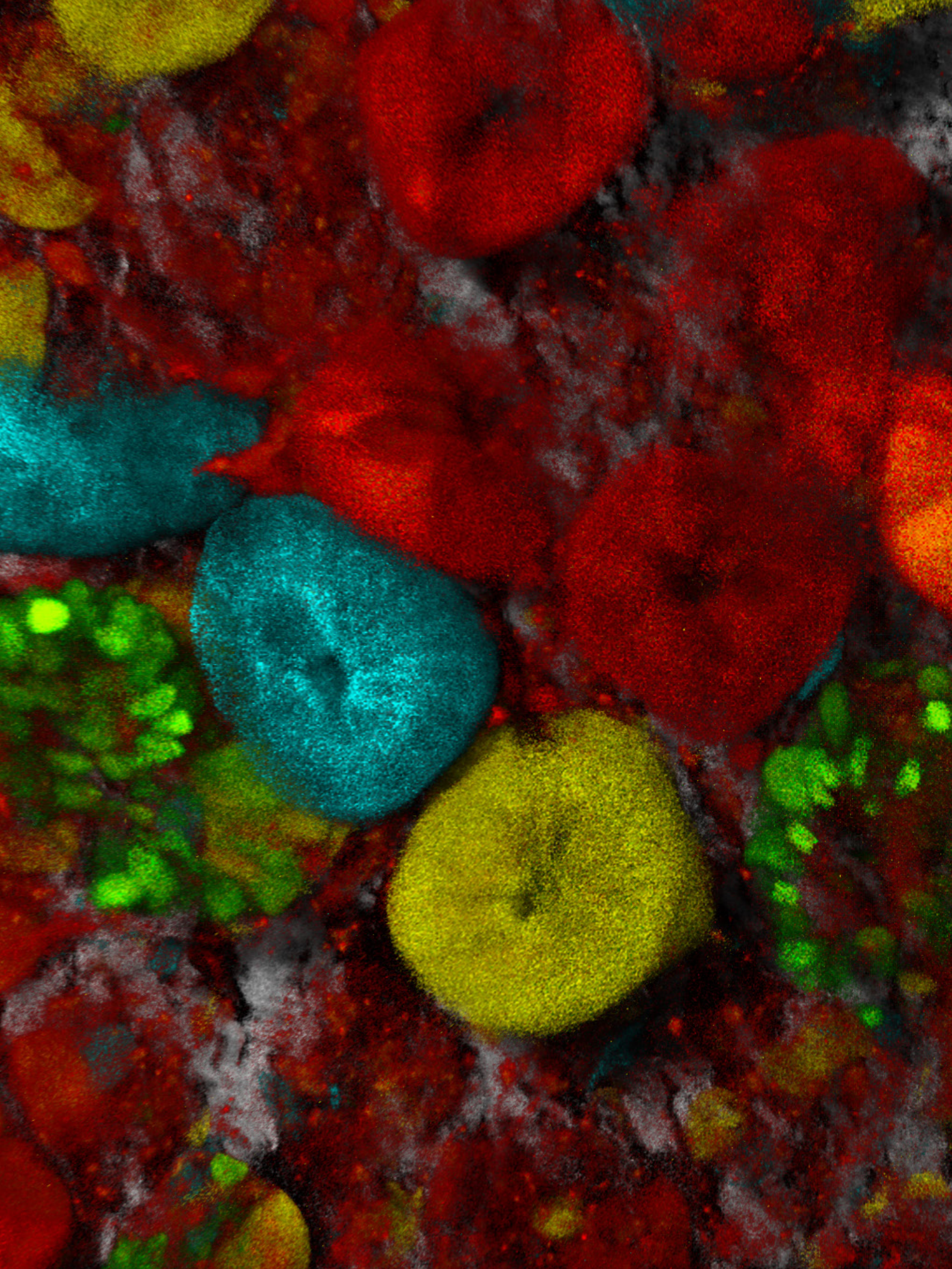
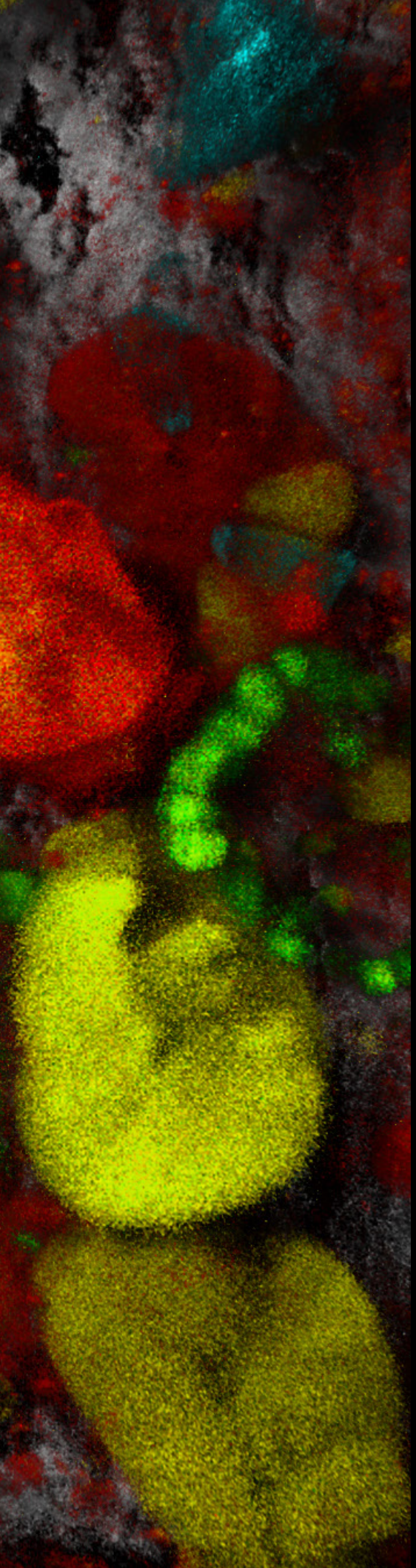
Leica
MICROSYSTEMS

STELLARIS DIVE

MULTICOLOR MULTIPHOTON MICROSCOPE

A RAINBOW OF POSSIBILITIES





A RAINBOW OF POSSIBILITIES

Understanding the complexity of life requires that it be studied with as many dimensions as possible in each experiment.

STELLARIS DIVE multiphoton system enables flexible spectral detection and the use of lifetime-based information combined with deep imaging beyond 1 mm. These capabilities open up the possibility to study the molecular interactions of as many targets as possible in their native context.

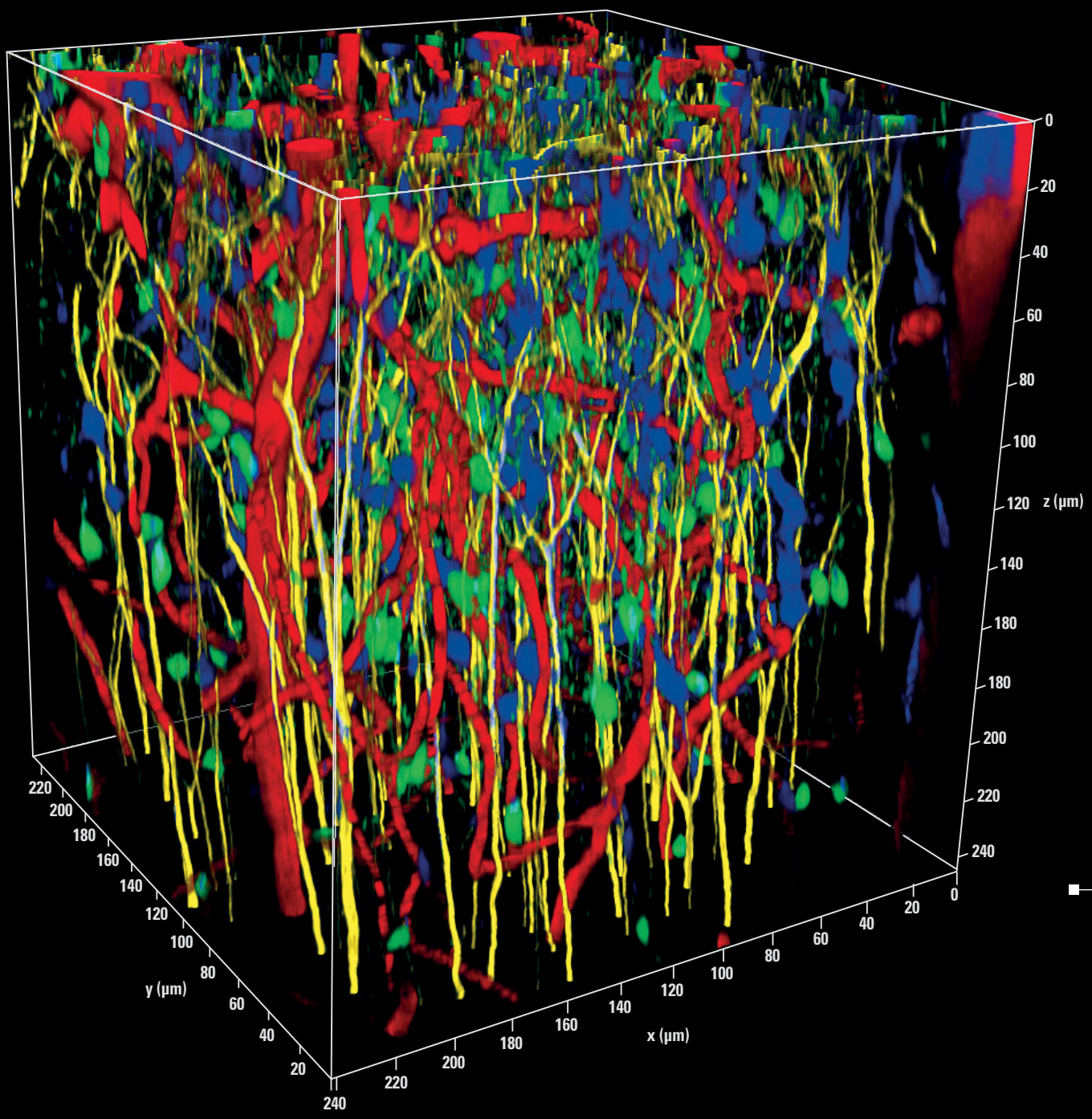
STELLARIS DIVE offers a rainbow of possibilities to expand your research.

Obtaining valuable insights into stem cell development and cancer cell progression. The image shows lineage-traced stem cells in the intestines of a confetti-mouse.

STELLARIS DIVE enabled the flexible spectral imaging of 4 simultaneous channels. The system also offers a sequential mode, so more than 4 signals can be captured sequentially . In this image, the label-free signal of second harmonics was used to find the right location inside the living mouse tissue, effectively making it a 5-channel acquisition.

Confetti Mouse, small intestines: gray SHG Collagen1; cyan, green, yellow, red lineage traced stem cells. Sample courtesy of Jacco van Rheenen. Netherlands Cancer Institute, NL

POWER
SEE MORE



Flexible multicolor imaging beyond 1 mm depth

Perform multiphoton experiments with a virtually unlimited number of fluorophore combinations to study complex processes - such as neuronal connectivity, organ structure, or dynamic interactions of cells and proteins – in more detail. This flexibility is possible thanks to the alliance between the 4Tune detector and up to 3 IR laser lines.

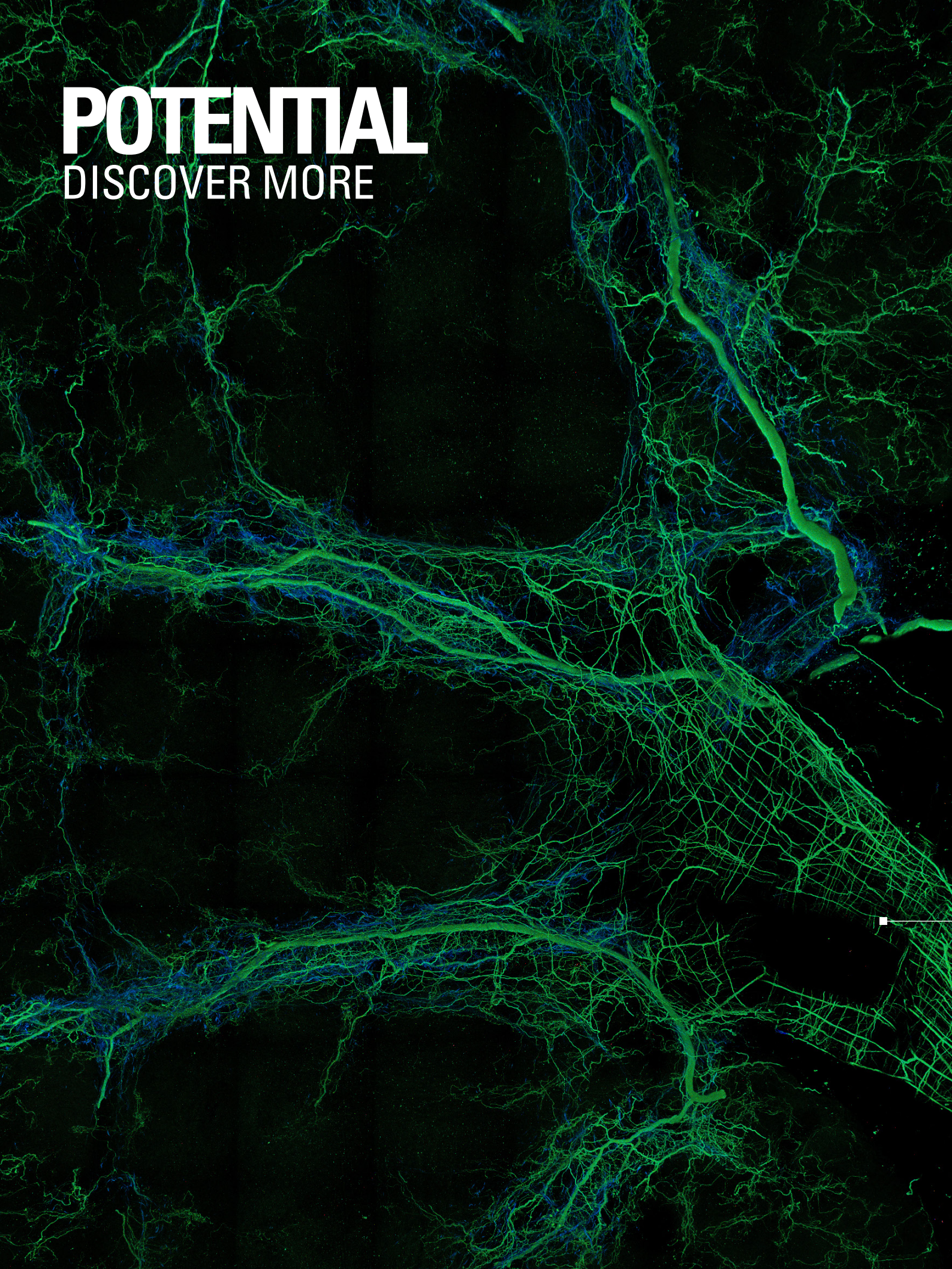
Moreover, the variable beam expander, VBE, facilitates imaging beyond 1 mm depth and allows tuning between resolution and depth so you can optimally adjust them to your experimental needs.

ANALYZE YOUR SAMPLE IN MORE DETAIL THAN EVER BEFORE USING UNLIMITED FLUOROHORE COMBINATIONS

The study of multiple events at the whole organ or tissue level enables a better understanding of disease mechanisms.

The image shows a 4-color stack of a live mouse brain. Using a combination of genetic constructs (GFP and YFP) plus two transient markers (sulforhodamine and fluorescent dextran), three different types of nerve cells plus the blood system were visualized. The goal is to gain insight into the interaction of the nerve cells and blood system in both healthy and degenerated tissue. Separating signals from spectrally overlapping markers, like the commonly used GFP and YFP, is facilitated by flexible spectral detection for deep tissue imaging, only available with 4Tune.

Live Mouse Brain: blue astrocytes, sulforhodamine; green microglia, GFP; yellow neurons, YFP; red blood vessels, Alexa680-Dextran. Sample courtesy of LMF, DZNE, Germany


POTENTIAL
DISCOVER MORE

The integration of TauSense in STELLARIS DIVE enables you to image tissue structures or study metabolic changes, such as changes in the NAD/NADH ratio, without the need of additional staining. This saves you the time and effort of labeling steps and allows the monitoring of components that cannot be labeled without perturbing their function, such as NADH.

To visualize the narrowband signal of second or third harmonics (SHG/THG), which occur at half or a third of the excitation wavelength, you can set the detection windows anywhere in the visible spectrum, and as narrow as 10 nm, thanks to the flexible spectral capabilities of 4Tune.

When SHG/THG signals occur in the same spectral range as fluorescence signals, TauSense can use lifetime-based information to separate the signal from each other. TauSense can also be used just to gain insight into the metabolic state of a specimen.

STELLARIS DIVE combines label-free visualization of structures with lifetime-based information, so you can get the most out of your experiments.

EXPAND YOUR EXPERIMENTS WITH LABEL-FREE IMAGING

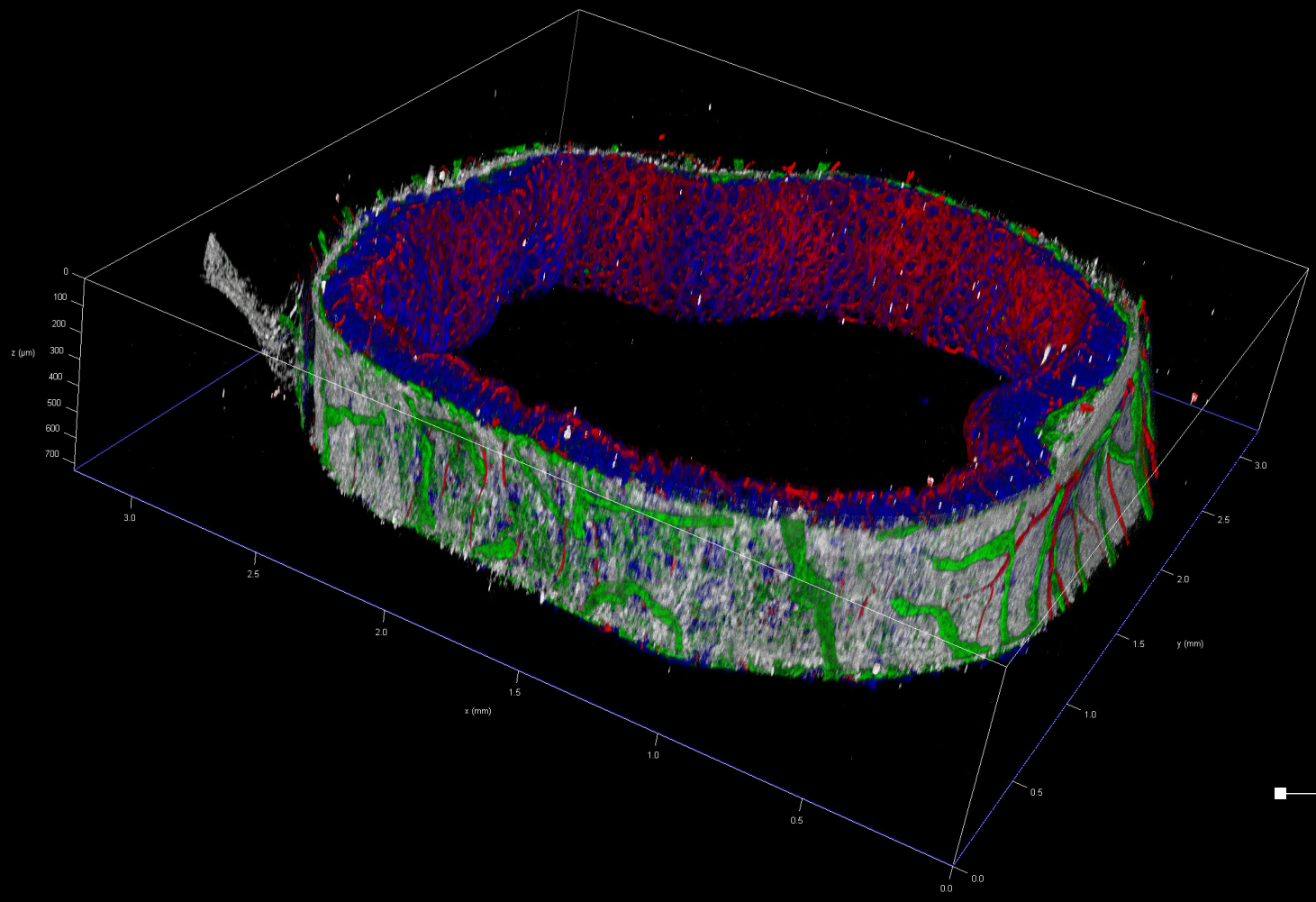
Analyzing the role of collagen in cancer

Polymers, such as collagen and elastin, have relevant roles in diseases like cancer. Changes in their morphology can be a good indicator of the overall tissue health. These structures can be visualized easily without any label using non-linear effects like SHG and THG. The image shows how two spectrally overlapping signals coming from nerve cells labelled with Alexa 633 and the SGH signal of collagen can be separated using TauSense. The SHG signal visualizes the collagen that surrounds and supports the nervous system.

The combination of TauSense and 4Tune enables the acquisition of this information with a single click.

Cleared kidney slice (SunJin Labs, Taiwan) with multiple stainings. Shown here: Nerve cells labeled with Alexa 633 lead to longer lifetimes in green, SHG signal of the collagen leads to shorter lifetimes in blue.

PRODUCTIVITY
DO MORE



New technologies to understand complex biological questions

Multiphoton imaging allows the study of biological questions in the most natural environment. STELLARIS DIVE transforms the way you perform multiphoton imaging, even for challenging intravital experiments, thanks to the integration of unique technologies within the ImageCompass interface.

GAIN PRODUCTIVITY IN YOUR EXPERIMENTS FROM SETUP TO FINAL RESULTS

ImageCompass

DIVE is fully integrated in the STELLARIS user interface, ImageCompass, so you can easily access the spectral capabilities of 4Tune. ImageCompass guides your experimental setup with its drag & drop functionality saving you time setting up the microscope and letting you focus on the investigation of your specimen.

LAS X Navigator

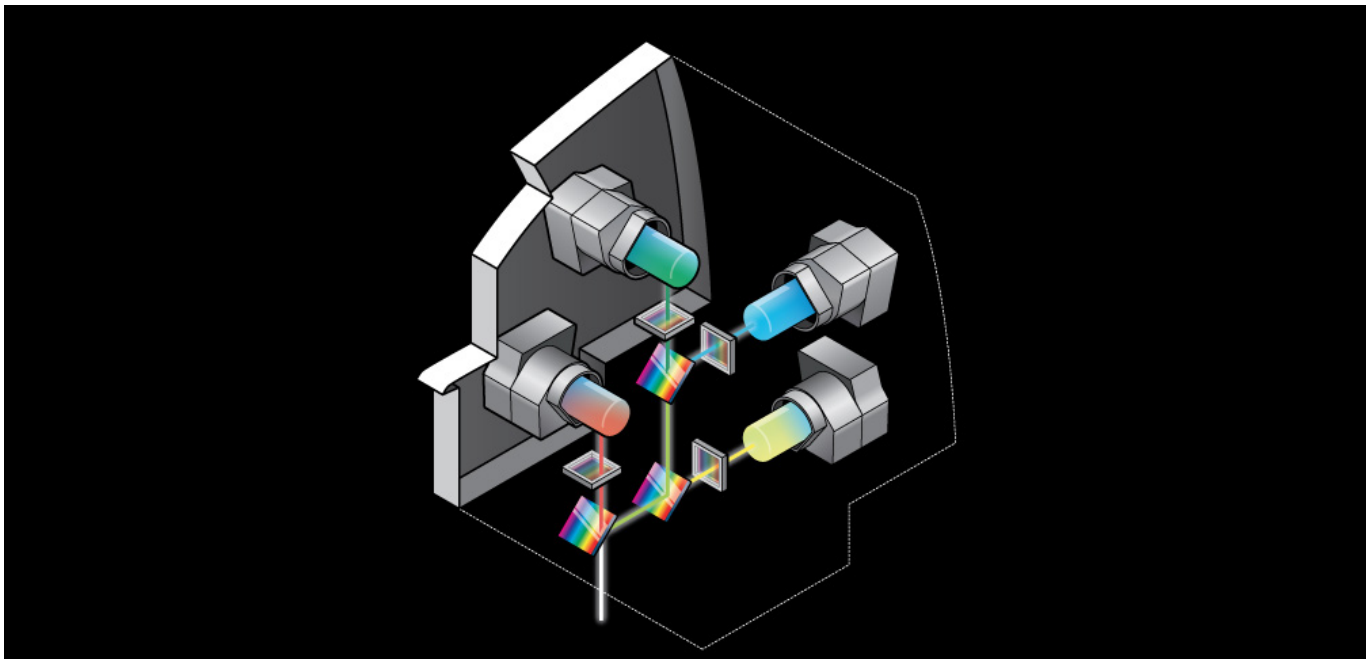
For the investigation of whole organisms, the LAS X Navigator provides you with the ability to freely navigate through your sample, always keeping a full overview even when you are zooming in on the details. The navigator tool provides orientation within the specimen, allows fast overviews, and enables detailed multi-position experiments.

Dynamic Signal Enhancement (DSE)

Fast processes, such as blood flow, can be visualized without compromise in contrast and temporal resolution with the enhanced sensitivity of 4Tune and DSE. In resonant scanning mode, STELLARIS DIVE accomplishes the fastest acquisitions. DSE acts like a rolling average, using weighted information from neighboring frames to improve the signal-to-noise ratio, while preserving the temporal resolution.

Slice of mouse intenstines, ~3.5 mm in diameter (cleared, SunJin Labs). Imaged with 920 nm to visualize AF488 (red, blood vessels) and SHG (gray, collagen), 1040 nm for SytoxOrange (green, nerve cells) and 1100 nm for AF633 (blue, nuclei).

4TUNE TECHNOLOGY IN FOCUS



4Tune spectral non-descanned detector: Up to 4 detection channels can be configured using a set of variable dichcroics and bandpass filters.

At the heart of STELLARIS DIVE is 4Tune, the first and only spectral non-descanned detection system. Through a combination of state-of-the-art non-descanned detection – the most sensitive way to collect scattered signals from deep layers – with a set of variable dichroics and bandpasses, deep in vivo multicolor imaging becomes possible.

4Tune can be equipped with two to four channels, covering the whole visible spectrum from 380 to 800 nm. Spectral windows can be defined with a precision of 1 nm and a minimal window size of 10 nm – ideal for imaging second harmonics signals.

Tuning the spectral windows in a frame or stack sequential manner makes it possible to use billions of color combinations in your experiment.

4Tune can be equipped with Power HyD NDD to facilitate photon counting applications, i.e., TauSense, or with PMT to achieve the highest dynamic range and any combination of those.

EXPAND YOUR RESEARCH

STELLARIS DIVE is equipped with the following product features:

Standard	Optional
TauSense	FALCON
ImageCompass	Resonant scanner
LIGHTNING	4Tune
Dynamic Signal Enhancement (DSE)	Power HyD NDD
LAS X Navigator	

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LASER RADIATION

VISIBLE AND INVISIBLE- CLASS 3B
AVOID DIRECT EXPOSURE TO BEAM

P < 500 mW 350- 700nm
IEC 60825-1: 2014

LASER RADIATION

VISIBLE AND INVISIBLE- CLASS 4
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION

Paverage < 4 W 350- 1600nm >40fs
IEC 60825-1: 2014

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