



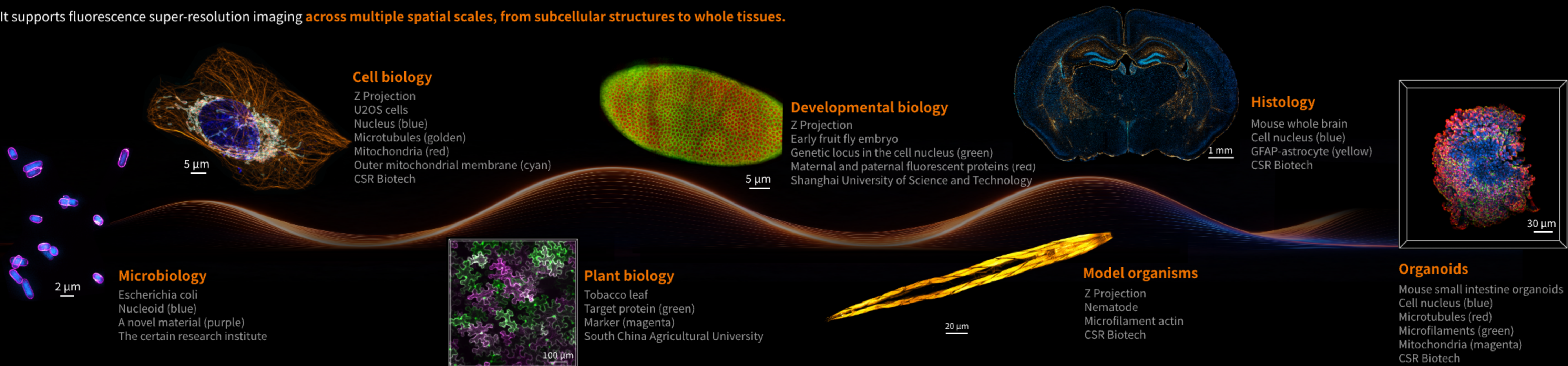
MI-SPIN⁵¹² Intelligent Spinning Disk Confocal Microscope

High Speed Dual Disk • Deep Sectioning Super-Resolution
Molecular Functional Quantification • AI-Assisted Imaging



Foundational imaging function: Multi-scale imaging capabilities

MI-SPIN integrates advanced intelligent imaging and processing functions optimized for sample imaging, enabling broad applications across cell biology, plant biology, microbiology, developmental biology, organoids, and histology. It supports fluorescence super-resolution imaging **across multiple spatial scales, from subcellular structures to whole tissues**.

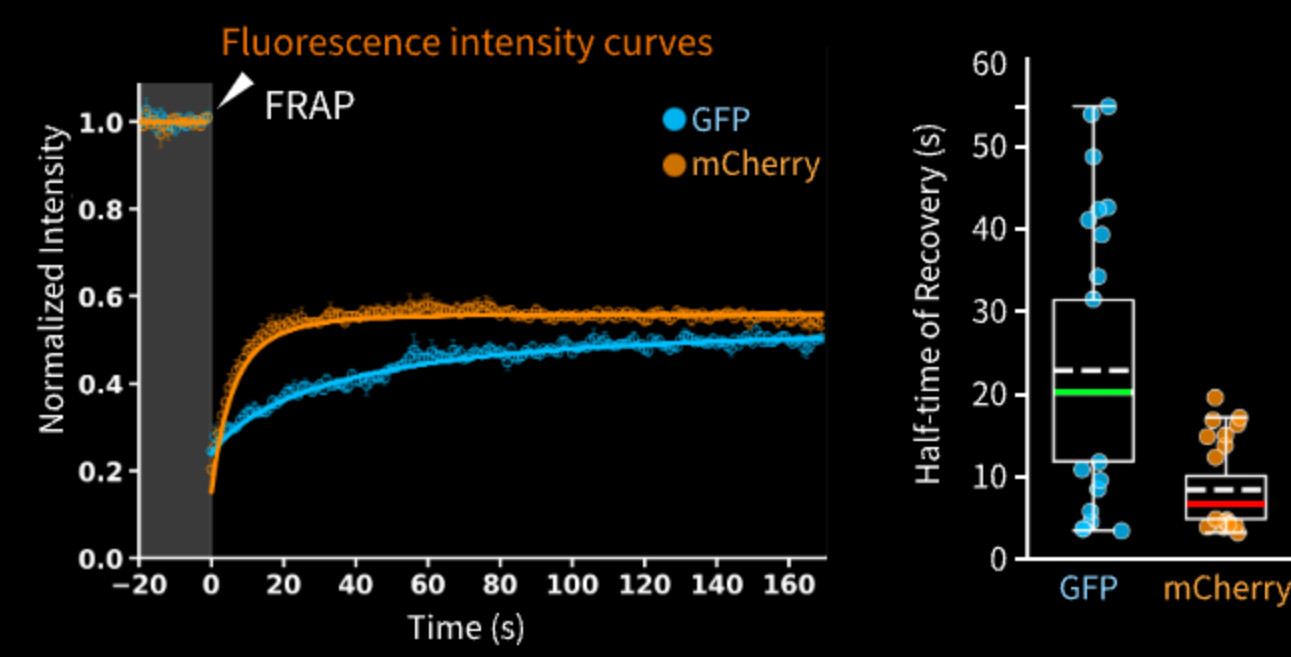
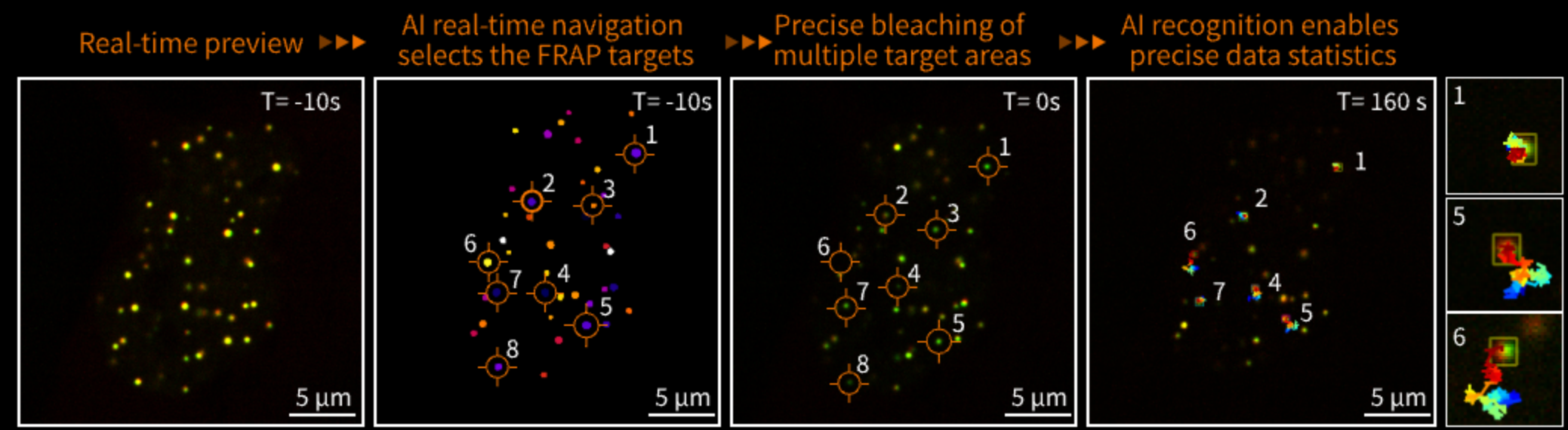


Advanced molecular insights: Molecular dynamics and interactions

MI-SPIN integrates **FRAP and FRET functional imaging modules**, enabling multidimensional biological analysis from static structural imaging to dynamic molecular event tracking, and providing deeper insights into molecular dynamics and interactions.

Streamlined AI-guided FRAP acquisition and analysis

Integrated into the spinning disk confocal system, the next-generation FRAP module combines AI-guided multi-target photobleaching with automated data statistics to enable dynamic tracking and quantitative recovery analysis with high speed, precision, and flexibility.

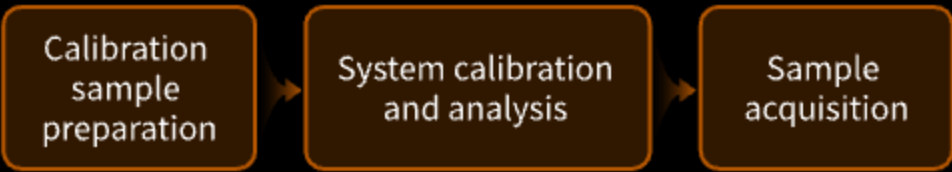


The FRAP results show that the mobility of the GFP-labeled protein is slightly lower, possibly due to the strong interaction, forming a stable "skeletal network"; while the mCherry-labeled protein has strong mobility and can quickly bind/ release other molecules, achieving rapid signal response; the difference in dynamic properties of these two proteins reveals that they play different functional roles in the phase separation particles.

Streamlined quantitative FRET calibration and acquisition

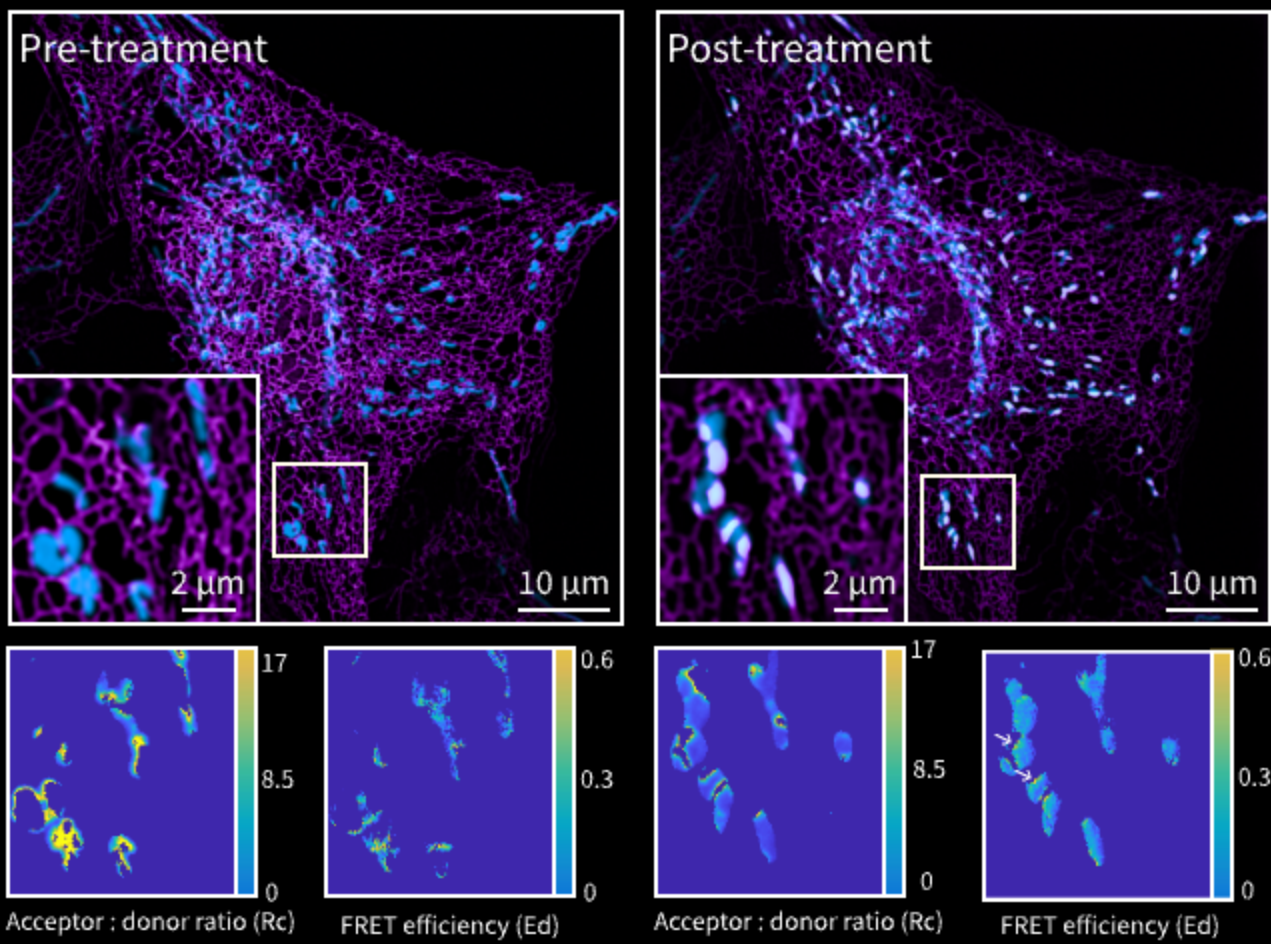
FRET set up and analyses capability are seamlessly ingratiated into spinning disk system. Compared to conventional WF-FRET, Spin-FRET leverages MI-SPIN's optical sectioning to significantly enhance image quality and spatial resolution. This makes the system ideal for 3D FRET, enabling the precise captrure of complex molecular events.

- Quantitative FRET calibration and acquisition module
- Standardized, streamlined calibration & analysis workflows



After drug treatment, FRET efficiency is higher at the mitochondrial periphery than at the center (arrows), indicating that interactions mainly occur at the outer regions.

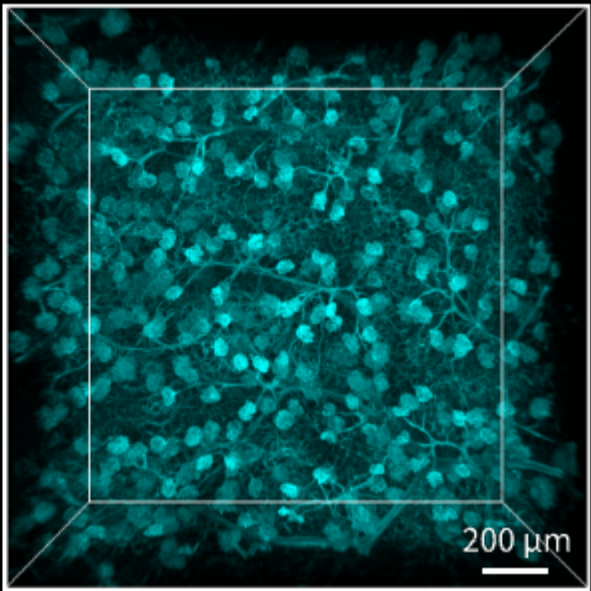
Donor channel (endoplasmic reticulum, magenta)
Acceptor channel (outer mitochondrial membrane, blue)
CSR Biotech



MI-SPIN 512: Intelligent spinning disk confocal microscope

MI-SPIN offers a highly versatile super resolution capable spinning disk confocal platform. The system is able to address wide variety of application including live cell imaging, high speed area scanning, deep tissues imaging and molecular functional imaging. Advance image processing capabilities and AI enabled workflow tools allow the system to deliver next generation performance.

- ✔ 8000 rpm dual disk rotation speed
- ✔ 100 nm resolution in Spin-SACD
- ✔ 150 nm XY-resolution with sparse deconvolution
- ✔ 30 mm ultra-large spin illumination FOV
- ✔ Excellent performance in high-throughput applications
- ✔ Integrate FRAP and quantitative FRET molecular measurements



3D imaging of optically cleared mouse kidney vasculature achieving a depth of 940 μm with a 10× objective
CSR Biotech

Next-generation microlens array spinning disk module

High-speed spinning disk module:

Equipped with two switchable microlens disks configurations optimized for different imaging requirements, including magnification, optical sectioning, resolution and acquisition speed.

Large-FOV uniform illumination module:

Achieves uniform illumination across a 30 mm full field of view while minimizing photobleaching in the non-imaging area, reducing phototoxicity and sample damage.

SYNER dual camera module^[1]:

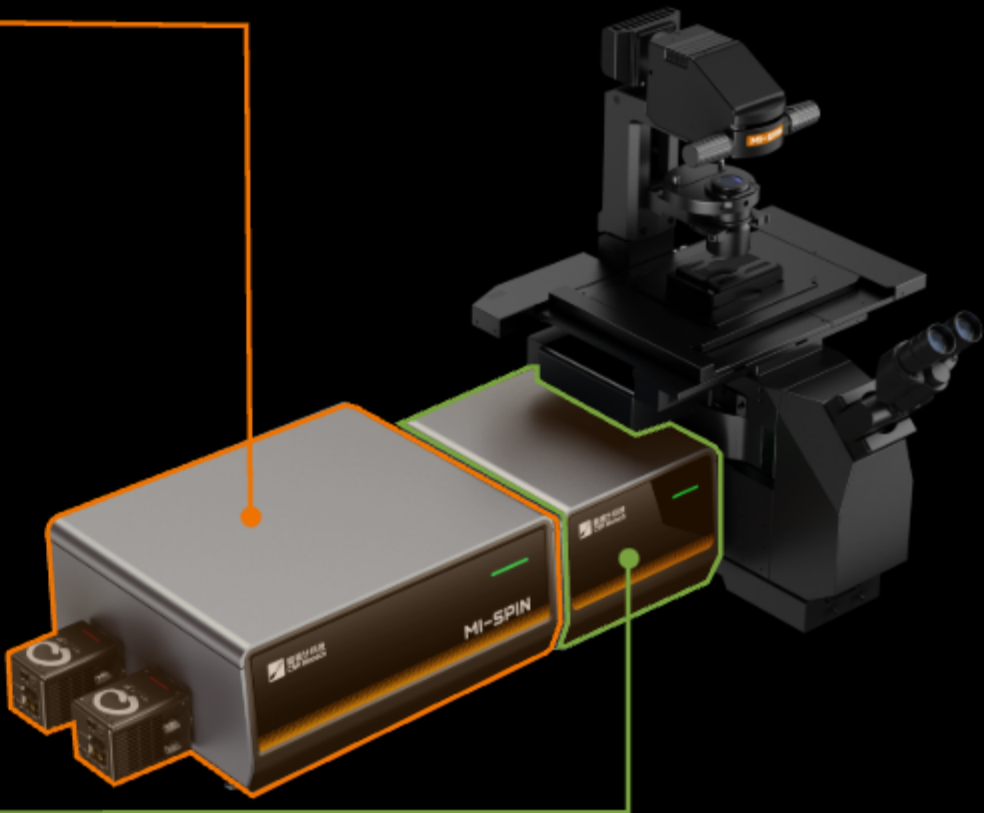
Enables simultaneous dual-channel imaging for precise analysis of fast dynamic interactions in live cells. For fixed multicolor samples, it doubles imaging throughput within the same acquisition time.

Advantages
Supports two different pinhole size of 25 μm and 50 μm
Dual disk max rotation speed 8000 rpm
30 mm ultra-large spin illumination FOV
Supports illumination uniformity

Add-on high-precision FRAP module

Modular FRAP using spot-scanning bleaching, offering sub-pixel precision and millisecond response speed. It supports user-defined ROIs, segmented image ROIs, and multi-region coordinated scanning.

Advantages
Supports multi-channel FRAP
Sub-pixel positioning accuracy
Time-multiplexed excitation and bleaching with ≤ 10 ms switching
User-defined, segmentation-based, and multi-region ROI



[1] SYNER: Synergetic Multi-Viewer

Exceeding the performance limits of the spinning disk confocal

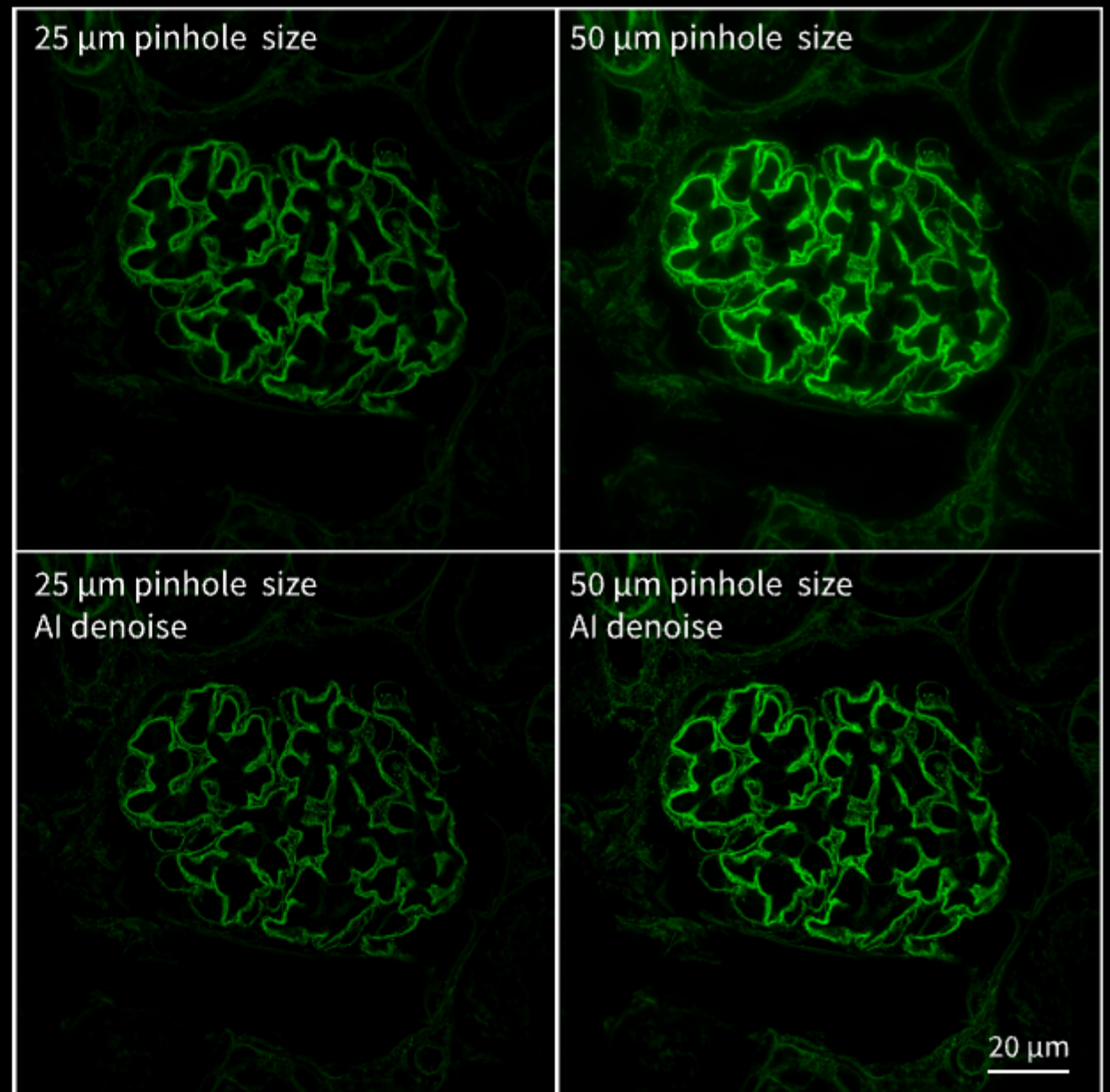
Advanced optical design of high-speed dual disk system

MI-SPIN integrates two high-speed dual disk (microlens array + pinhole array) with differentiated pinhole size, 25 μm and 50 μm engineered for deep optical sectioning in thick samples.

These two pinhole configurations perfectly balance imaging depth and resolution:

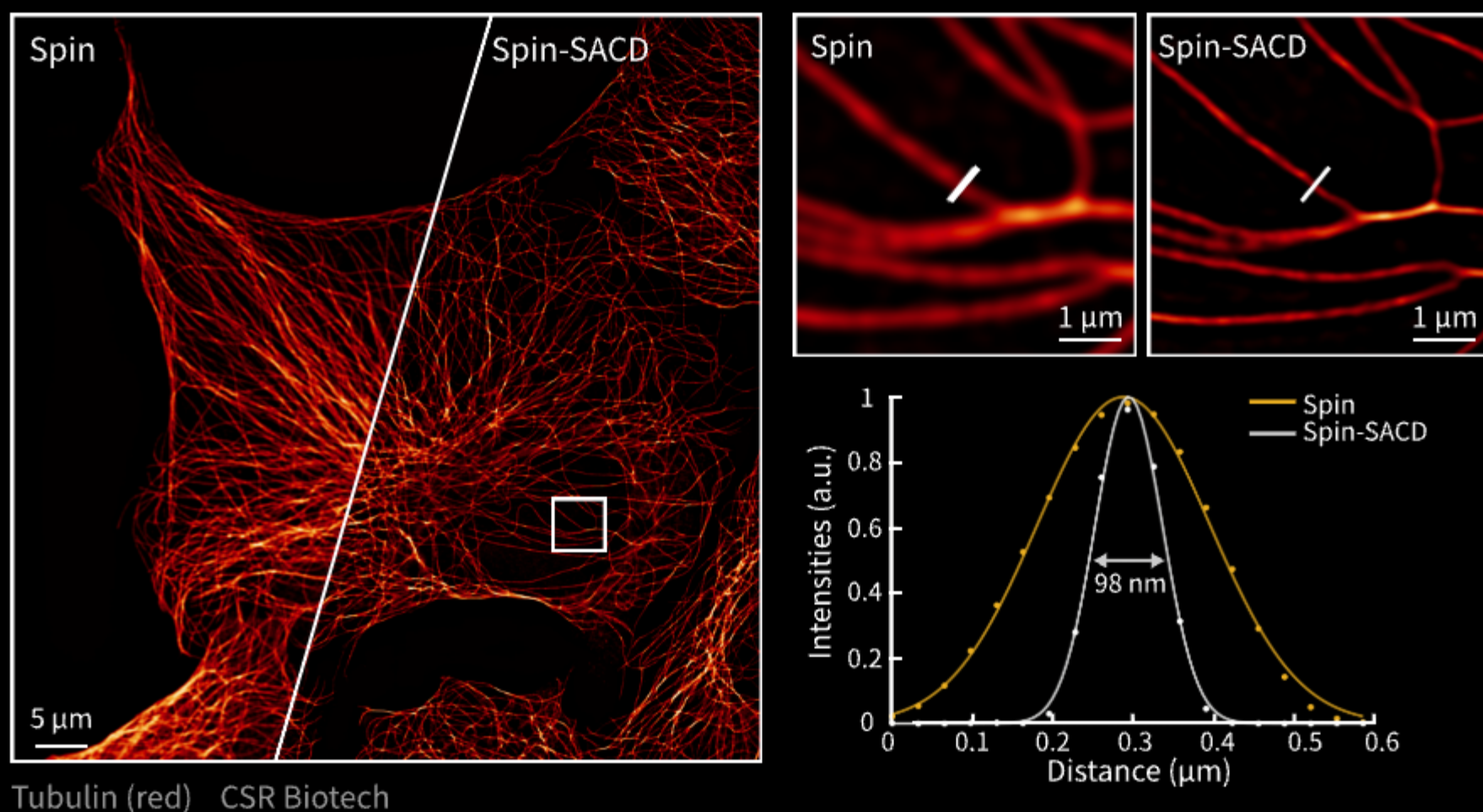
- ✓ 25 μm : preserves high resolution while rejecting out-of-focus signal, optimised for thick samples with strong background and complex structures
- ✓ 50 μm : extends imaging depth without sacrificing signal-to-noise (SNR), optimised for thick samples with low background and weak signals

MI-SPIN combines algorithm-assisted sectioning and dual disk hardware-sectioning to push the boundaries of deep super-resolution imaging. In WGA-stained mouse kidney sections, background subtraction and AI-driven denoising effectively remove out-of-focus fluorescence and enhance image SNR to reveal fine structures.



Mouse kidney section WGA (green) CSR Biotech

CSR Biotech's proprietary Spin-SACD technology reconstructs a single super-resolution image from multiple frames by leveraging the physical characteristics of fluorescence fluctuation. The method enhances spatial resolution by approximately two-fold with minimal spinning disk confocal images.



MI-SPIN 512 System Specifications

Configuration	Core functions	Specifications	Standard ✓ Optional ○
Imaging Mode	Brightfield (BF)	White LED light source	✓
		DIC	○
	Widefield (WF)	Multi-channel laser light source for widefield imaging	✓
	Spinning disk confocal (Spin)	Spinning disk confocal Optical resolution: XY: 230 nm / Z: 450 nm Computational super-resolution: XY: 150 nm / Z: 280 nm ^[1]	✓
		Spin-SACD super-resolution XY: 100 nm ; Z: 280 nm	✓
Hardware Component	Excitation power	High power single-mode laser	✓
		High power multi-mode laser	○
	Excitation wavelengths ^[2]	405 nm, 488 nm, 561 nm, 640 nm	✓
		445 nm, 515 nm, 532 nm, 594 nm, 750 nm	○
	LED eyepiece	405 nm, 488 nm, 561 nm, 640 nm	✓
		445 nm, 515 nm	○
	Spin	Single disk max rotation speed: 18000 rpm Pinhole size: 50 µm; 25 µm	✓
		Dual disk (microlens array + pinhole array) max rotation speed: 8000 rpm Pinhole size: 50 µm; 25 µm	○
	Multi-channel fluorescence imaging options	Single-camera multi-channel full-frame sequential imaging	✓
		Single-camera multi-channel high-speed simultaneous imaging	○
		Dual-camera multi-channel full-frame imaging with flexible camera selection	○
	Acquisition camera	Two choices of sCMOS cameras: Hamamatsu ORCA-Fusion BT, Teledyne Photometrics Kinetix 29	✓
	Spin illumination FOV	Max. 30 mm FOV	✓
	Microscope stand	Evident IX85 / Evident IX83 / Nikon Ti2-E	✓
	Objectives	Compatible with a wide range of objectives including air, water, oil and silicon oil immersion	✓
	Advanced imaging function ^[3]	Real-time preview and auto-tracking, large-area preview, event-triggered multi-phase and high-speed multi-well plate imaging, large-ROI stitching	✓
Molecular Functional Imaging	FRET	Supports qualitative and quantitative FRET measurements for G-R labeling; C-Y labeling is optional depending on the lasers configuration	✓
	FRAP	Supports multi-channel FRAP Sub-pixel positioning accuracy Time-multiplexed excitation and bleaching with ≤ 10 ms switching User-defined, segmentation-based, and multi-region ROI	○

[1] Resolution in XY and Z after Sparse deconvolution.

[2] Compatible with common excitation wavelengths.

[3] CSR Biotech provides CSR IMAGER (for MI-SPIN control) and MicroscopeX FINER (general image analysis), fully supporting advanced intelligent imaging features.

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