

# Multimodal Chemical Imaging with STELLARIS 8 CRS

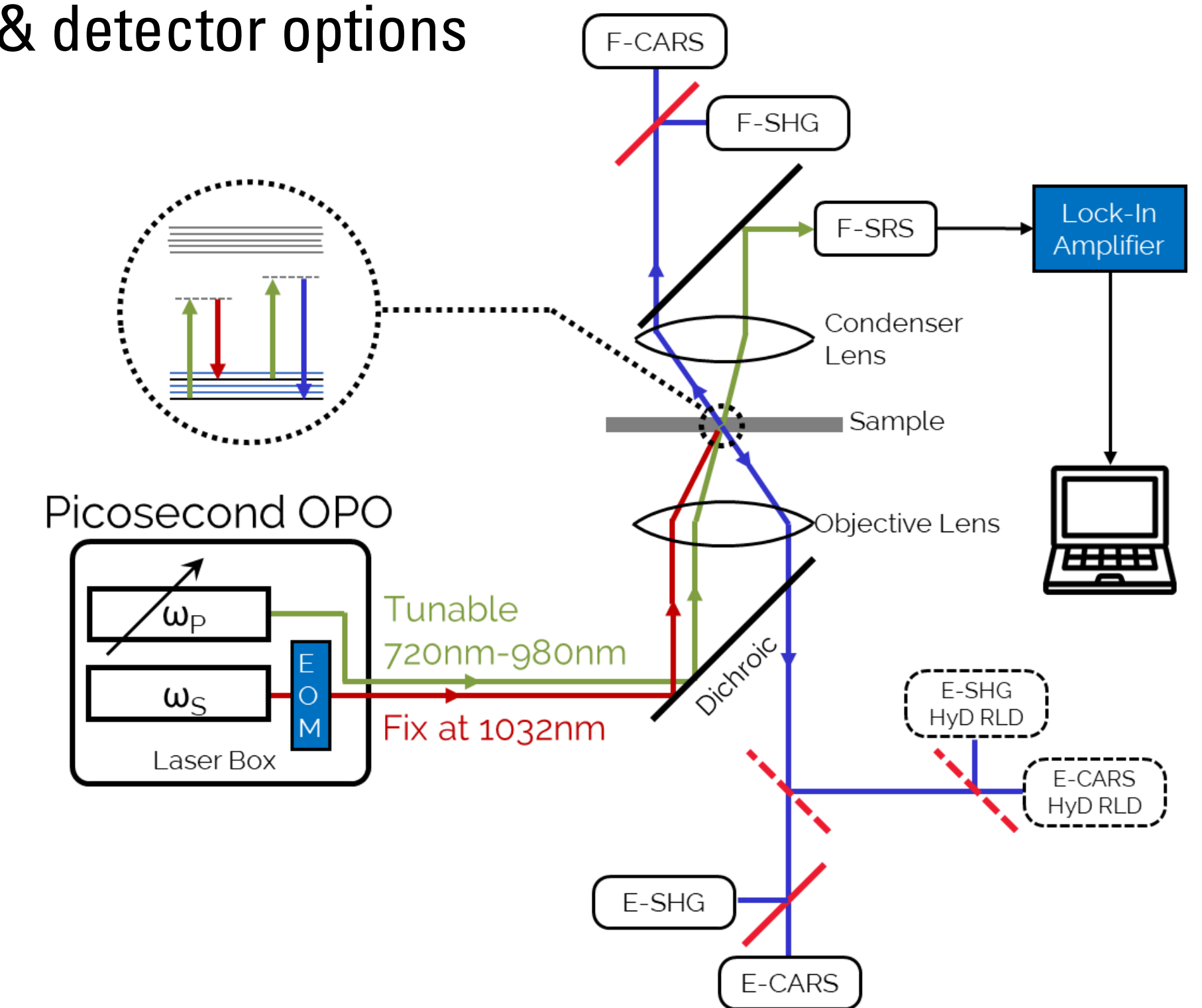
Dr. Volker Schweikhard, Leica Microsystems CMS GmbH, Am Friedensplatz 3, 68165 Mannheim, Germany. E-mail: volker.schweikhard@leica-microsystems.com

## STELLARIS 8 CRS: Leica's hands-free standalone CRS solution



- Fully integrated visible confocal microscope
- CARS and SRS
- Second-Harmonic-Generation (SHG)
- 2-photon fluorescence
- Lifetime imaging

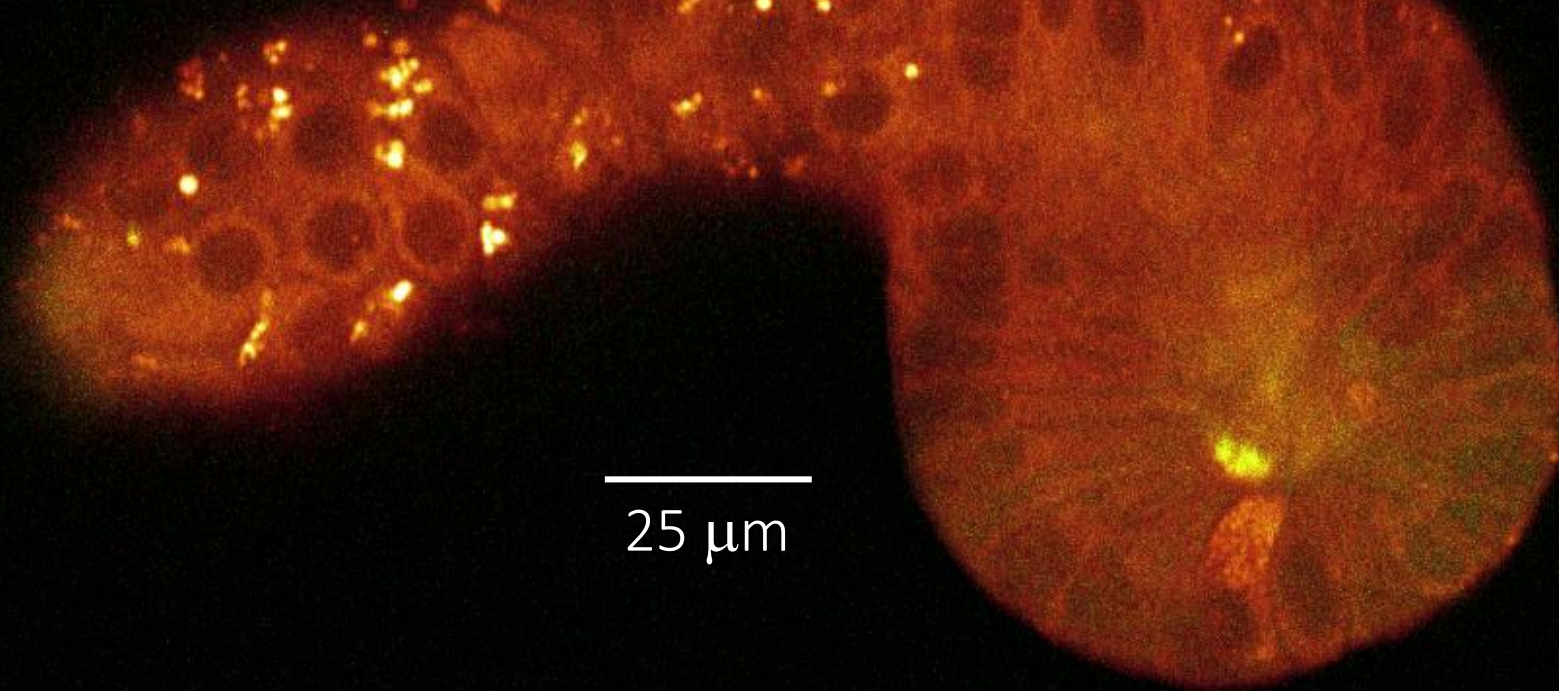
## CRS beam routing layout & detector options



## CRS: Serving a growing range of application areas:

### Label-Free Live Imaging ...

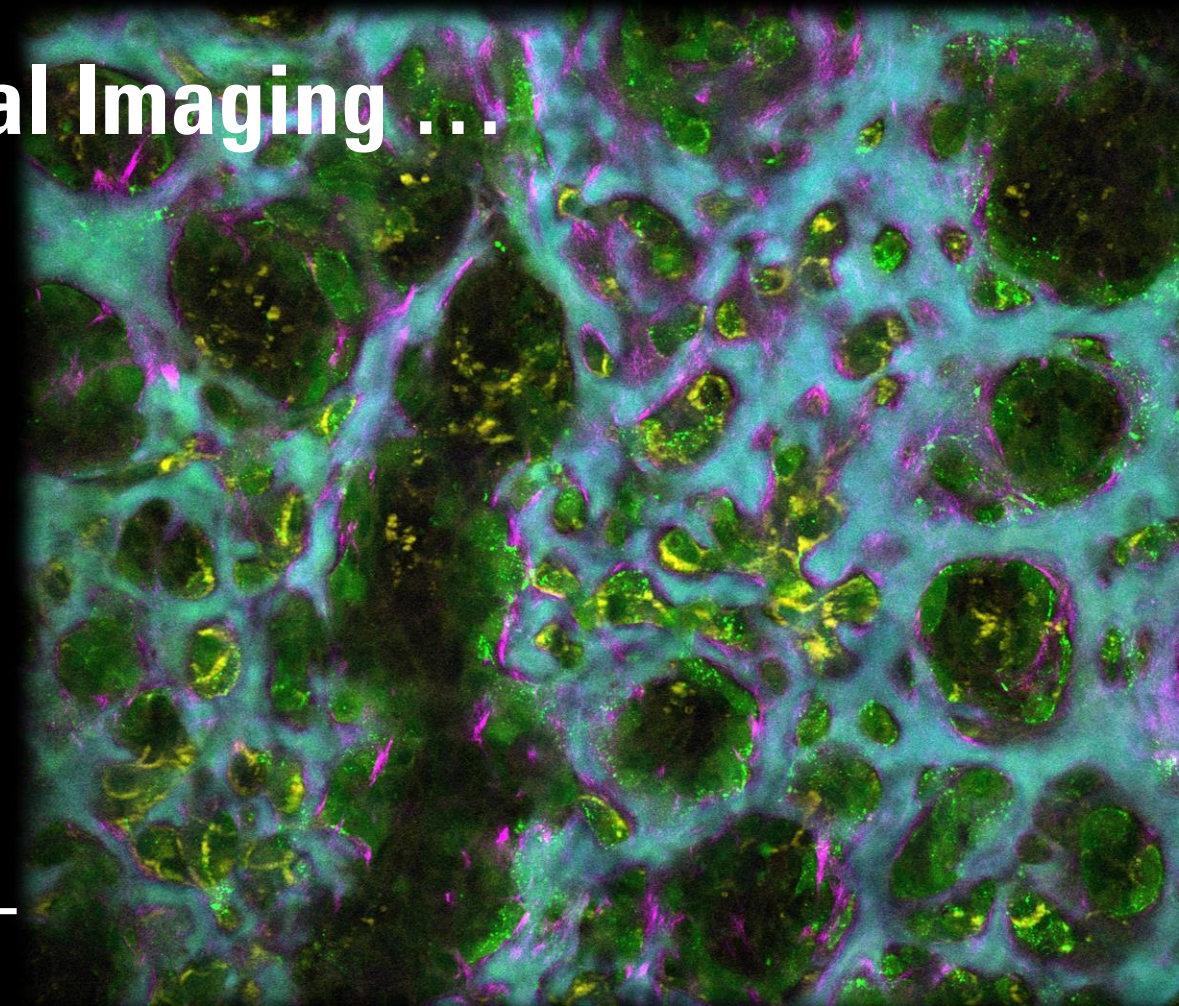
Lipids & Proteins  
(SRS, 2930  $\text{cm}^{-1}$ )



Untreated small-intestinal organoid

### Multi-Modal Imaging ...

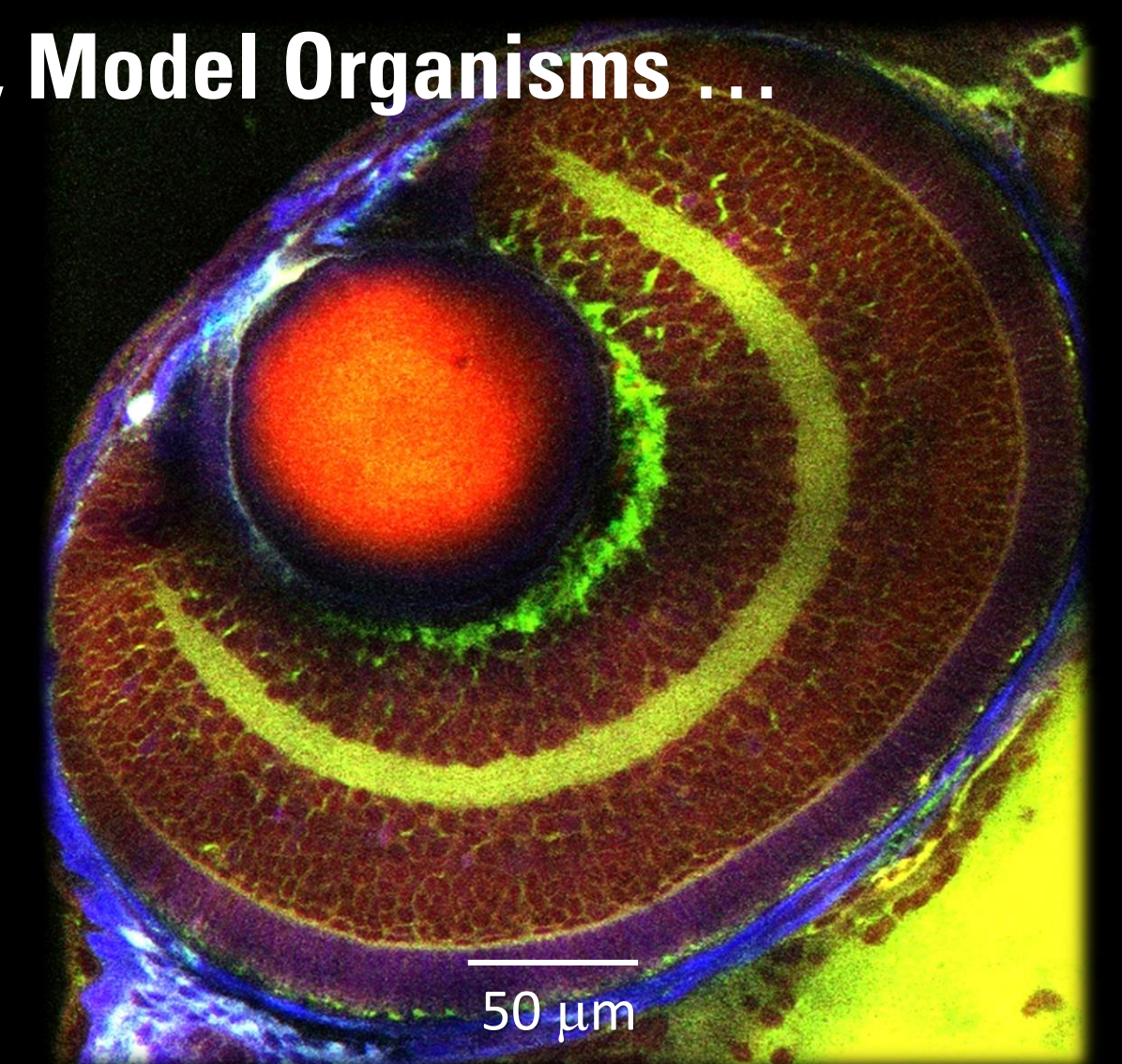
Bone Mineral  
(SRS, 950  $\text{cm}^{-1}$ )  
Lipids  
(SRS, 2850  $\text{cm}^{-1}$ )  
Collagen (SHG)  
Osteoblasts  
(mCherry confocal)



Mouse skullcap explant

### Cells, Tissues, Model Organisms ...

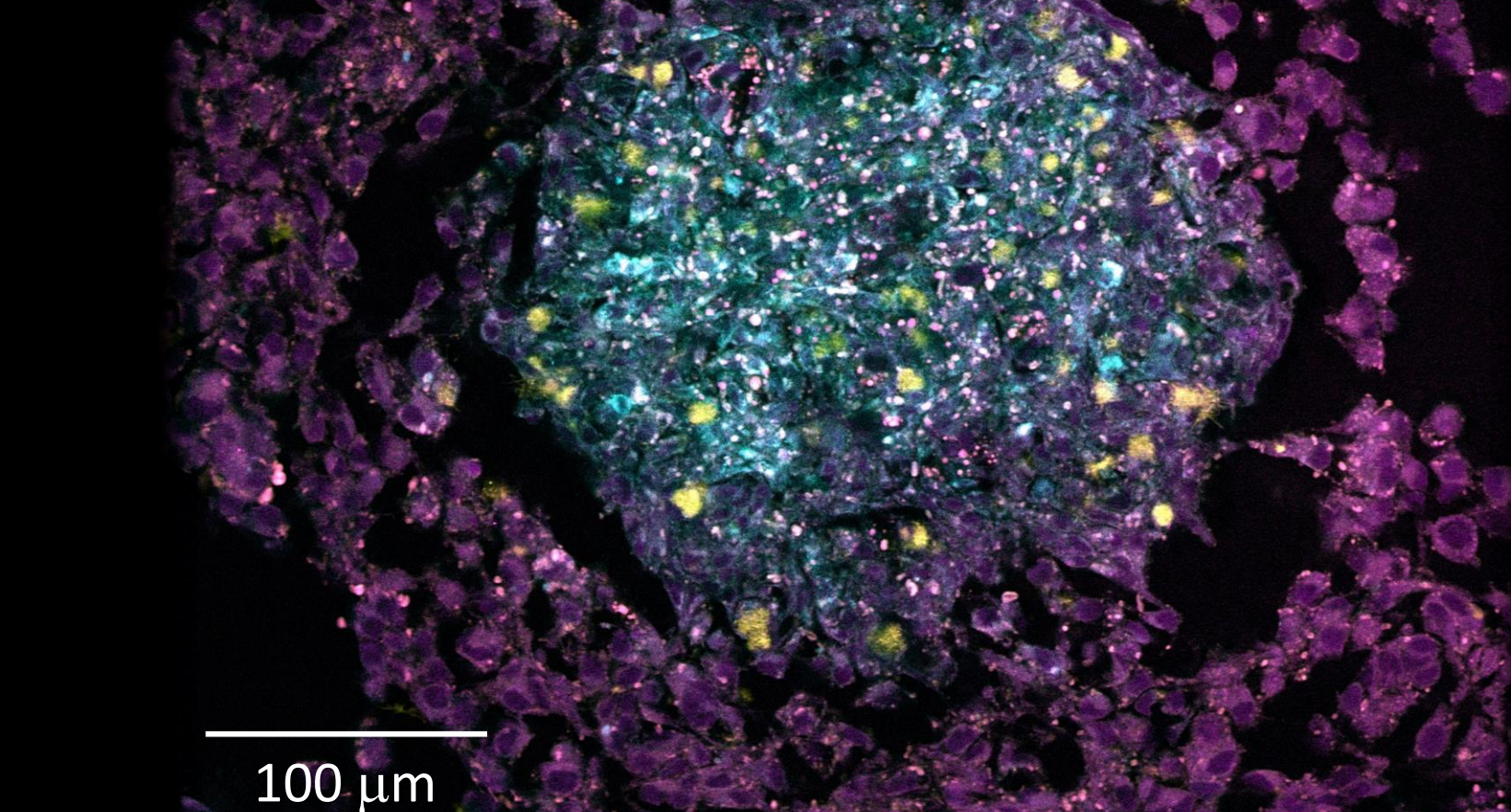
SHG/2-Photon  
Autofluorescence  
Lipids  
(SRS, 2850  $\text{cm}^{-1}$ )  
Proteins  
(SRS, 2930  $\text{cm}^{-1}$ )



Eye of an intact, unlabeled Zebrafish

### Supporting Cancer Research ...

Unsaturated lipid (SRS, 3020  $\text{cm}^{-1}$ )  
Total lipid (SRS, 2850  $\text{cm}^{-1}$ )  
Collagen extracellular matrix (SRG)

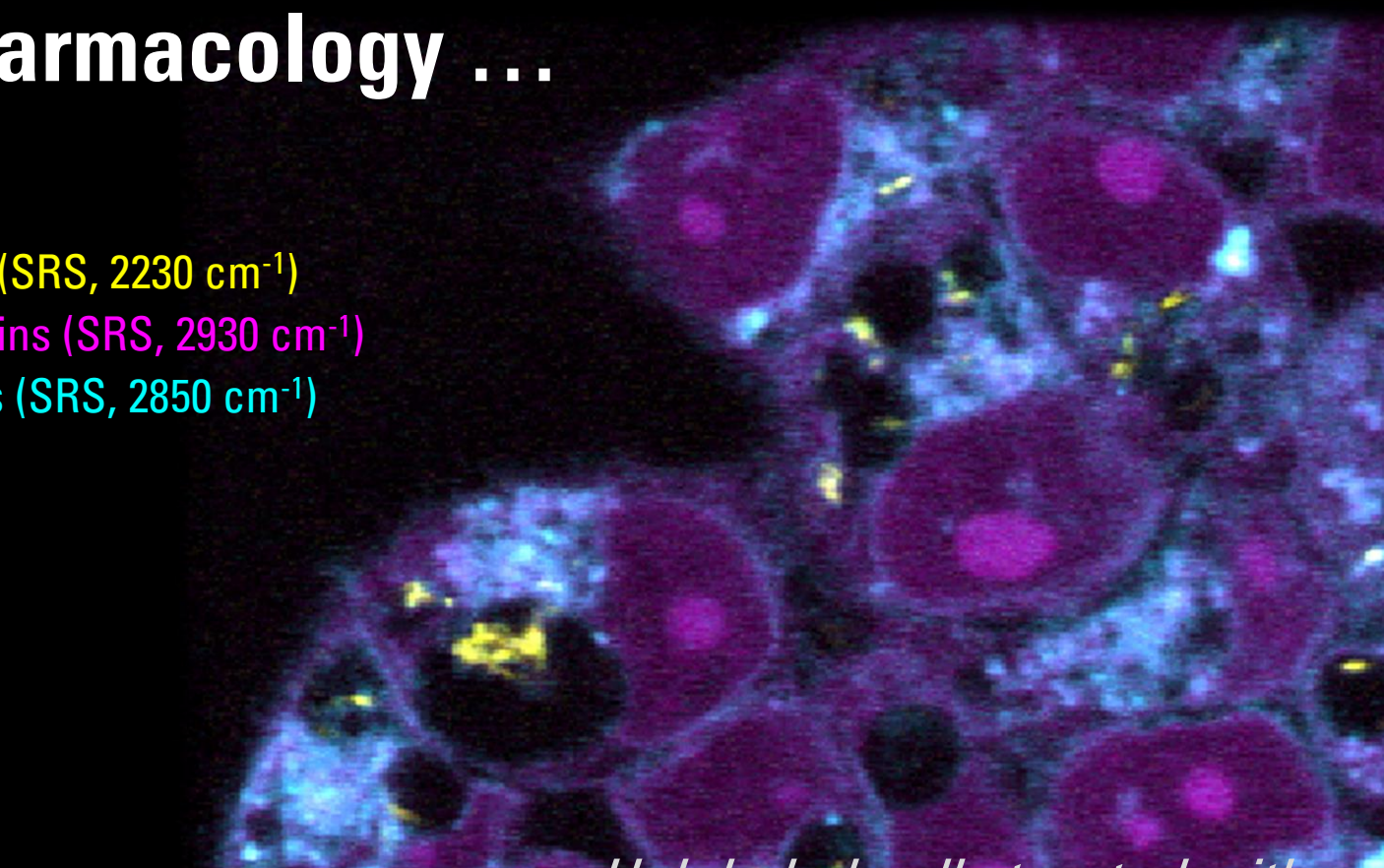


100  $\mu\text{m}$

Unlabeled tri-cellular skin cancer spheroid

### ... Pharmacology ...

Drug (SRS, 2230  $\text{cm}^{-1}$ )  
Proteins (SRS, 2930  $\text{cm}^{-1}$ )  
Lipids (SRS, 2850  $\text{cm}^{-1}$ )

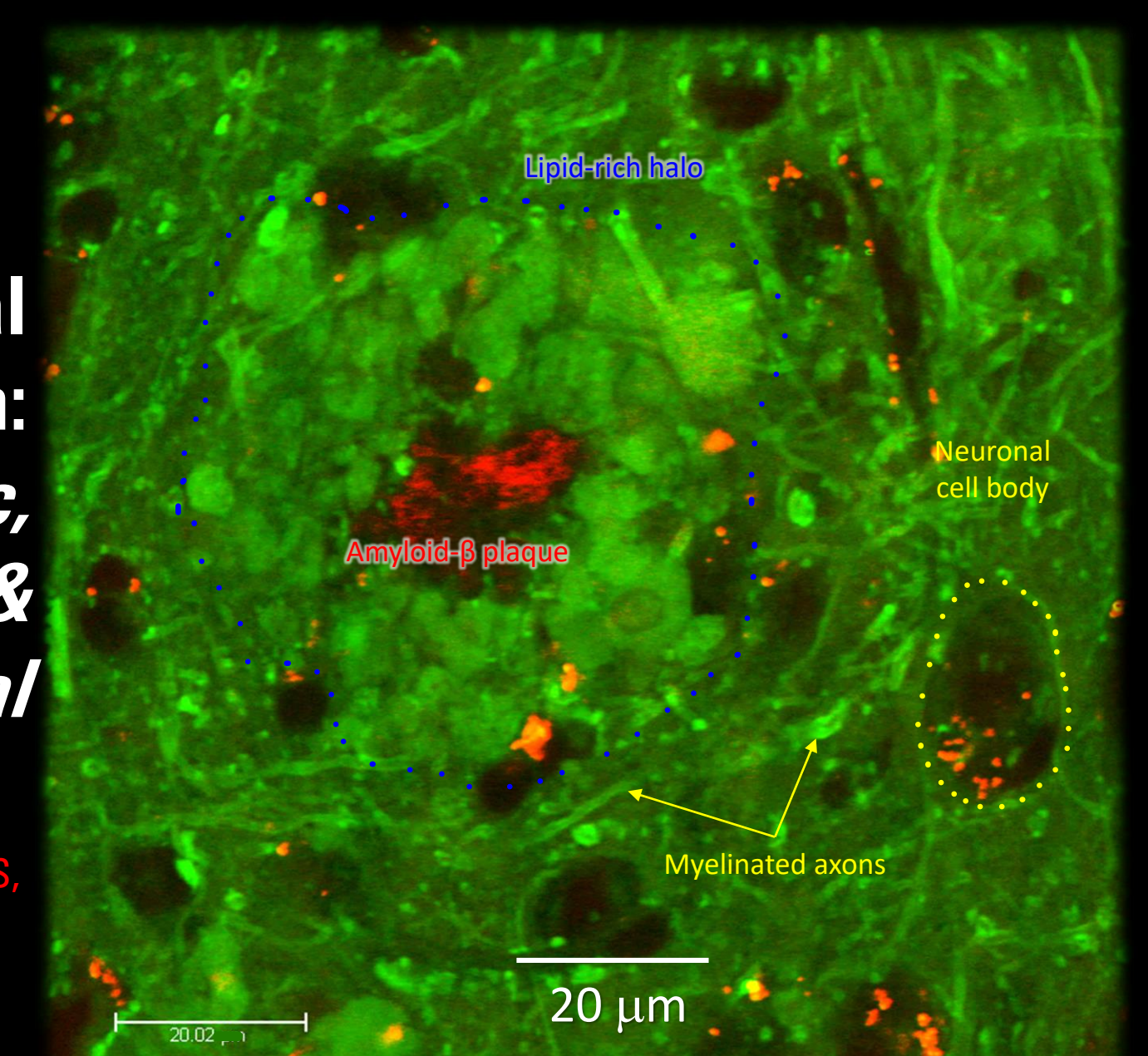


20  $\mu\text{m}$

Unlabeled cells treated with a Raman-tagged pharma compound

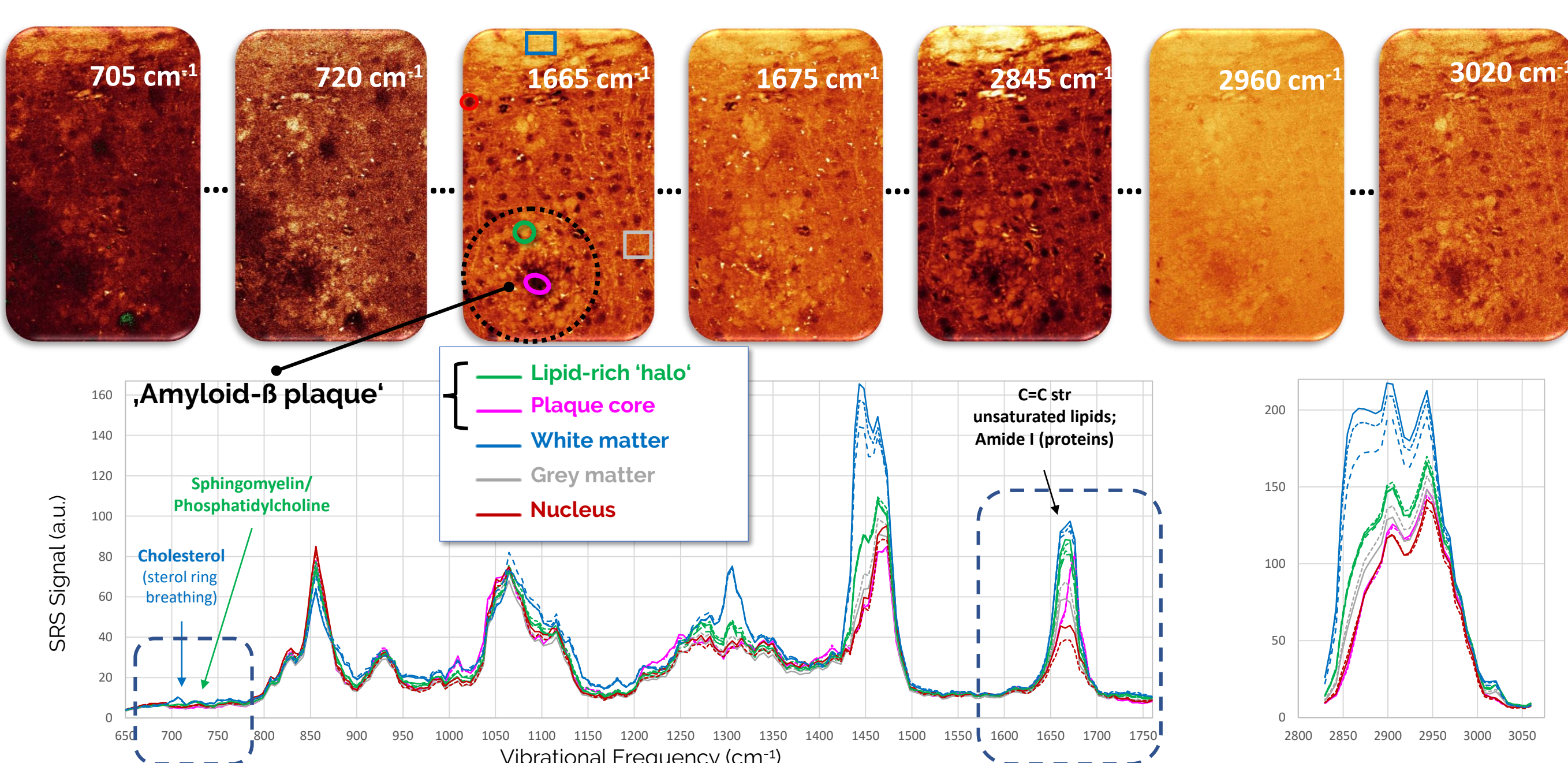
### ... and Medical Research: Basic, Preclinical & Translational

$\beta$ -Sheet Protein: SRS,  
ratio 1675/1665  $\text{cm}^{-1}$   
Lipids  
(SRS, 2850  $\text{cm}^{-1}$ )

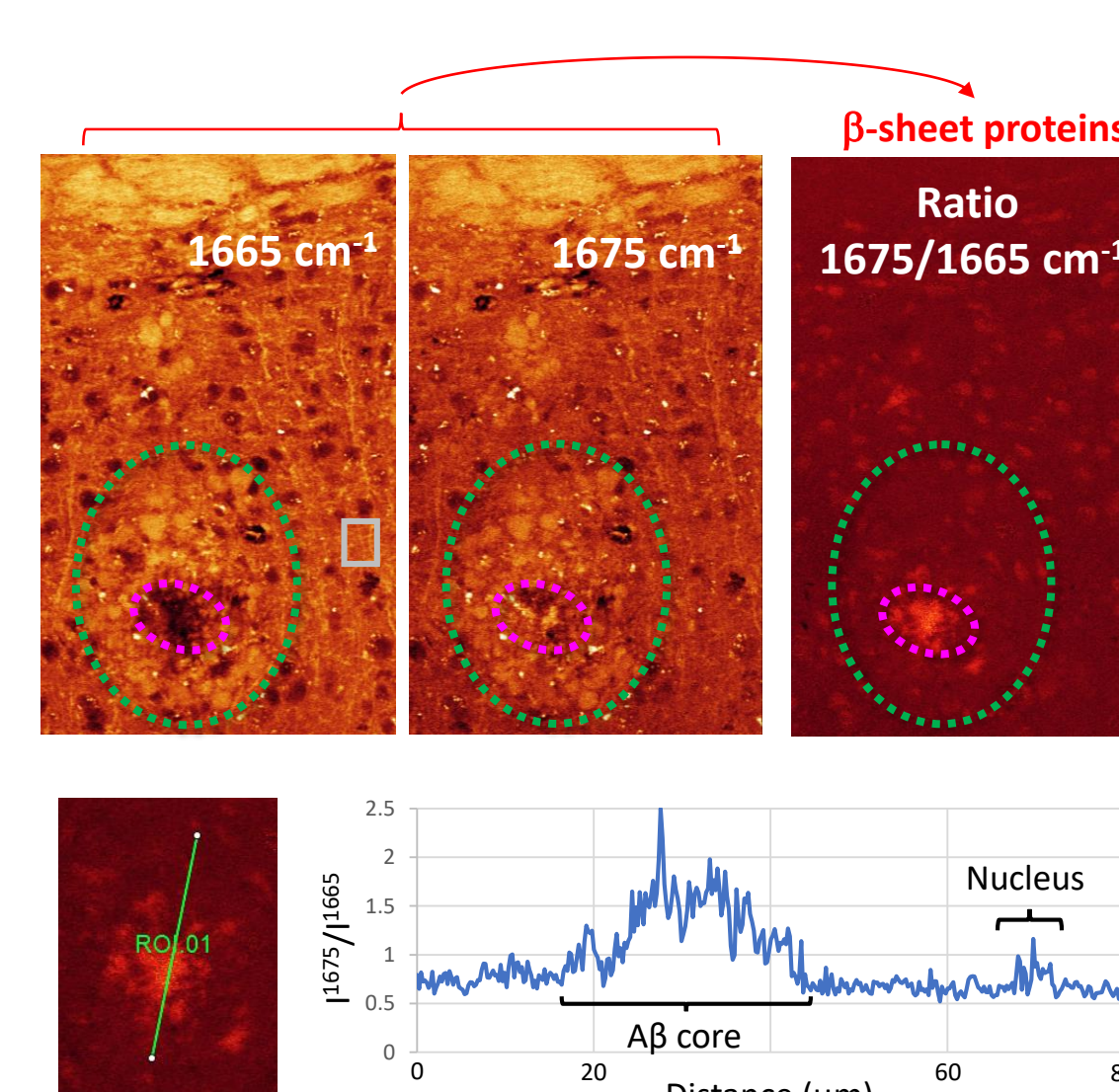


Unlabeled mouse brain tissue

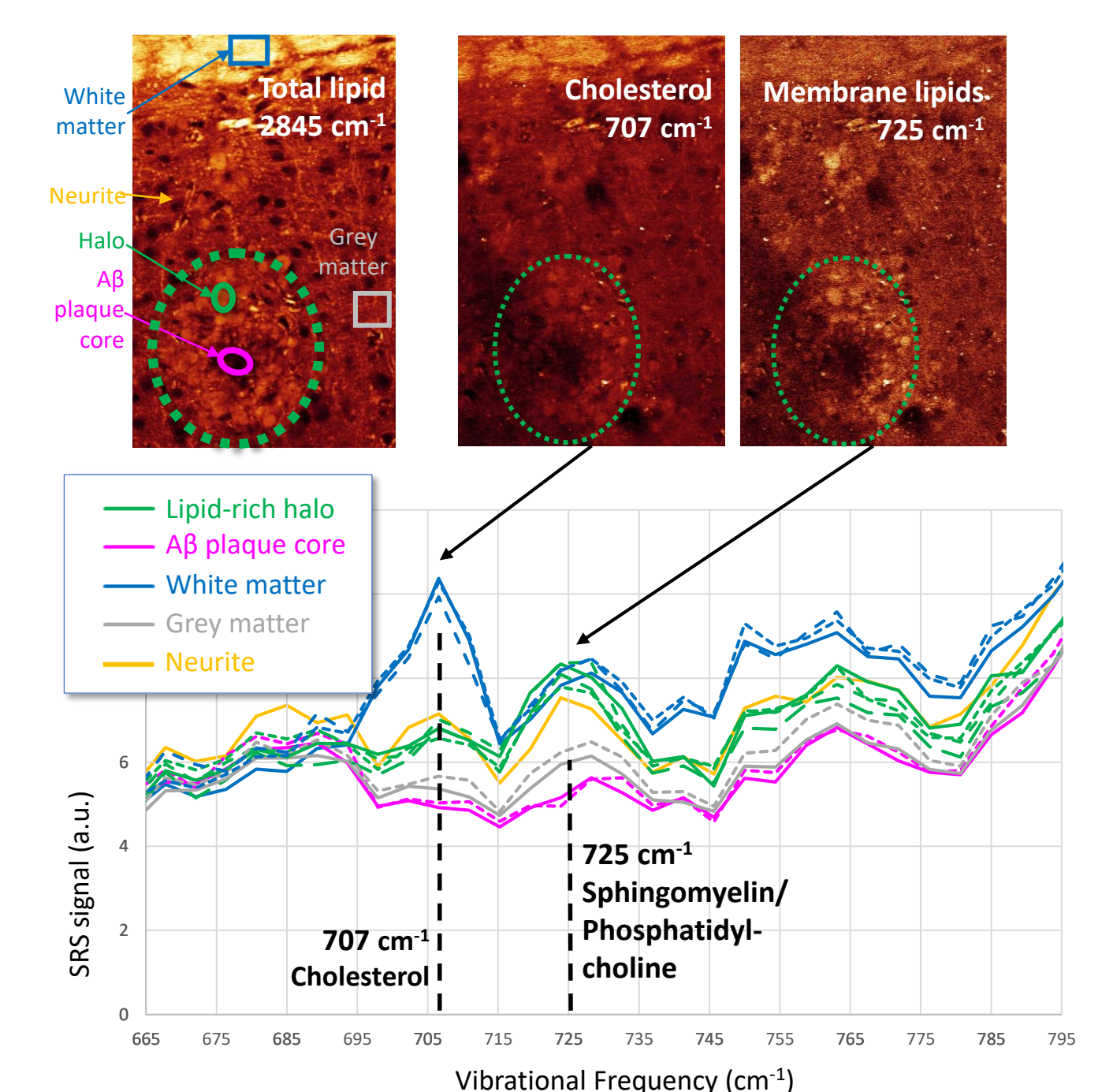
## Application: SRS spectroscopic imaging of the diseased mouse brain



## Label-Free visualization of Amyloid- $\beta$ aggregates



## Differential Localization of Lipid Classes to Healthy and Pathological Structures



Reference: Schweikhard et al., bioRxiv 2019 <http://dx.doi.org/10.1101/789248>

<https://www.leica-microsystems.com/products/confocal-microscopes/p/stellaris-8-crs/>