RFLSI III
Laser Speckle Imaging System
For Pre-Clinical Research about Vascular.

Observe
Laser Speckle Imaging System (RFLSI III) is a blood perfusion imager based on Laser Speckle Contrast Imaging (LSCI) technology. LSCI provides a better means 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. There is no influence on the perfusion, as no contact to the tissue is needed, nor dyes or tracer elements.

What is speckle contrast analysis?
Speckle flow techniques are based on the changes over time of the dynamic speckle pattern generated by motion in the sample. In these techniques, this changing speckle pattern is recorded with a camera that has an integration time in the order of the speckle decorrelation time (i.e., in the millisecond range). Due to the long integration time compared to the typical decorrelation time of the speckle pattern, the speckle pattern will be blurred in the recorded image. The level of blurring is quantified by the speckle contrast.


 DW14006 as a direct AMPK activator ameliorates diabetic peripheral neuropathy in mice.

After anesthesia with isoflurane (RWD, China), the real-time regional velocity and distribution of blood flow and perfused blood vessel of sciatic nerve and foot pads were detected by Laser Speckle Contrast Imaging/LSCI (RFLSI Pro, RWD, China). Blood perfusion areas of sciatic nerve and foot pads were analyzed by Image J.

Meningeal lymphatics clear erythrocytes that arise from subarachnoid hemorrhage.
To verify whether meningeal lymphatic vessels serve as the route for the drainage of erythrocytes from the CSF into the CLNs, we ablated meningeal lymphatic vessels by injecting Visudyne into the cisterna magna and photoconverted it by laser light. After 7 days of ablation, use the laser speckle to observe the lymphatic coverage of the transverse sinus and the superior sagittal sinus were notably lower.

Why Choose the RFLSI III

**Quantized Data:**
In-vivo data
Quality control standards for ischemia model

**Imaging Data:**
4K imaging for the blood vessel
Up to 120 images per second

**Real-time Data:**
You can get the reperfusion data during ischemia model
It is especially suitable for physiological vascular related research
Laser Speckle imaging system (RFLSI III) is a blood perfusion imager based on Laser Speckle Contrast Imaging (LSCI) technology. LSCI provides a better means 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. There is no influence on the perfusion, as no contact to the tissue is needed, nor dyes or tracer elements.

What is speckle contrast analysis?
Speckle flow techniques are based on the changes over time of the dynamic speckle pattern generated by motion in the sample. In these techniques, this changing speckle pattern is recorded with a camera that has an integration time in the order of the speckle decorrelation time (i.e., in the millisecond range). Due to the long integration time compared to the typical decorrelation time of the speckle pattern, the speckle pattern will be blurred in the recorded image. The level of blurring is quantified by the speckle contrast.  


Case study
DW14006 as a direct AMPK activator ameliorates diabetic peripheral neuropathy in mice

After anesthesia with isoflurane (RWD, China), the real-time regional velocity and distribution of blood flow and perfused blood vessel of sciatic nerve and foot pads were detected by Laser Speckle Contrast Imaging/LSCI (RFLSI Pro, RWD, China). Blood perfusion areas of sciatic nerve and foot pads were analyzed by Image J.

Meningeal lymphatics clear erythrocytes that arise from subarachnoid hemorrhage

To verify whether meningeal lymphatic vessels serve as the route for the drainage of erythrocytes from the CSF into the CLNs, we ablated meningeal lymphatic vessels by injecting Visudyne into the cisterna magna and photoconverted it by laser light. After 7 days of ablation, use the laser speckle to observe the lymphatic coverage of the transverse sinus and the superior sagittal sinus were notably lower.

Why Choose the RFLSI III

Quantized Data:
- In vivo data
- Quality control standards for ischemia model

Real-time Data:
- You can get the reperfusion data during ischemia model
- It is especially suitable for physiological vascular related research

Visual Data:
- 4K imaging for the blood vessel
- Up to 120 images per second

DW14006 as a direct AMPK activator ameliorates diabetic peripheral neuropathy in mice

After anesthesia with isoflurane (RWD, China), the real-time regional velocity and distribution of blood flow and perfused blood vessel of sciatic nerve and foot pads were detected by Laser Speckle Contrast Imaging/LSCI (RFLSI Pro, RWD, China). Blood perfusion areas of sciatic nerve and foot pads were analyzed by Image J.

Meningeal lymphatics clear erythrocytes that arise from subarachnoid hemorrhage

To verify whether meningeal lymphatic vessels serve as the route for the drainage of erythrocytes from the CSF into the CLNs, we ablated meningeal lymphatic vessels by injecting Visudyne into the cisterna magna and photoconverted it by laser light. After 7 days of ablation, use the laser speckle to observe the lymphatic coverage of the transverse sinus and the superior sagittal sinus were notably lower.

Why Choose the RFLSI III

Quantized Data:
- In vivo data
- Quality control standards for ischemia model

Real-time Data:
- You can get the reperfusion data during ischemia model
- It is especially suitable for physiological vascular related research

Visual Data:
- 4K imaging for the blood vessel
- Up to 120 images per second
DW14006 as a direct AMPK activator ameliorates diabetic peripheral neuropathy in mice

C57BL/6J mice (male, 7-8 weeks old) were anesthetized by isoflurane inhalation with anesthesia respirator (R540IP, RWD Life Science) 2 hours after oral gavage of 100 mg/kg candidate compounds. Carotid arterial thrombosis was induced with a filter paper-disc (d = 2 mm) soaked with 10% FeCl3 and the blood flow was monitored by laser-speckle blood flow imaging system (RFLSI Pro, RWD Life Science).

Arterial Supercharging Is More Beneficial to Flap Survival Due to Quadruple Dilation of Venules

Three days after flap harvest, observed from the laser speckle images, the vascular network in the skin bridge between the iliolumbar and sacrococcygeal perforasomes in the ILA group underwent extensive dilation (Fig. 4). On day 3, the perfusion value of the vascular network had an increase of 2.89 ± 0.77 over that obtained immediately after surgery in the ILA group, whereas an increase of only 0.79 ± 0.47 could be obtained in the ILV group, resulting in significant difference between the two groups (P < 0.001; Table 3). The histology showed that the average venous diameter was 203 ± 15 mm in the ILA group, which was significantly larger than 91 ± 12 mm in the ILV group (P < 0.001); the average arteriolar diameter was 88 ± 13 mm in the ILV group, which was also significantly larger than 67 ± 9 mm in the ILA group (P < 0.001; Fig. 5).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td></td>
</tr>
<tr>
<td>Vessel (mm)</td>
<td>Immediately after surgery: 0.65 ± 0.01, 1 d after surgery: 0.60 ± 0.02, 2 d after surgery: 0.67 ± 0.06, 3 d after surgery: 0.69 ± 0.08</td>
</tr>
<tr>
<td>Vein (mm)</td>
<td></td>
</tr>
<tr>
<td>Artery (mm)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Diameter change in vessels of the choke zone between the iliolumbar and posterior intercostal perforasomes.
DW14006 as a direct AMPK activator ameliorates diabetic peripheral neuropathy in mice

C57BL/6J mice (male, 7-8 weeks old) were anesthetized by isoflurane inhalation with anesthesia respirator (R540IP, RWD Life Science) 2 hours after oral gavage of 100 mg/kg candidate compounds. Carotid arterial thrombosis was induced with a filter paper-disc (d = 2 mm) soaked with 10% FeCl3 and the blood flow was monitored by laser-speckle blood flow imaging system (RFLSI Pro, RWD Life Science).

Arterial Supercharging Is More Beneficial to Flap Survival Due to Quadruple Dilation of Venules

Three days after flap harvest, observed from the laser speckle images, the vascular network in the skin bridge between the iliolumbar and sacrococcygeal perforasomes in the ILA group underwent extensive dilation (Fig. 4). On day 3, the perfusion value of the vascular network had an increase of 2.89 ± 0.77 over that obtained immediately after surgery in the ILA group, whereas an increase of only 0.79 ± 0.47 could be obtained in the ILV group, resulting in significant difference between the two groups (P < 0.01; Table 3). The histology showed that the average venous diameter was 203 ± 15 mm in the ILA group, which was significantly larger than 91 ± 12 mm in the ILV group (P < 0.001); the average arterial diameter was 88 ± 13 mm in the ILV group, which was also significantly larger than 67 ± 9 mm in the ILA group (P < 0.001; Fig. 5).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>RFLSI III</td>
</tr>
<tr>
<td>Brand</td>
<td>RWD</td>
</tr>
<tr>
<td>Scope of monitoring</td>
<td>0-5000 PU</td>
</tr>
<tr>
<td>Image acquisition speed</td>
<td>Up to 120 FPS</td>
</tr>
<tr>
<td>Image size</td>
<td>&lt;90 × 90mm</td>
</tr>
<tr>
<td>Camera</td>
<td>Dual CMOS(Color)</td>
</tr>
<tr>
<td>Zoom range</td>
<td>12× optical zoom with auto-focus</td>
</tr>
<tr>
<td>Monitor camera</td>
<td>5.0 million(2048 × 2048)</td>
</tr>
<tr>
<td>Image camera</td>
<td>5.0 million(2048 × 2048)</td>
</tr>
<tr>
<td>Monitoring Laser</td>
<td>785 nm</td>
</tr>
<tr>
<td>Laser power</td>
<td>110mW</td>
</tr>
<tr>
<td>Indicator laser</td>
<td>660 nm</td>
</tr>
<tr>
<td>Region of interest (ROI)</td>
<td>On-line &amp; Off-line analysis</td>
</tr>
<tr>
<td>ROI shape</td>
<td>Square, circle, polygon</td>
</tr>
<tr>
<td>Vascular diameter</td>
<td>On-line &amp; Off-line analysis</td>
</tr>
<tr>
<td>Data</td>
<td>Imagine, Video Blood Perfusion</td>
</tr>
</tbody>
</table>