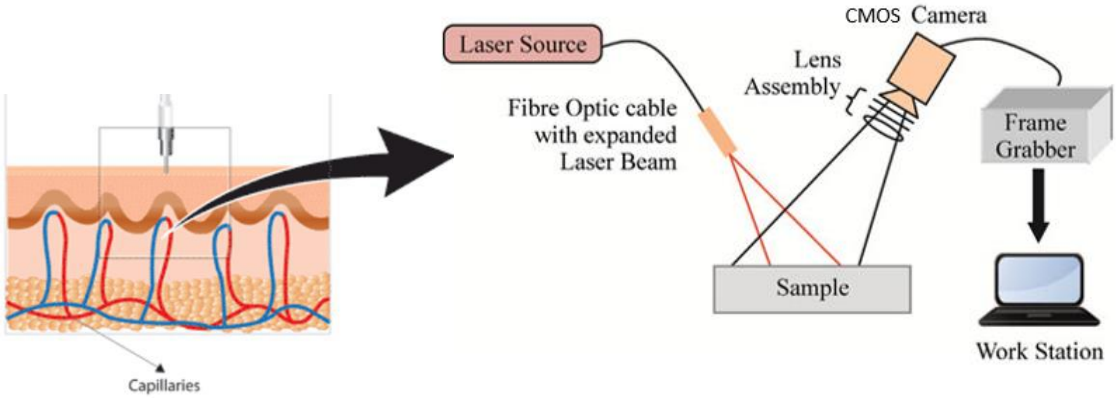
Laser Speckle Vs other technologies

RWD

What is Laser Speckle?



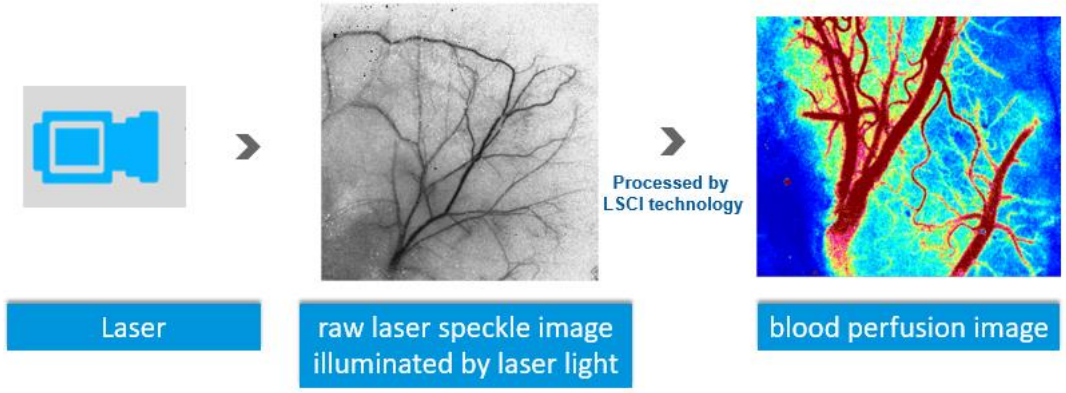


Image by RFLSIⅢ

What is Laser Speckle?

When a laser is used to illuminate blood vessel tissue, the reflected light varies in intensity since the red blood cells in the vessels continue to flow .
The image sensor collects all the reflected light signals,then convert the reflected laser signal into image signal,which then constitute a blurred speckle pattern.
The faster the blood flow, the faster the red blood cells flow, and the more the speckle image is blurred.

Six Imaging Technologies

Technology	Advantages	Disadvantages
Laser speckle imaging system	Non-invasive(**non-contact)** Full filed with Real-time imaging **High quality quantized data** Easy to get started	Desktop computer is required
Laser Doppler	Non-invasive	Without imaging
Pet-CT	Quantitative High accuracy and sensitivity	High cost of use High price **Complicated operation**
FMRI (Functional magnetic resonance imaging)	Get the information of brain both structural and the activities area	High cost of use High purchase cost **Time-consuming**
Ultrasound Doppler	Non-invasive Radiation-free Quantitative of blood flow	Probe **indispensable** Limited detection area
Fluorescent contrast agent	More suitable for disease diagnosis and prognosis evaluation	Fluorescence quenching Complicated preparation

Laser Speckle Technology V.S. Other Technologies

●Competition with other technologies

ultrasound doppler **vs.** **laser doppler** **vs.** **laser speckle**

ultrasound doppler	laser doppler	laser speckle
contact with Coupling agent	must keep the probe stably	no contact
Non-detection zone induced by frequency of ultrasound	limited detection zone	full field detection
low spacial/temporal resolution	low spacial/temporal resolution	high spacial/temporal resolution
just wavelength	2D image by scanning	2D image in real time
local area monitoring	single point monitoring	large view field

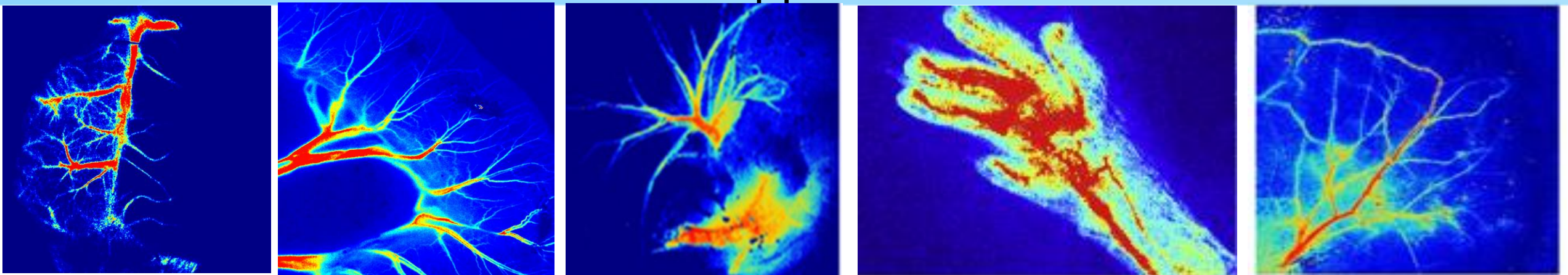
RWD Laser Speckle Contrast Imaging RFLSI Ⅲ

RWD Laser Speckle Imaging System (RFLSI Ⅲ) is a blood perfusion imager based on Laser Speckle Contrast Imaging (LSCI) technology. LSCI provides a better method to study the microcirculation that were not possible in the past. It allows visualization of tissue blood perfusion and imaging with high time and spatial resolution. Quantified data can be obtained, without contact to the tissue, nor dyes or tracer elements.

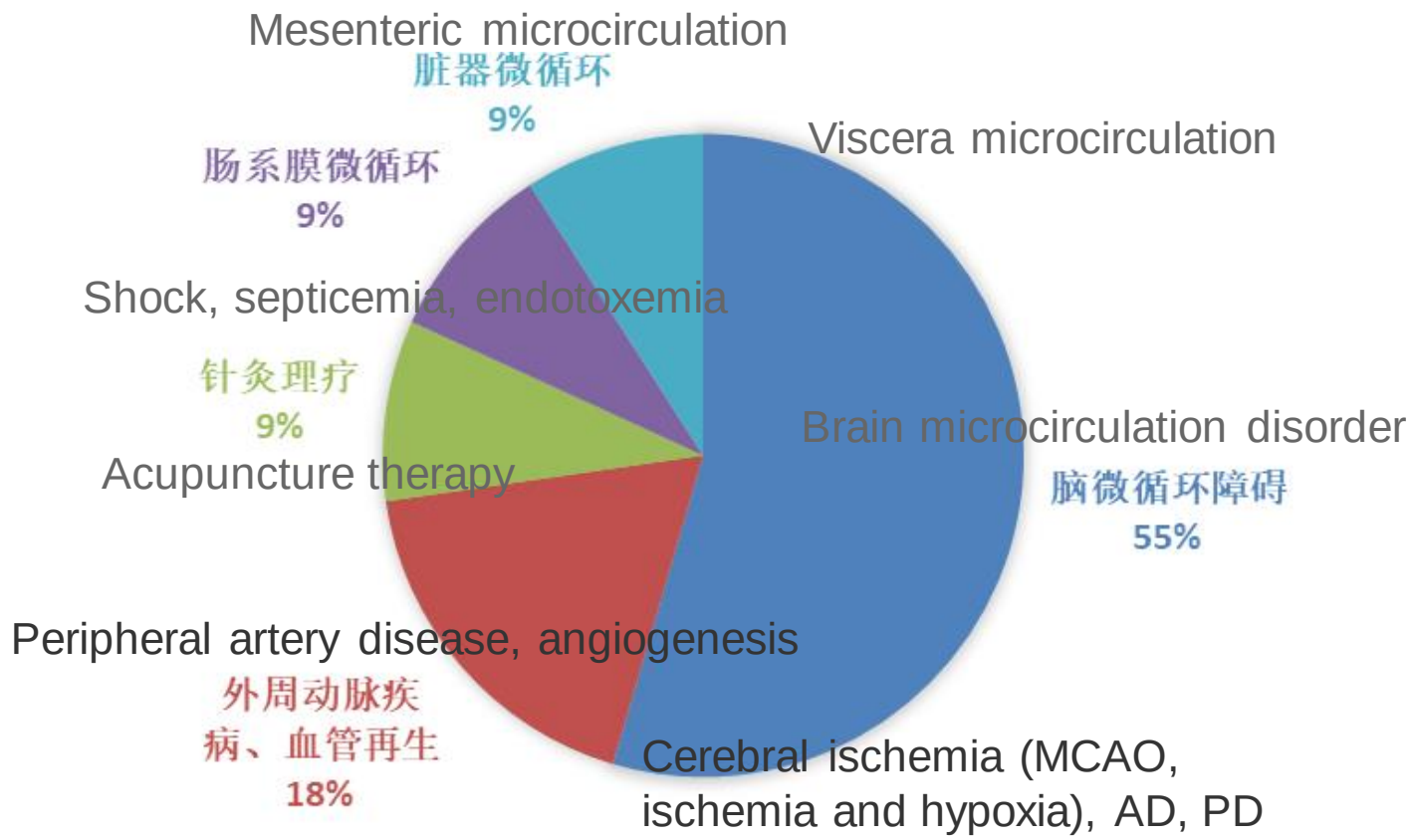
RWD Laser Speckle Imaging System

- **Product Features:**
- High time & spatial resolution
- Non-contact, No contrast agent
- Full field real-time imaging
- Multi-output: Video, Image, Quantified data of Blood flow perfusion or vessel diameter
- Offline software analysis

Wide Applications



Laser Speckle Imaging System-Application



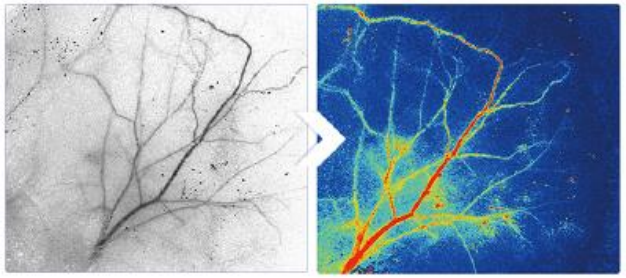
Applications:

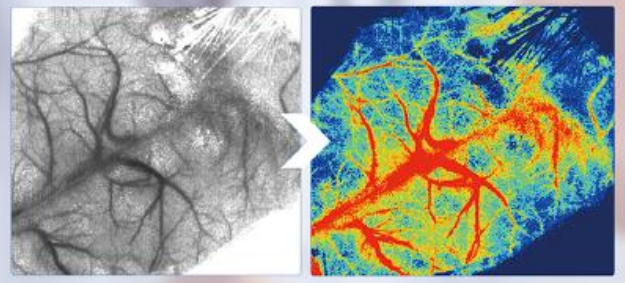
Cerebral Blood Flow Monitoring
Cortical Spreading Depolarization
Neovascularization/Angiogenesis
Stroke Model(MCAO) assessment
Skin Blood Flow Monitoring
Organ Blood Flow Monitoring
Hind Limb Ischemia

Application

Inner ear canal

Anesthetize the mice; stick the auricles flat and seamlessly on the glass slide with double-sided tape, and drop saline on the auricles; turn on the laser speckle flow meter, and use the 785 nm laser to the mouse auricle blood flow for imaging, observe and record in high signal-to-noise ratio mode.



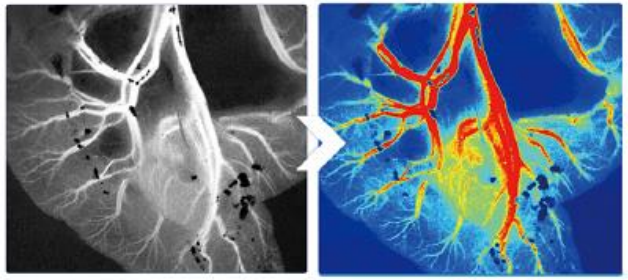


Brain

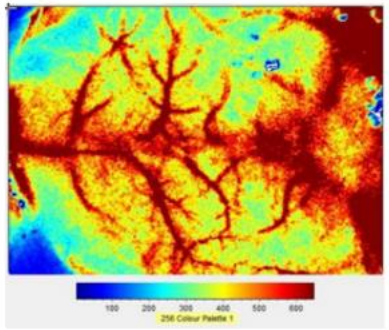
Anesthetize the mice, remove the head hair and scalp, and fix the mice on a stereotaxic instrument; use a laser speckle blood flow meter at 785 nm, record in high signal-to-noise ratio mode, and observe the cerebral blood flow.

Intestinal mucosa

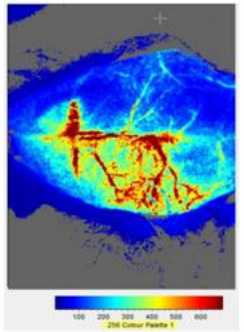
Anesthetize the mice; open the abdominal cavity, select the area of the mesentery that is suitable for observation, and spread the warm Krebs solution (37 ° C) to keep the mesentery moist and maintain its normal physiological function; The 785 nm laser was used to image the intestinal mucosal blood flow of mice, and the high signal-to-noise ratio mode was used to observe and record.



●Example 1：blood perfusion imaging of MCAO model in rat cortex

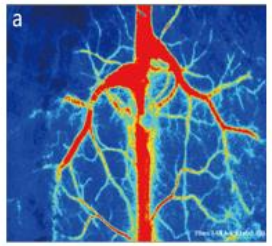


Before MCAO

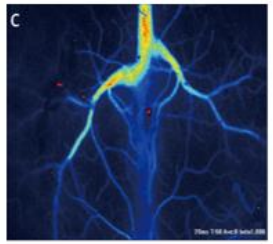


After MCAO established

●Example 2：Cortical blood flow imaging of tree shrew (nonhuman primate)

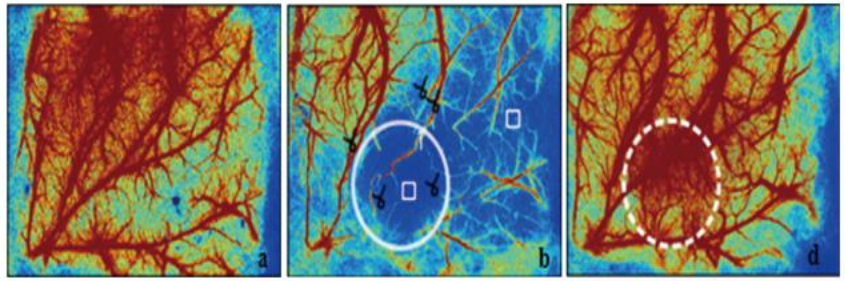


Normal



Over anesthesia

●Example 3：cerebral blood flow distribution of the mini–stroke model in a rat cortex



normal

The model has been established

The model has been removed for 24 hours