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S e l e c t  t h e  P e r f e c t  S y s t e m  f o r  Y o u r  A p p l i c a t i o n s

Today’s advanced functionality, including the revolutionary Linear Unmixing Feature of the LSM 510 META, Multitracking, RealROI Scan with user definable scan areas and comfortably implemented 3D Deconvolution software, provides ideal conditions for the analysis of cells in their tissue context with maximum spatial and spectral resolution.

The Zeiss LSM 510 is a fully integrated system of scanning module, microscope and software. The microscope can be selected according to individual needs in various configurations. Further components like external detectors, objectives, fine focusing units and illumination chambers customize the LSM 510 for getting both excellent images and the quantitative data needed.

High Resolution Imaging: Explore Cellular Details with Advanced Cellular Details with Advanced LS M 510 Features

The imaging of neurons and other cells located deeply within the surrounding tissue is a difficult task because of problems of spatial and spectral resolution or interfering auto-fluorescent cence. New features of the LSM solve such problems in an ideal way: The Linear Unmixing function of the LSM 510 META, allows the imaging of selectively labeled cells and the surrounding tissue, regardless of auto-absorbs cence or substantial dye cross talk. The 3D Deconvolution option of the LSM 510 allows neuronal cells located deep inside tissue speci mens to be imaged with outstanding spatial resolution. Other functions such as Multitracking and RealROI Scan support the imaging of cells in a complex tissue environment by selective excitation and flexible choice of scanning areas. With this unique package of features, it is easy to gain valuable information on synaptic connectivity, or the physiological state of the specimen.

Enhanced Spatial and Spectral Resolution: Linear Unmixing, 3D Deconvolution, Multitracking and RealROI Scan

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LITERATURE
[1] H. Bauch. 3D Deconvolution in Microscopic Applications. Imaging & Microscopy. 3/1, 1999

Microscopy from Carl Zeiss

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Using Tracers & Dyes with Overlapping Spectra

Anterograde and retrograde tracers (e.g., Fluoro-gold, Beads, SYTOX) use a significant part of the emission spectrum and limit the choice of other fluorochromes. By Multitracking (selective excitation) with the Zeiss LSM 510, emission cross-talk is largely reduced, so anatomical population or cell state markers like Sytox and immunofluorescence markers can easily be combined.

Where emission spectra overlap, Linear Unmixing with the Zeiss LSM 510 META allows clear separation of multiple fluorochromes without any emission cross-talk. As a result, even dyes with nearly identical emission spectra can now be separated, e.g., SYTOX green and FITC.

Separate Autofluorescence Reliably from Fluorochromes

Usually autofluorescence structures of the specimen have to be removed to avoid signal crosstalk. By selective excitation Multitracking (LSM 510) and Linear Unmixing (LSM 510 META), these structures can remain in the sample and can even be used as natural landmarks. Linear Unmixing also provides a tool permitting to use the full range of laser wavelengths and modern structural and physiological dyes together with intrinsic fluorescence signals.

Thick specimens with strong fluorescence are not easy to image in 3D even with confocal microscopes. Under such conditions, clear 3D images can only be acquired with the Zeiss LSM 510 META. By using the capabilities for user defined scan areas, photobleaching and user defined area selection, rotation, zoom – there is no limit. As a side effect, the scanning speed of the ROI becomes faster at the same time.

Obtain Impressive 3D Views in Complex Specimens

Multitracking and Linear Unmixing significantly improve results. With Selective Excitation Multitracking, Multitrack or Laser Unmixing, full range of excitation and emission wavelengths and new dyes can be used.

Linear Unmixing in the LSM 510 META. An image stack of the emission is acquired on track 1. The linear unmixing of the emission stack is performed on track 2 creating a well separated two-channel image of both dyes.

Linear Unmixing in the LSM 510 META. A lambda stack of the emission is acquired on track 1. The linear unmixing of the emission stack is performed on track 2 creating a well separated two-channel image of both dyes.

RealROI Scan feature of the Zeiss LSM 510, by using the capabilities for user defined scan areas, fluorescence and user defined area selection, rotation, zoom – there is no limit. As a side effect, the scanning speed of the ROI becomes faster at the same time.

When emission spectra overlap, Linear Unmixing with the Zeiss LSM 510 META allows clear separation of multiple fluorochromes without any emission cross-talk. This means the destruction of valuable anatomical information. With selective excitation Multitracking (LSM 510) and Linear Unmixing (LSM 510 META), these structures can remain in the sample and can even be used as natural landmarks. Linear Unmixing also provides a tool permitting to use the full range of laser wavelengths and modern structural and physiological dyes together with intrinsic fluorescence signals.

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Using Tracers & Dyes with Overlapping Spectra

Anterograde and retrograde tracers (e.g., Fluoro-gold, Beads, WTAG) use a significant part of the emission spectrum and limit the choice of other fluorochromes. By Multitracking (selective excitation) with the Zeiss LSM 510, emission crosstalk is largely reduced, allowing anatomical population or cell state markers like Sytox and immunofluorescence markers to be easily combined.

Separate Autofluorescence Reliably from Fluorochromes

When emission spectra overlap, Linear Unmixing with the Zeiss LSM 510 META allows clear separation of multiple fluorochromes, regardless of dye pairs with nearly identical emission spectra. With selective excitation, Multitracking (LSM 510) and Linear Unmixing (LSM 510 META) provide the means to remove any emission crosstalk and generate well-separated images.

Obtain Impressive 3D Views in Complex Specimens

Thick specimens with strong fluorescence are not easy to image in 3D even with confocal microscopes. Under such conditions, clear 3D images can only be created with the Zeiss LSM 510. Separately excited Multitracking (LSM 510) and Linear Unmixing (LSM 510 META) allow the separation of different channels. Even dyes with nearly identical emission spectra can now be separated, e.g., Sytox green and FITC.
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Separate Autofluorescence Reliably from Fluorochromes

When emission spectra overlap, Linear Unmixing with the Zeiss LSM 510 META allows clear separation of multiple fluorochromes without any emission crosstalk. This method, which aligns dyes with nearly identical emission spectra can now be separated, e.g. SYTOX green and YOYO.

Usually autofluorescence rich structures of the specimen have to be removed to avoid signal crosstalk like photoreceptors, brain tissue, certain fixatives. This means the destruction of valuable information. With selective excitation Multitrack-
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Thick specimens with strong fluorescence are not easy to image in 3D even with confocal micro-
sopes. Under such conditions, clear 3D images can easily be created with the Zeiss LSM 510 META


RealROI Scan, user defined imaging areas in the specimen. Rotation and user defined areas at a mouse click. 3D Deconvolution; image restoration based on automated computing of the point spread function using the acquisition parameters.
Select the Perfect System for Your Applications

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Microscopy from Carl Zeiss

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Upright LSM 510 microscope options:
Available with conventional or fixed stage focusing, fully motorized, including a variety of contrast techniques suited for neuroscience, physiology and cell biology.

Inverted LSM 510 microscope options:
Fully motorized, offering side or base ports suited for cellular and developmental biology. Scan heads can be switched from upright to inverted microscopes without realignment.

Copyright LSM 510 microscope options:
Authorized for conversion or field development by Zeiss to suit the needs of the user. These systems are specifically required for neuroscience, physiology and cell biology.

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