HISTOFLOW

PROSPECTIVE INSTRUMENTS

ENABLING LABEL-FREE PATHOLOGY

PROSPECTIVE LIFE SCIENCE

TURN-KEY
EASY-TO-USE
COMPACT
MULTIMODAL

Multiphoton Microscopes

PROSPECTIVE LASERS
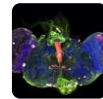
FSX Ultrafast Laser

TWO-PHOTON, SHG & THG
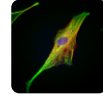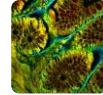OPTOGENETICS
FLIM
CARS & SRS

Femtosecond Lasers

PROSPECTIVE IMAGING SERVICES

MULTIPHOTON MICROSCOPY

WIDEFIELD FLUORESCENCE

FLIM

WHOLE SLIDE IMAGING (WSI)

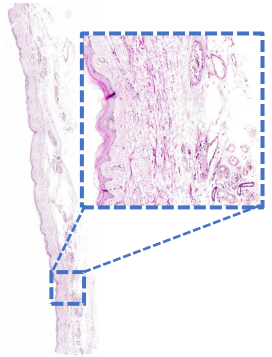LIGHTSHEET mesoSPIM

SAMPLE PREPARATION
IMAGING
DATA MANAGEMENT

Contract Imaging Service

PROSPECTIVE MEDICAL RESEARCH

AI MACHINE LEARNING

AI-POWERED LABEL-FREE
HISTOPATHOLOGY

Label-free Pathology

Multimodal multiphoton imaging for medical applications

## HISTOFLOW – a Label-free Instant Digital Pathology Platform

HISTOFLOW - INSTANT PATHOLOGY

- Turn-key
- Mobile
- Compact
- Ex-vivo
- In-vivo endoscopic capabilities
- Multimodal imaging

HISTOFLOW

„The aim is to develop a turn-key, easy-to-use and high performance imaging platform for unstained tissue"

SPEED

RESOLUTION   SENSITIVITY

SIGNAL TO NOISE   FIELD OF VIEW

DEPTH   SPECIFICITY
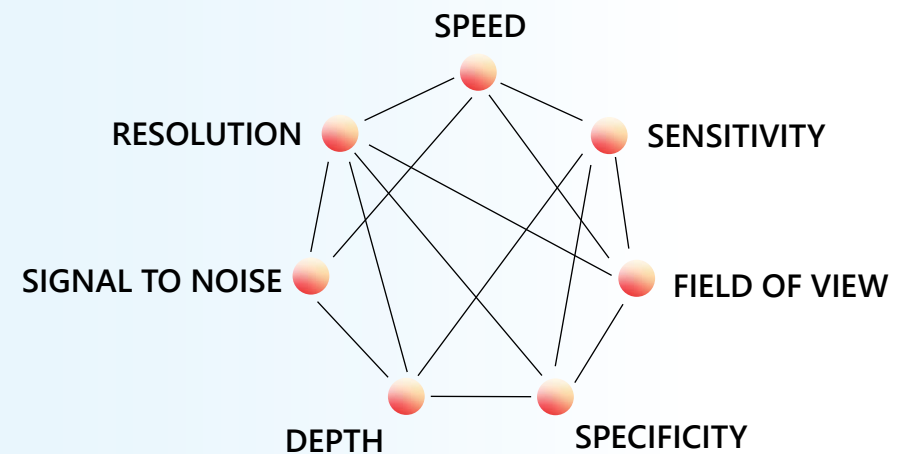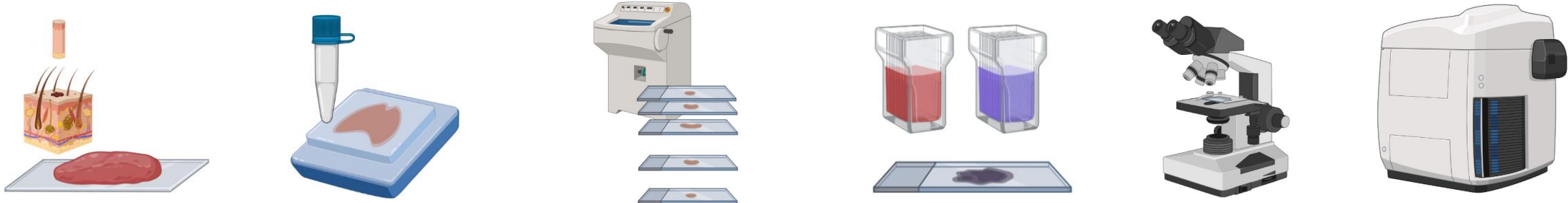
HISTOFLOW – INSTANT PATHOLOGY

- AI-powered virtual H&E staining

- Fully equipped multimodal microscope for 2D and 3D imaging

- Label-free imaging of biomarkers

HISTOFLOW

„Ai-powered, label-free pathology, for a broad range of 2D and 3D samples"

STATE OF THE ART: HISTOPATHOLOGY

FFPE: 1-2 days	Biopsy	Fixation & Embedding	Tissue Sections	Staining	Diagnostics	Digitalization
CRYO: ~ 1h	Biopsy	Embedding	Tissue Sections	Staining	Diagnostics	

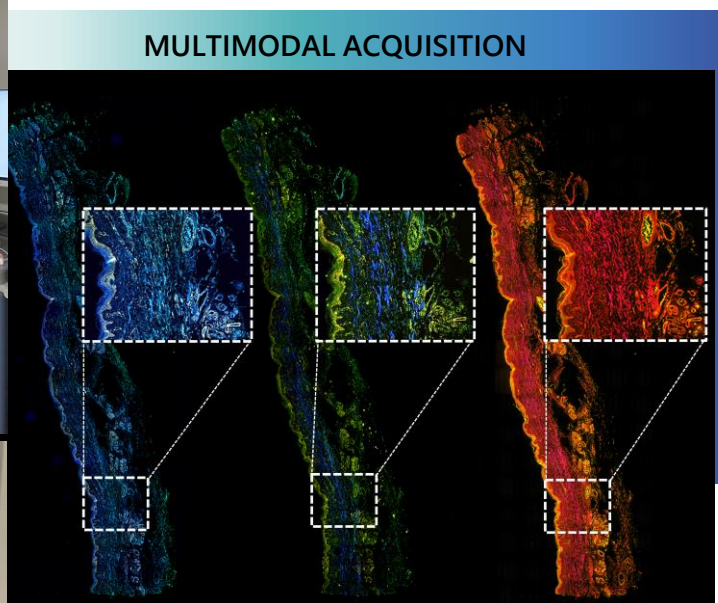| HISTOFLOW	*Endoscope ready*	*Native 3D Samples*	*Optical slicing & Digitalization*	*Virtual AI-staining*	*Orthogonal Data*

*Created with BioRender.com
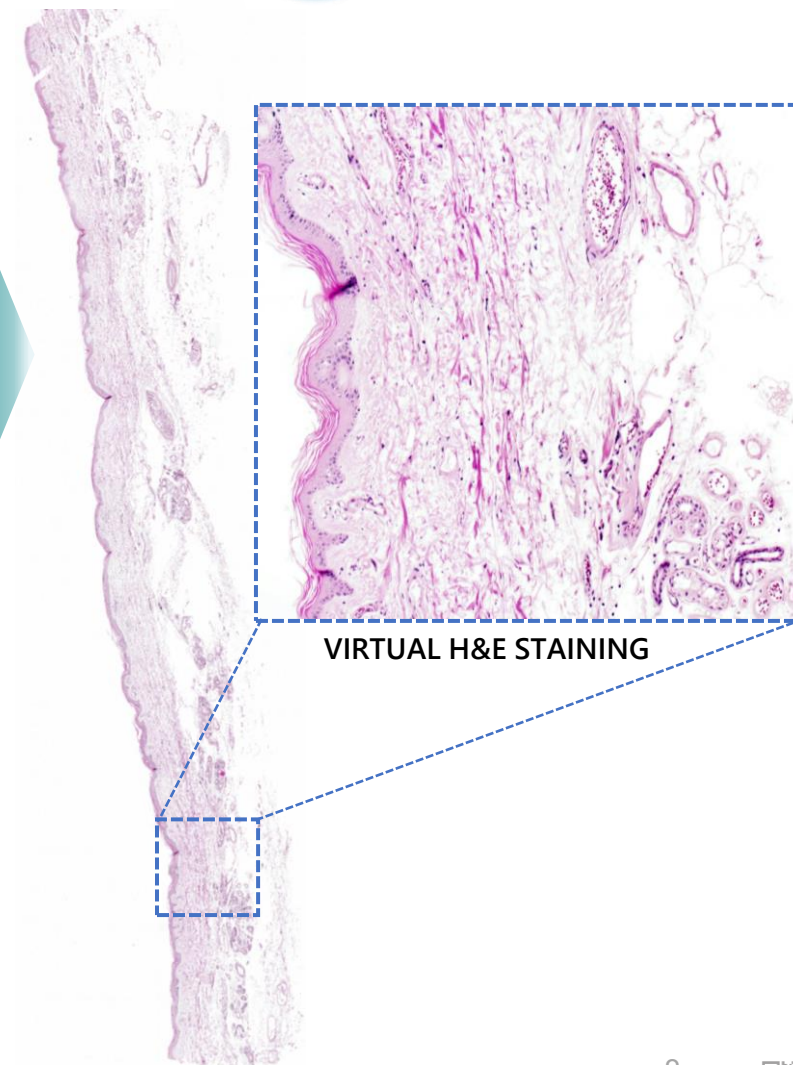
HISTOFLOW – AI-powered Histopathology
Virtual H&E Staining

AI-POWERED VIRTUAL H&E STAINING

MULTIMODAL ACQUISITION
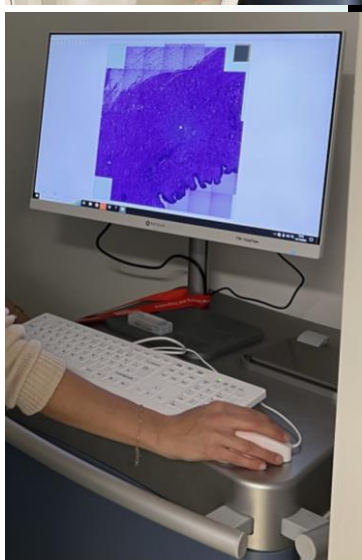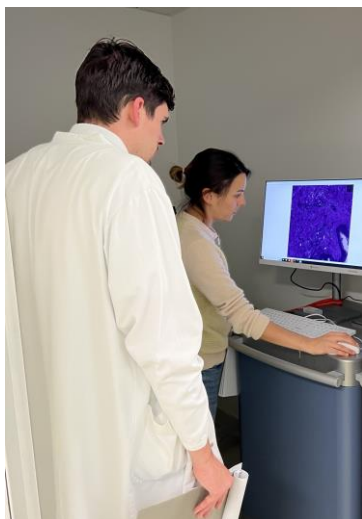
AI MACHINE LEARNING

HISTOFLOW:

„AI powered virtual H&E staining"

VIRTUAL H&E STAINING

HISTOFLOW – Multimodal for Orthogonal Data
Fully Analyze a Tissue's Landscape
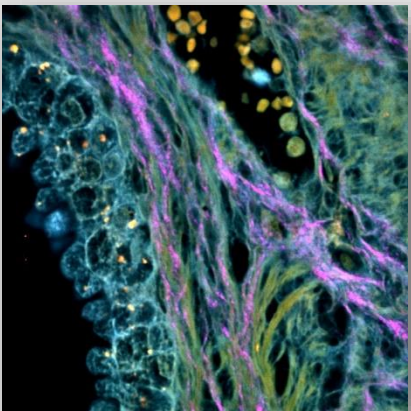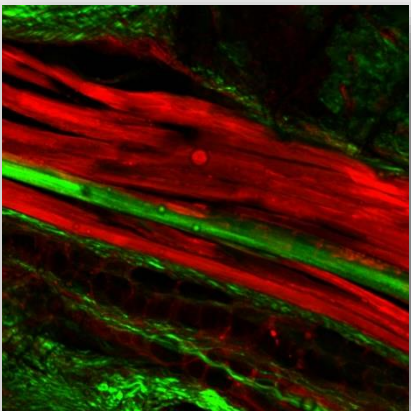
HISTOFLOW – Beyond virtual H&E

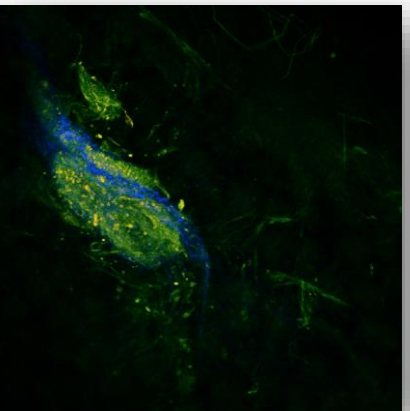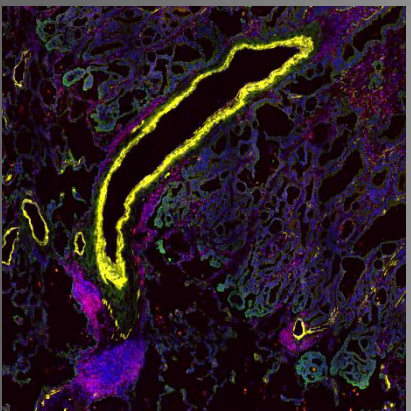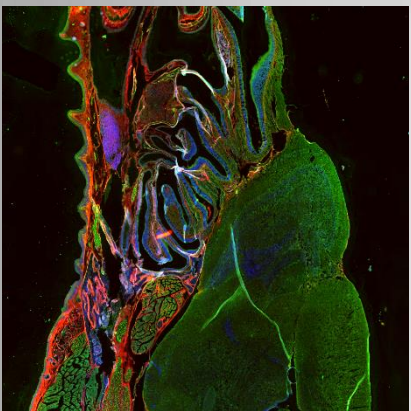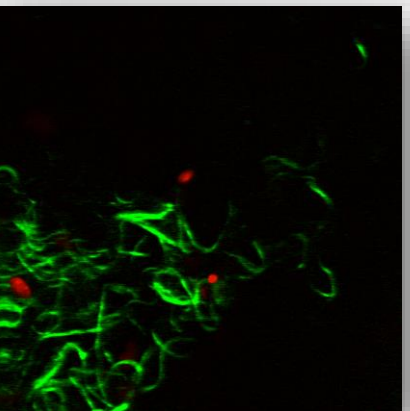- Orthogonal data
- More than H&E
- Already digitalized

MULTIMODAL IMAGING

	FFPE-samples	Cryosections	3D Tissue
Label-free			
IHC/ICC			

MULTIMODAL IMAGING

Label-free Pathology

Widefield Fluorescence

Two-Photon Fluorescence

SHG label-free Collagen Imaging

15 mm

Autofluorescence
Autofluorescence
Autoflourescence
Autofluorescnece

Collagen (SHG)
Autofluorescence
Autofluorescence
Autofluorescence

Collagen (SHG)
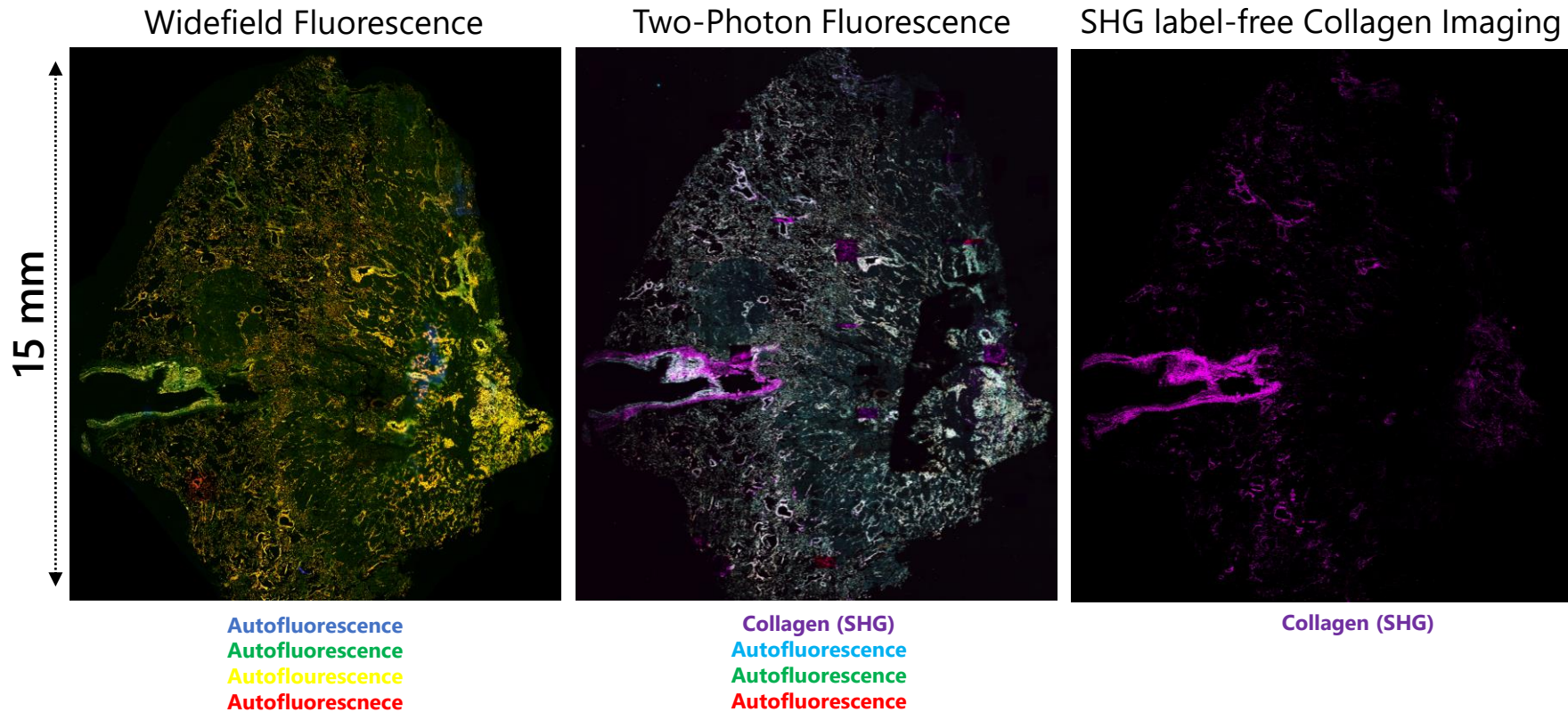
HISTOFLOW:

„Multiple imaging applications and modalities for label-free biomarkers"

HISTOFLOW – Label-Free Biomarkers

BIOMARKERS

BIOMARKER: „measurable indicator of some biological state or condition" (Wikipedia)

Optical properties: e.g. fluorescence, absorption
Mechanical properties: e.g. stiffness
Morphological properties: e.g. cell nucleus
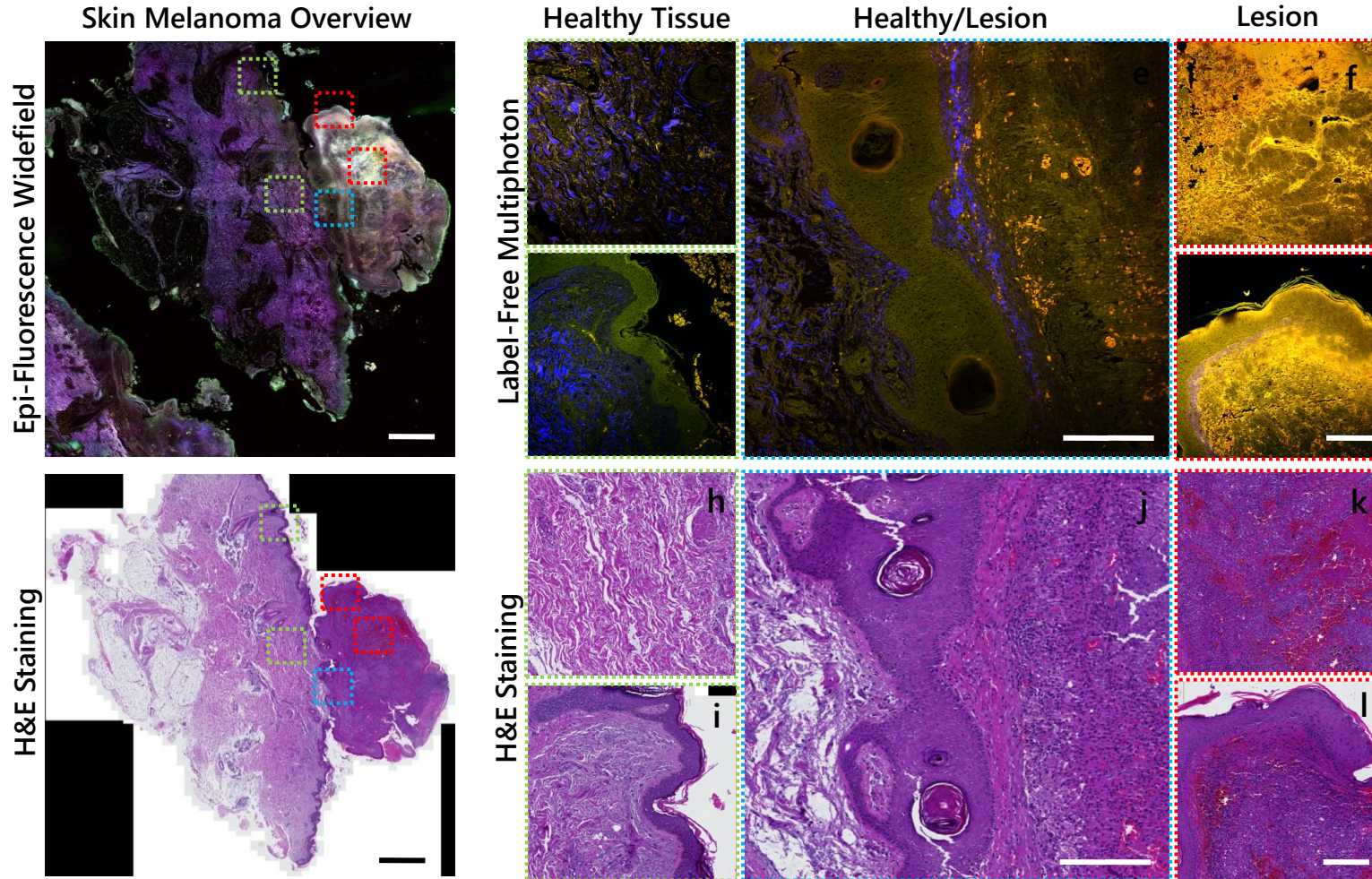**Structural properties:**   e.g. wall thickness

Biomarkers in medicine:
Predictive, diagnostic, prognostic indicator &   "Contact-free, non-destructive"

WIDEFIELD GUIDED MULTIPHOTON MICROSCOPY
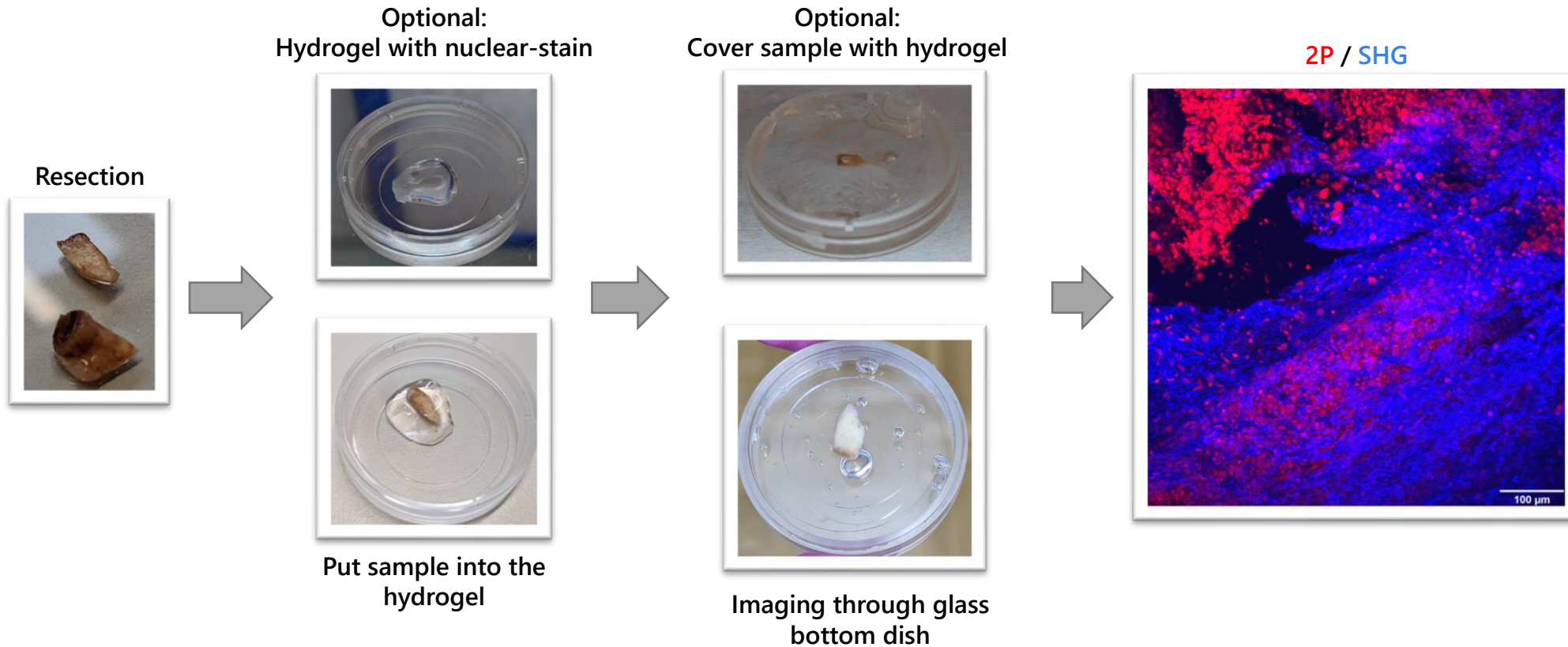
Label-free Pathology

HISTOFLOW:

„Combine speed of widefield and label-free data from multiphoton microscopy"
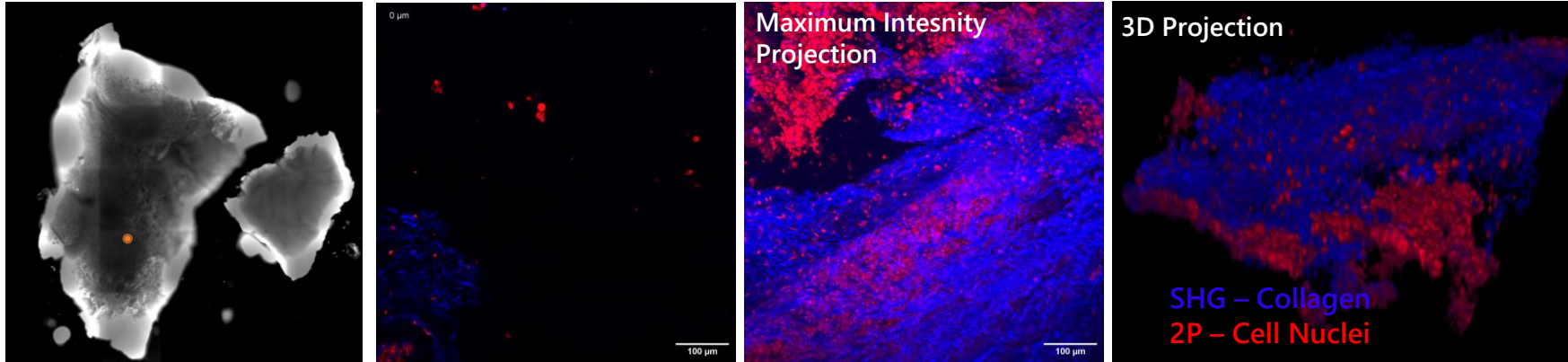
WIDEFIELD GUIDED MULTIPHOTON MICROSCOPY
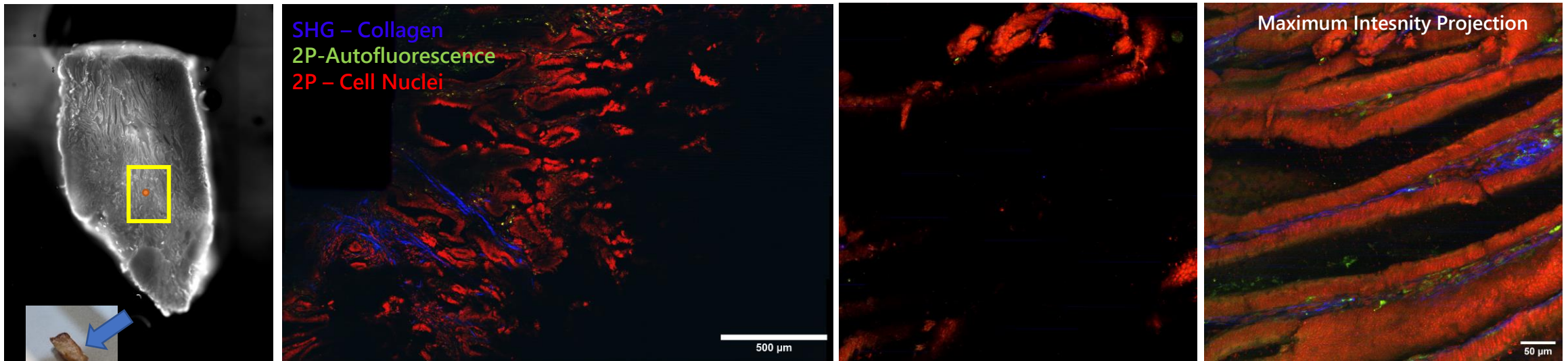
3D Label-free Pathology

Resection

Optional:
Hydrogel with nuclear-stain

Put sample into the hydrogel

Optional:
Cover sample with hydrogel

Imaging through glass bottom dish

2P / SHG

100 μm

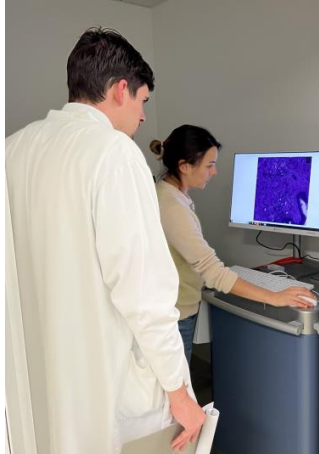# WIDEFIELD GUIDED MULTIPHOTON MICROSCOPY

3D Label-free Pathology

HISTOFLOW:

„Combine speed of widefield and penetration depth, optical sectioning and othogonal data from multiphoton microscopy"
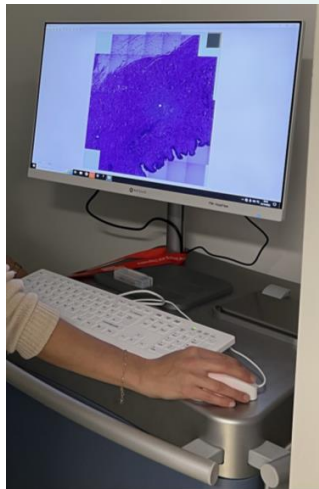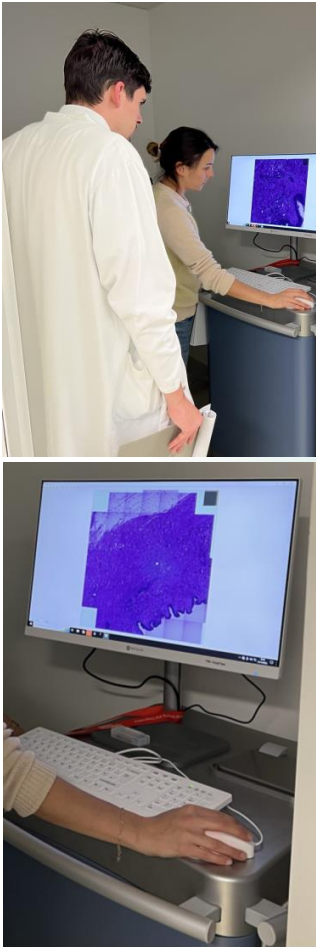
SUMMARY

HISTOFLOW

- AI-powered virtual H&E staining
- Fully equipped multimodal microscope
- Label-free imaging of biomarkers
- Imaging across scales in 3D

- Prototype
- AI needs a lot of input data and training hours
- Pathologists have to „learn" to work with new and digital datasets

OUTLOOK

HISTOFLOW
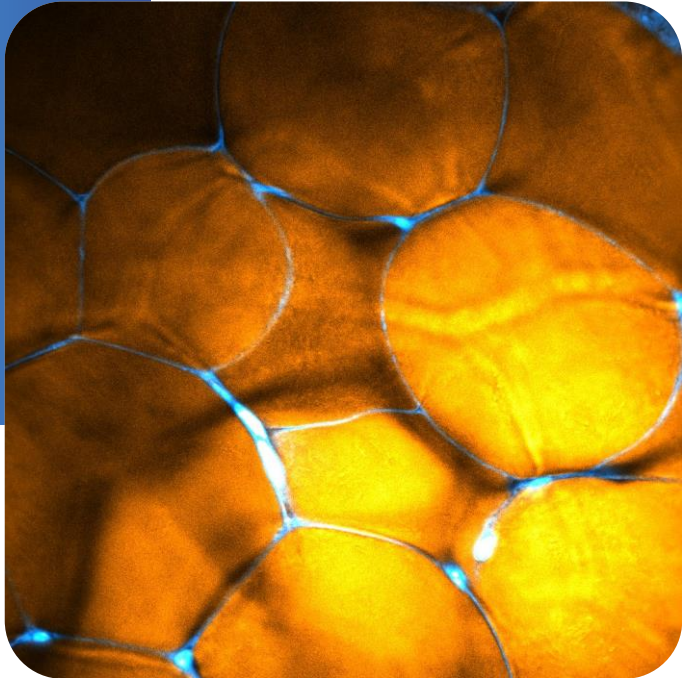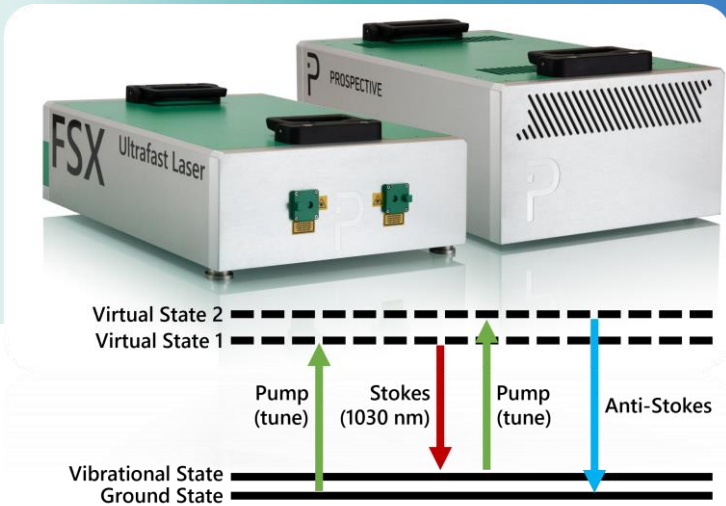
CARS for label-free Pathology

Image courtesy Prof. Thomas Hellerer and Thomas Kellerer, Multiphoton Imaging Lab, University of Applied Sciences Munich

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PROSPECTIVE INSTRUMENTS

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