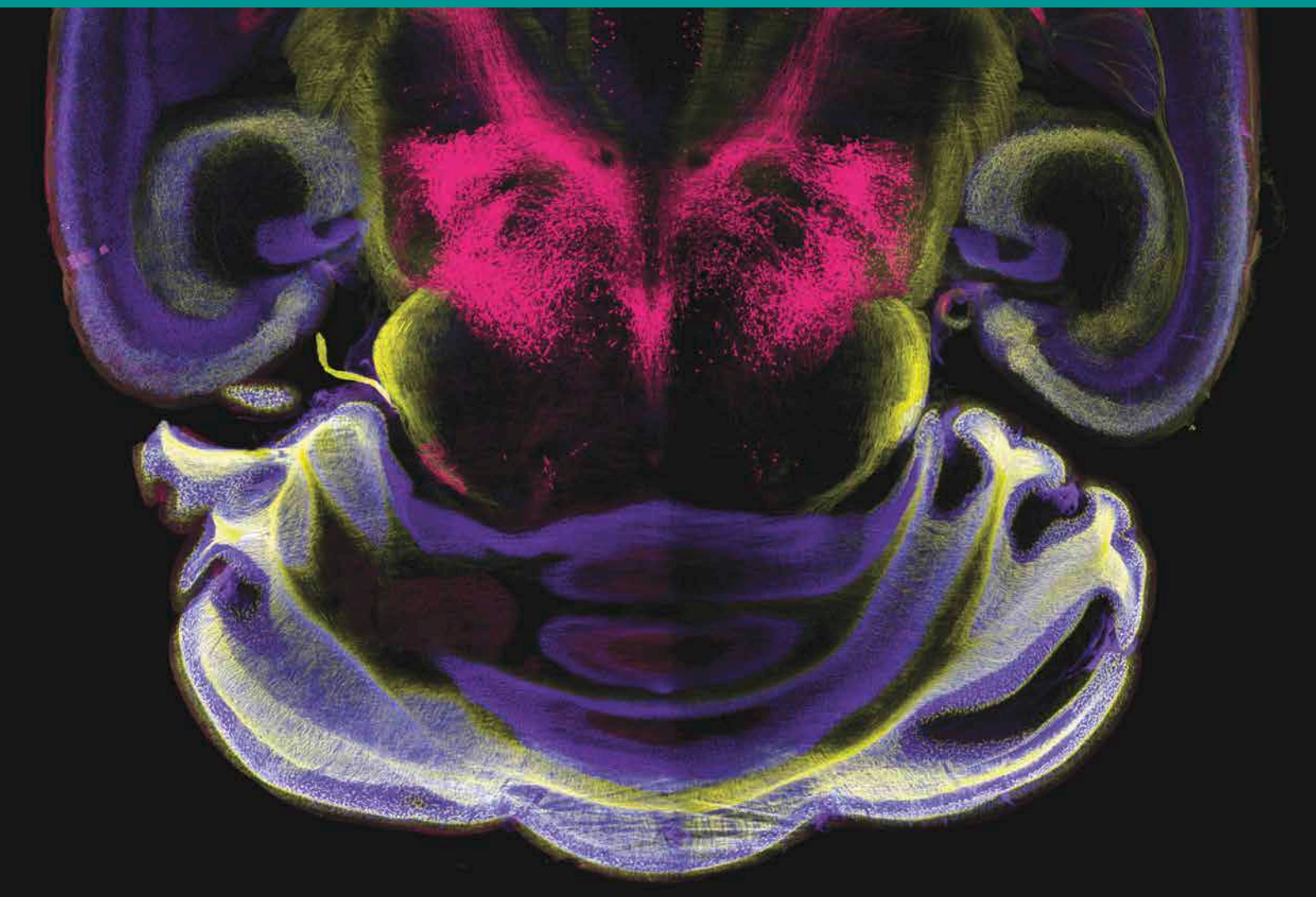
Miltenyi Biotec

3D imaging at LightSpeed

Revolutionize your imaging workflow with MACS® UltraMounts and the MACS Deep Clearing Kit

Unlock 3D imaging at LightSpeed with the UltraMicroscope Platform and Miltenyi Biotec's workflow solutions. MACS UltraMounts and Clearing Kits power seamless end-to-end 3D imaging – from sample preparation to automated acquisition – enabling scalable, reproducible imaging of organoids, xenografts, and whole tissues with speed, precision, and exceptional data quality.

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3D imaging accelerated at LightSpeed

The UltraMicroscope Platform, together with MACS UltraMounts and MACS Clearing Kits, enables fully integrated, high-throughput 3D imaging workflows from sample preparation to data acquisition. Combining full automation with a spacious imaging chamber, the platform is ideally suited for parallel imaging of multiple samples. With the addition of LightSpeed Mode, volumetric imaging is significantly accelerated, enabling rapid data acquisition for demanding 3D imaging applications.

High-throughput 3D imaging of organoids, xenografts, and whole organs

MACS UltraMounts extend the capabilities of the UltraMicroscope Platform by enabling truly scalable, high-throughput workflows. Depending on sample type, researchers can image up to 48 organoids, 24 or 12 xenografts, 8 whole mouse brains, or 12 chicken embryos in a single run – dramatically increasing efficiency and throughput.

Designed for seamless workflow integration, MACS UltraMounts allow samples to remain in the same holder throughout labeling, clearing, and imaging. This reduces handling steps, minimizes variability, and ensures highly reproducible results across experiments (fig. 1).

MACS UltraMount portfolio at a glance:

- **MACS UltraMount 48**: 48 wells (3 × 3 × 3 mm), for small to medium organoids.
- **MACS UltraMount 36**: 36 wells (7 × 7 × 5 mm), for high-throughput imaging of organoids, small tissues, and xenografts.
- **MACS UltraMount 24**: 24 wells (7 × 7 × 5 mm), for small tissues, xenografts, or large organoids.
- **MACS UltraMount 12**: 12 wells (7 × 7 × 5 mm), for larger or more complex tissue samples and xenografts.
- **MACS UltraMount 8**: 8 wells (8 × 10 × 16 mm), for 8 whole mouse brains.

All MACS UltraMounts feature open-sided designs enabling single-sided light sheet illumination. Intuitive handling and standardized mounting increase experimental throughput while ensuring consistent results. The optimized mounting concept enables rapid loading and precise, reproducible positioning, minimizing user variability and ensuring stability during extended acquisition. The MACS UltraMount 36 is specifically designed for use with the UltraMicroscope Choros™, supporting high-throughput imaging of embedded specimens and large-scale studies (fig. 5).

LEARN MORE

Discover stunning light sheet imaging results from start to finish.

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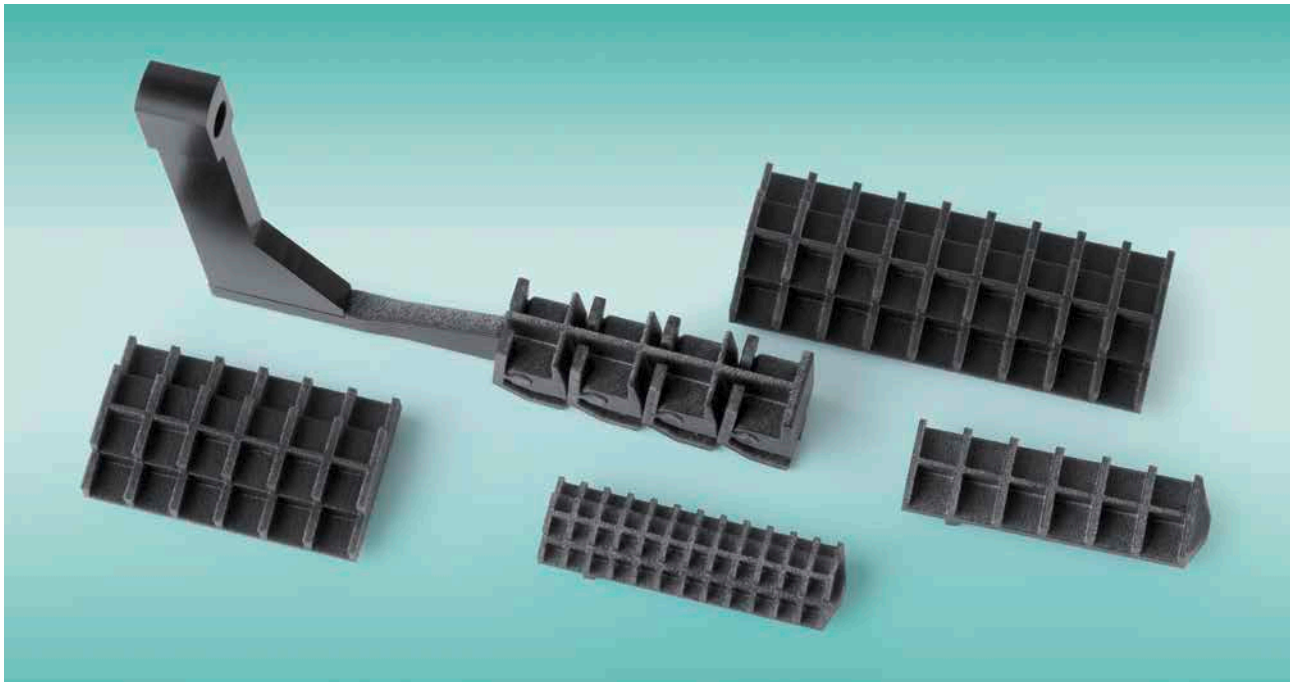


Figure 1: MACS UltraMount portfolio featuring five optimized sample holders designed for scalable, high-throughput 3D imaging applications.

High-throughput tissue clearing

As part of a complete workflow solution, MACS UltraMounts are manufactured from chemical-resistant polymers and feature open-well designs that facilitate efficient batch processing during tissue clearing and labeling.

The MACS Deep Clearing Kit supports deep tissue penetration in challenging specimens such as whole mouse brains (fig. 2). Just like the MACS Clearing Kit, it enables efficient antibody penetration, low background signal, and reduced autofluorescence. Validated across a wide range of tissue types, these solutions simplify and accelerate sample preparation while delivering robust and reproducible results.

To further support 3D imaging workflows, a portfolio of 3D immunofluorescence (3D-IF) antibodies is available, optimized for use with both MACS Clearing Kits. These primary antibodies are conjugated to Vio® Dyes – highly bright and photostable fluorochromes that enhance signal quality and consistency (fig. 3). This approach reduces labeling time while minimizing non-specific binding and background. With four Vio Dye fluorophores available, multicolor imaging can be performed with ease and flexibility (figs. 4 and 6).

Fully integrated software for automated imaging and analysis

Imspector 7.7 introduces the Experiment Manager, which integrates seamlessly with MACS UltraMounts to simplify batch acquisition. Predefined template masks enable fast and reliable setup of imaging parameters across multiple samples. Once configured, the UltraMicroscope Platform automates image acquisition, allowing researchers to focus on data interpretation rather than instrument operation. Samples can be visualized either as a single combined dataset or as individual well-based image files.

For downstream analysis, datasets can be easily transferred to MACS iQ View – 3D Large Volume software, enabling batch processing, image stitching, and 3D deconvolution with minimal user interaction.

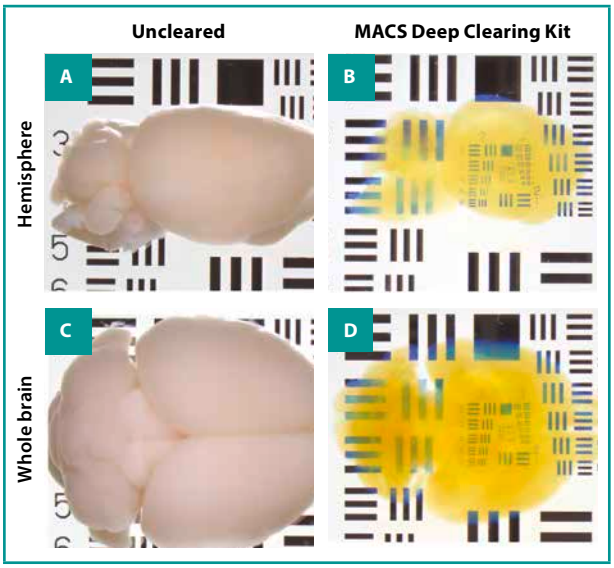


Figure 2: A, C) Side and top views of a fixed mouse brain prior to tissue clearing. B, D) Side and top views of tissue cleared using the MACS Deep Clearing Kit.

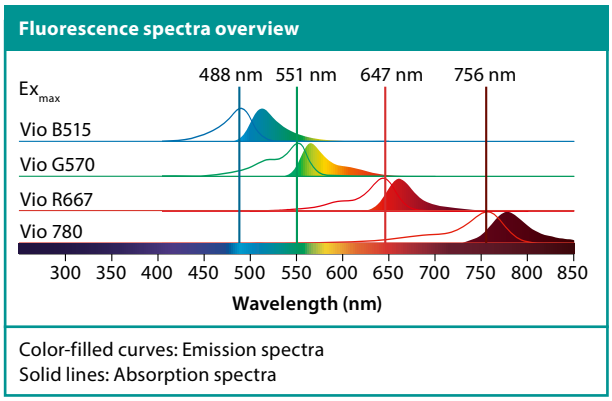


Figure 3: Excitation (empty curves) and emission (filled curves) spectra of Vio Dyes. The excitation maxima (Ex_{max}) align with those of commonly used Alexa Fluor® dyes.

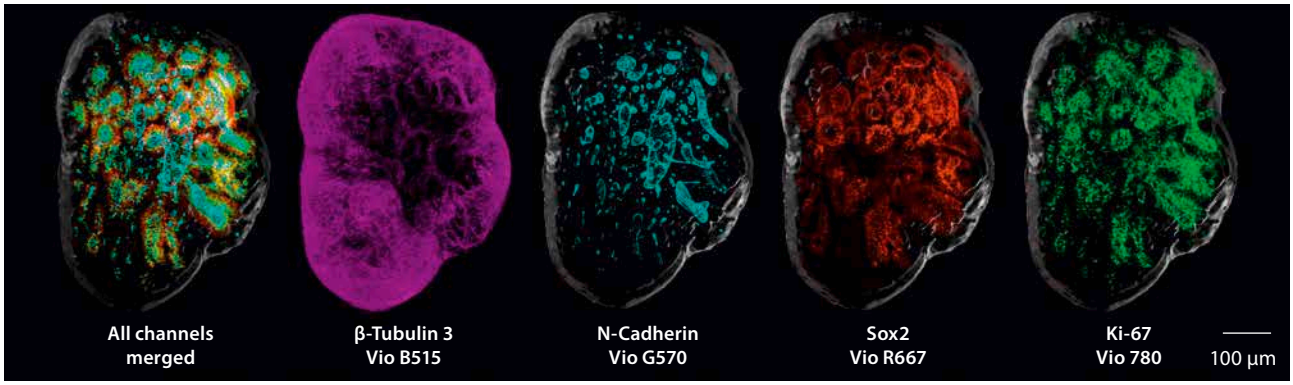


Figure 4: Human cerebral organoid cleared with the MACS Clearing Kit and labeled in four channels using 3D-IF antibodies.

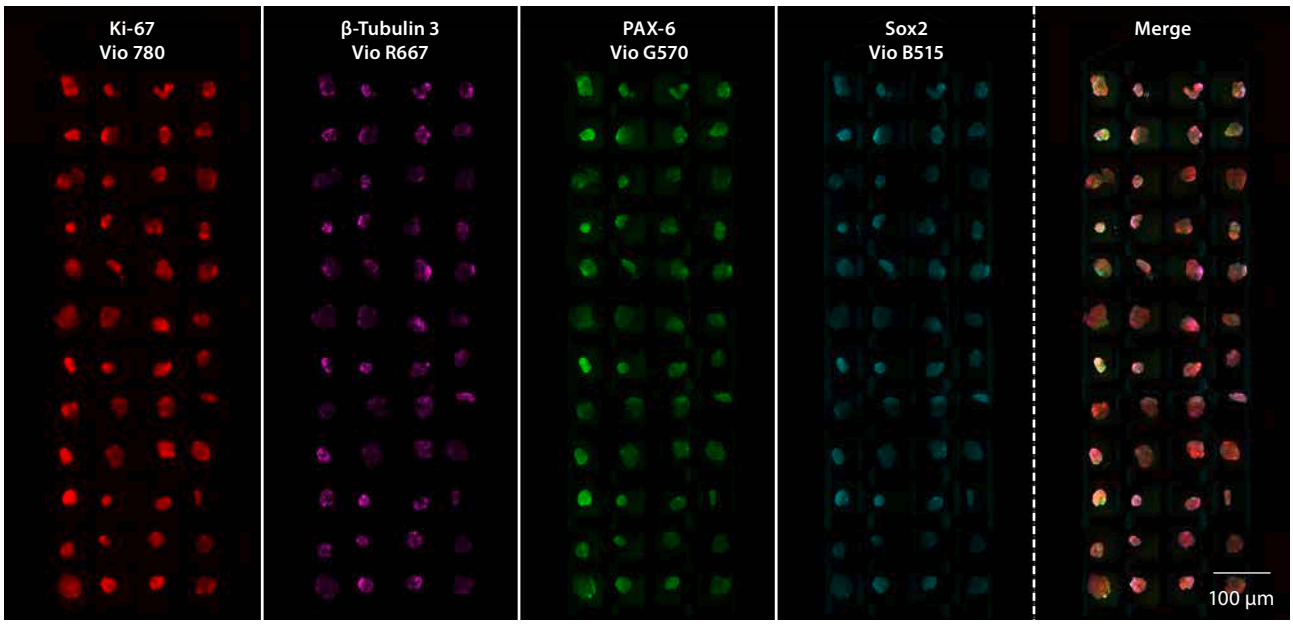


Figure 5: Brain organoids imaged in just over one hour using the MACS UltraMount 48 and LightSpeed Mode on the UltraMicroscope Blaze™. Imaging parameters: 1× objective, 10.1 cm^3 total volume, 5.9 × 5.9 × 5 µm voxel size; image stitching performed in MACS iQ View 3D – Large Volume within twelve minutes.

An end-to-end workflow for LightSpeed 3D imaging

MACS UltraMounts, together with the UltraMicroscope Platform, MACS Clearing Kits, antibody solutions, and integrated software, provide a complete and scalable workflow for high-throughput 3D-IF imaging.

From sample preparation to automated acquisition and advanced image analysis, this integrated solution reduces hands-on time, improves reproducibility, and accelerates research workflows – enabling scientists to generate high-quality 3D data at true LightSpeed (fig. 7).

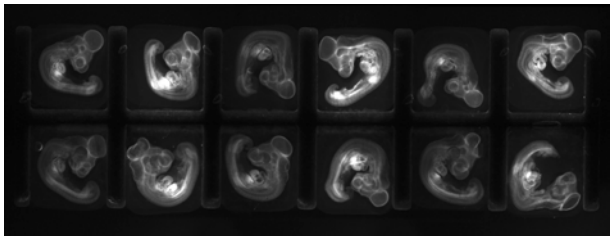


Figure 7: Scan of chicken embryos in the MACS UltraMount 12 acquired using the UltraMicroscope Blaze.

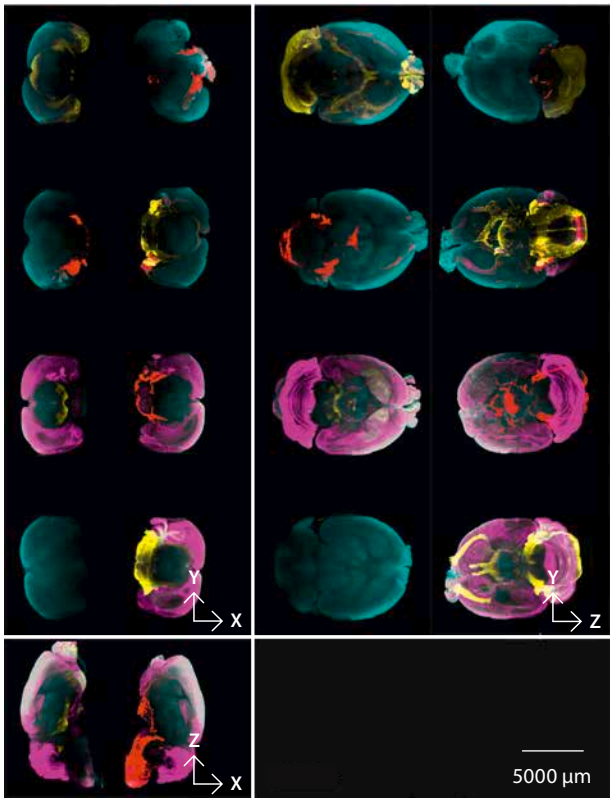


Figure 6: Mouse brains mounted in the MACS UltraMount 8 were prepared using the MACS Deep Clearing Kit and imaged to visualize calretinin, NeuN, CD31, neurofilament, tyrosine hydroxylase, MBP, and parvalbumin. Imaging parameters: staining with Vio Dyes G570, R667, and 780; acquisition performed on the UltraMicroscope Blaze.

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