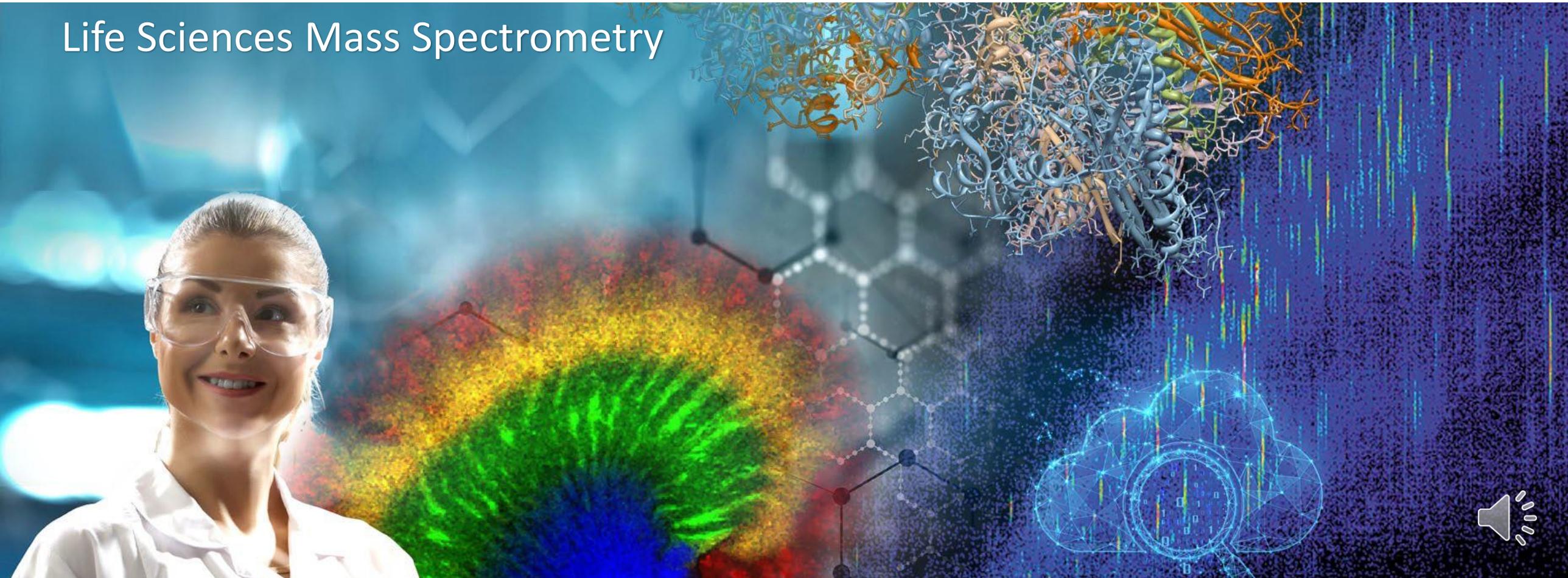


MALDI guided SpatialOMx[®] on a timsTOF fleX uncovers proteomic profiles of breast cancer subpopulations



Dr. Corinna Henkel, Application specialist MALDI Imaging, Bruker Daltonics, Bremen, Germany

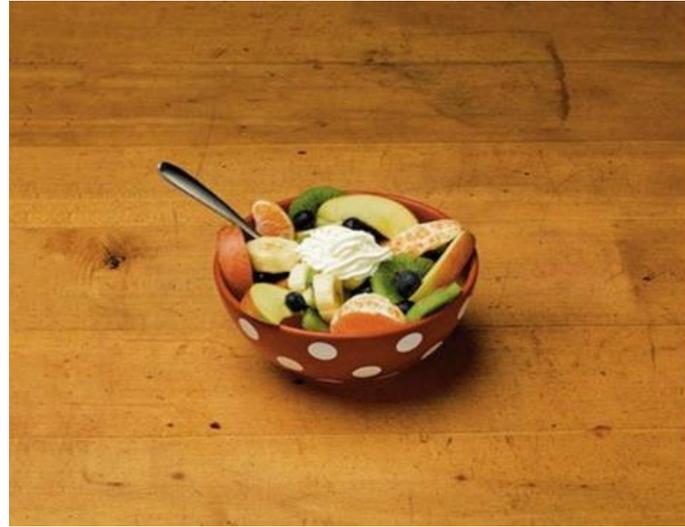
Life Sciences Mass Spectrometry



The SpatialOMx[®] Advantage for OMICS researchers

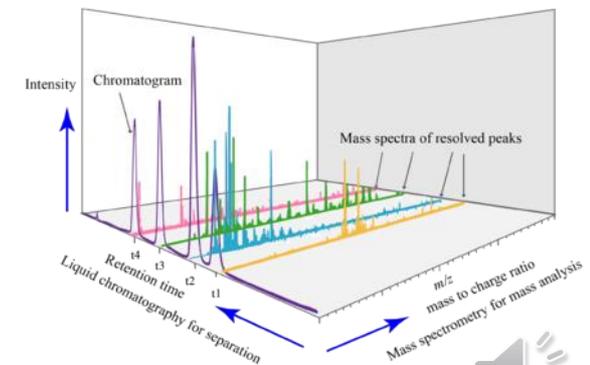
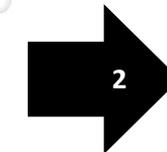
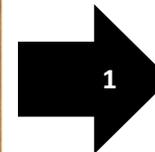
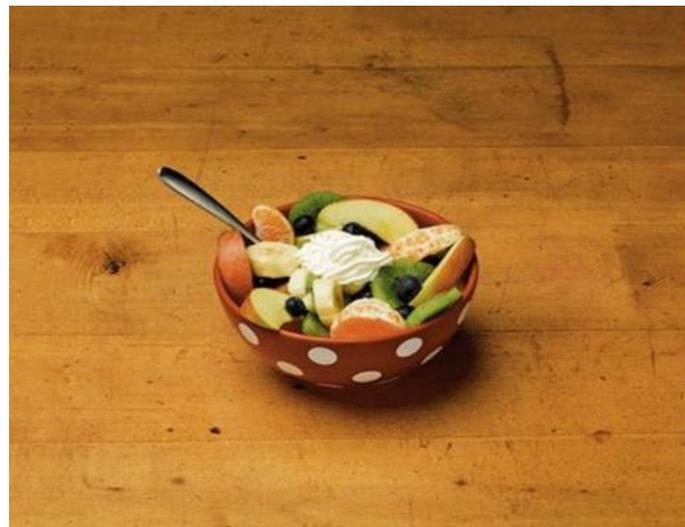


Problem: identify and differentiate e.g. tumor subpopulations within heterogenous multi-cellular tissue specimen



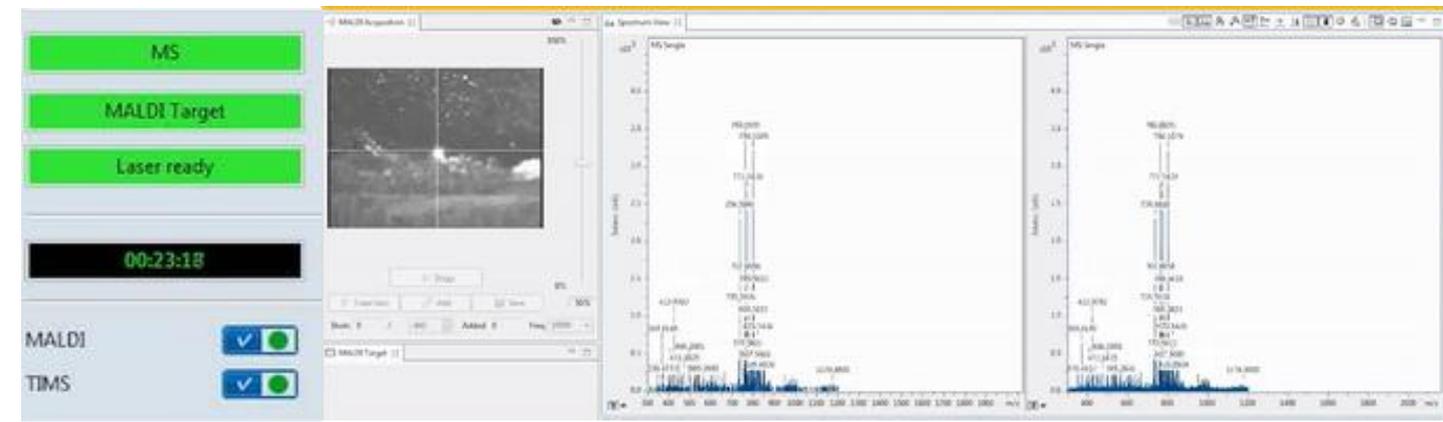
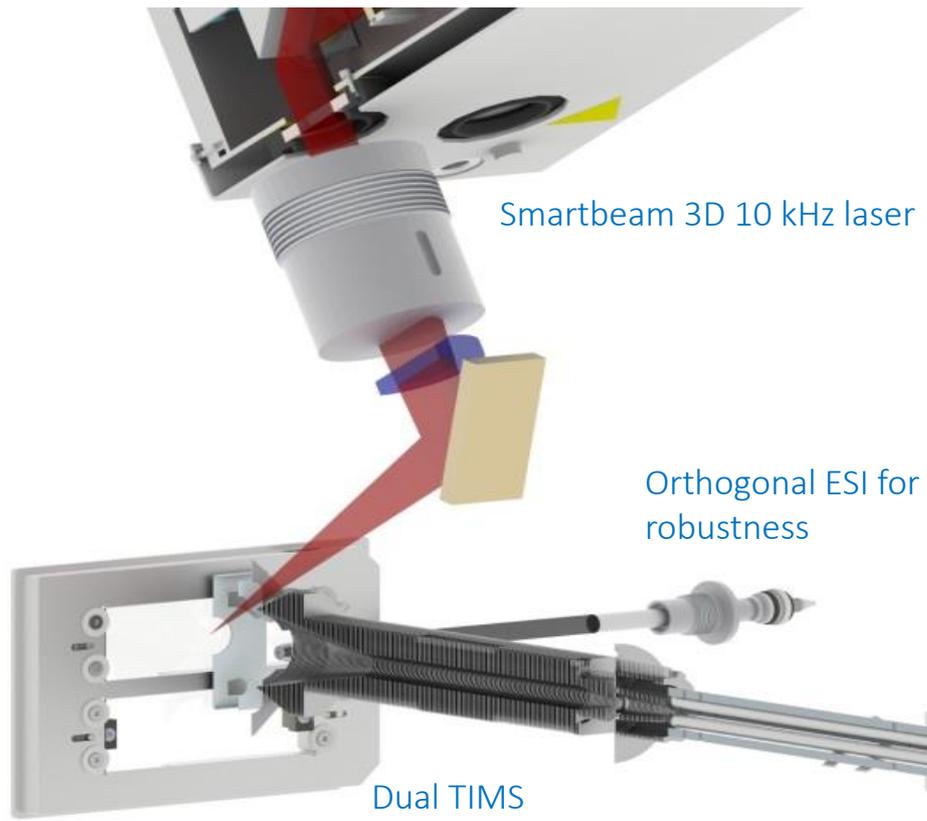
How do we ID the piece of fruit that's spoiling the salad?

Current Omics Solution: homogenize sample, analyze via LC-MS. This strategy suffers from low specificity and dilution effects, therefore sensitivity suffers



timsTOF *flex*

Enabling SpatialOMx



High throughput, high spatial resolution imaging

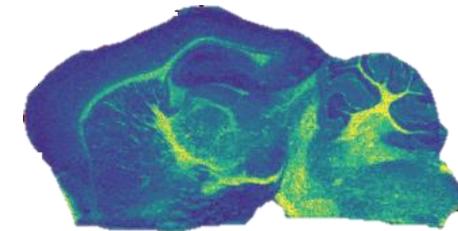
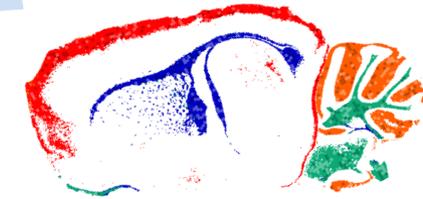
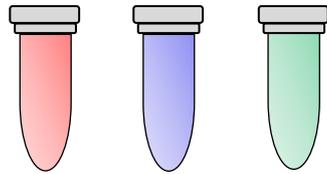
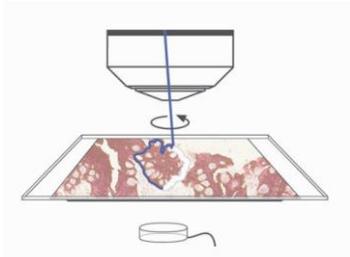


UHR-OTOF & high speed digitizer



The SpatialOMx[®] Advantage of the timsTOF flex

4D Omics AND MALDI Imaging in *ONE* instrument



Left-hand side of the instrument:

- LC-MS/MS PASEF
- High-sensitivity Omics

ESI



MALDI

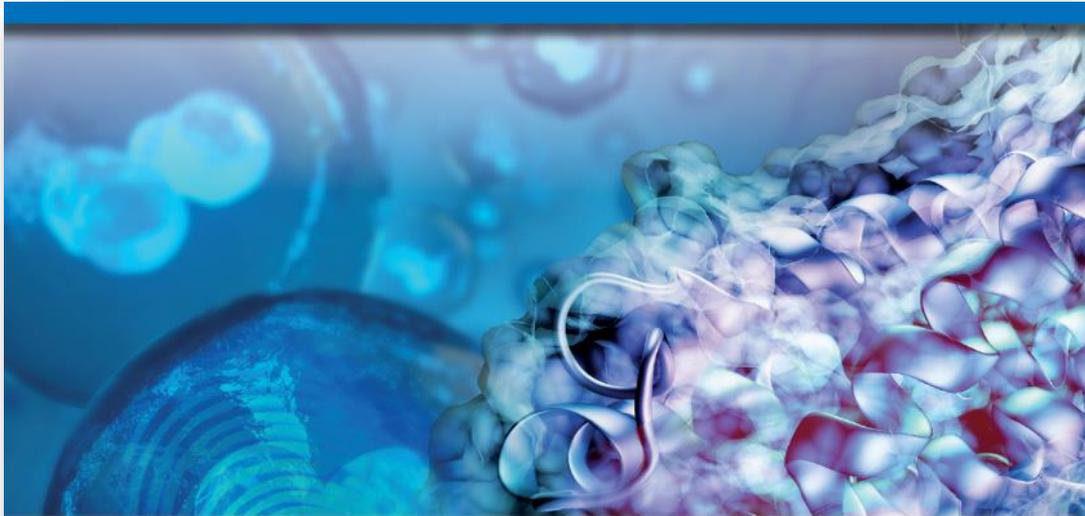
Right-hand side of the instrument:

- 10kHz SmartBeam 3D laser
- High-speed imaging capability
- 4D-molecular imaging

MALDI Imaging delivers context to Omics data.



SpatialOMx Proof of concept (POC) example from the Prof. Ron Heeren Group



- **MALDI guided SpatialOMx uncovers proteomic profiles in tumor subpopulations of breast cancer**

MALDI guided SpatialOMx provides an excellent possibility to discover deep proteomics insights into heterogenous tumor subpopulations by retaining the regiospecific information of an imaging technique.

Abstract

The timsTOF fleX system bridges a current gap by providing MALDI Imaging and in-depth proteomics analysis in just one instrument. The instrument offers all benefits of a timsTOF Pro for time-efficient and sensitive proteomics, combined with a high-resolution

MALDI source and stage. Using PASEF technology, it is possible to retrieve high protein ID rates with small sample amounts. Here we present the new SpatialOMx workflow to identify distinct proteomic profiles for different tumor subpopulations in breast cancer as an example for this powerful approach.

Introduction

Since tissue and disease are correlated, SpatialOMx provides the unique opportunity to combine regiospecific information from MALDI Imaging with deep proteomic coverage for biomarker discovery and molecular characterization. MALDI Imaging has

Keywords:
SpatialOMx, MALDI
Imaging, Proteomics,
PASEF



Ron Heeren
Maastricht, NL



TECHNICAL BRIEF

Proteomics
Proteomics and Systems Biology

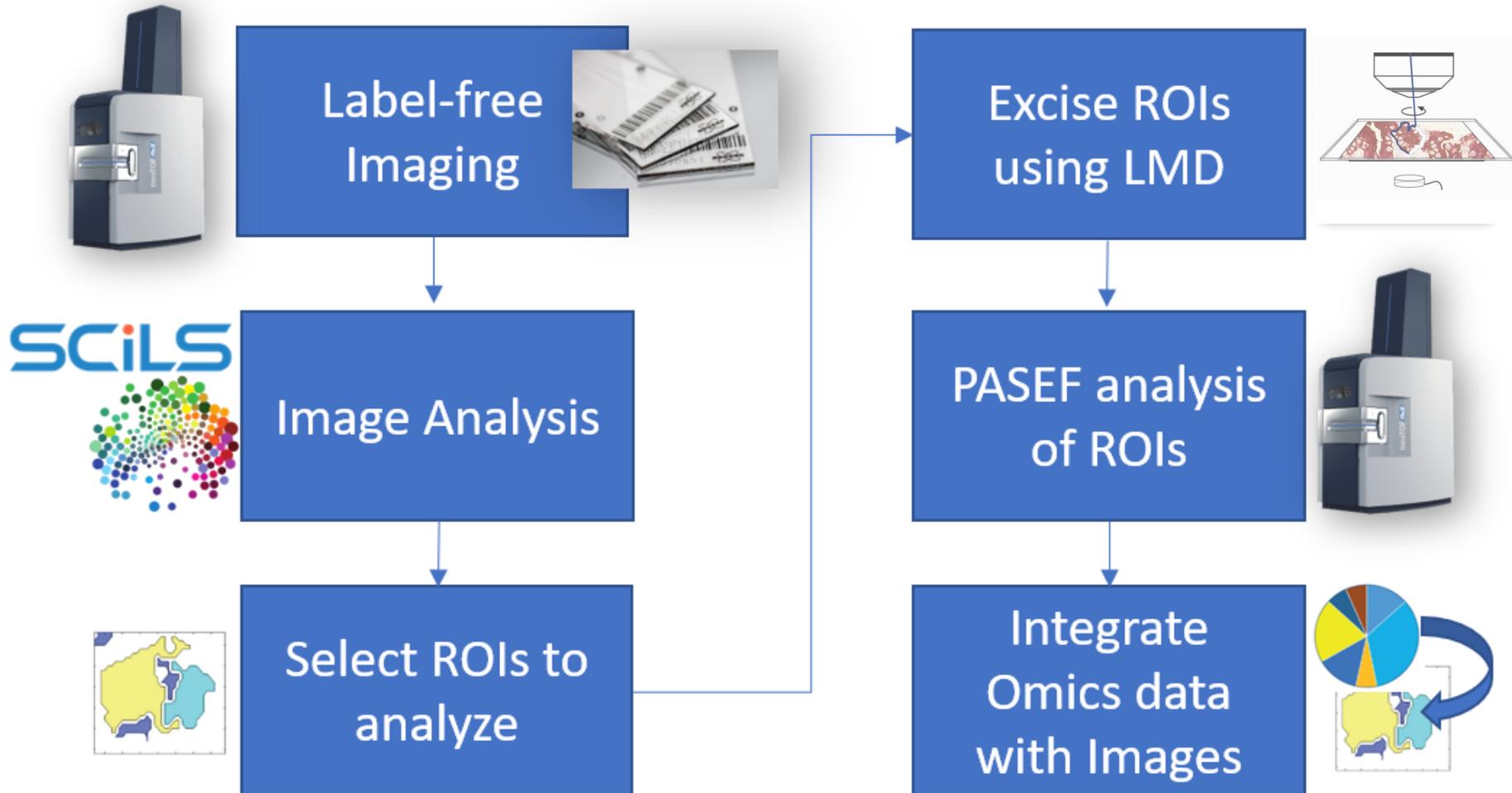
www.proteomics-journal.com

MS Imaging-Guided Microproteomics for Spatial Omics on a Single Instrument

Frédéric Dewez, Janina Oejten, Corinna Henkel, Romano Hebler, Heiko Neuweger, Edwin De Pauw, Ron M. A. Heeren, and Benjamin Balluff*



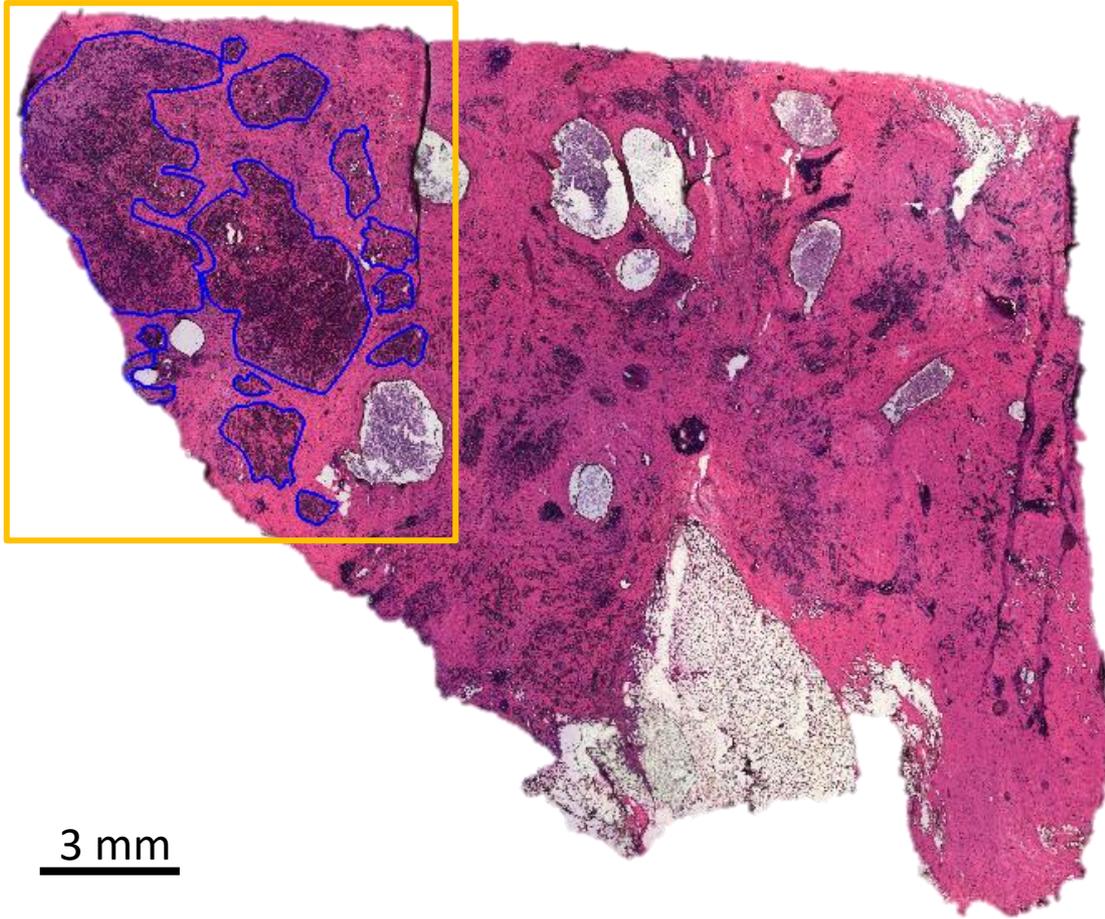
SpatialOMx[®] workflow



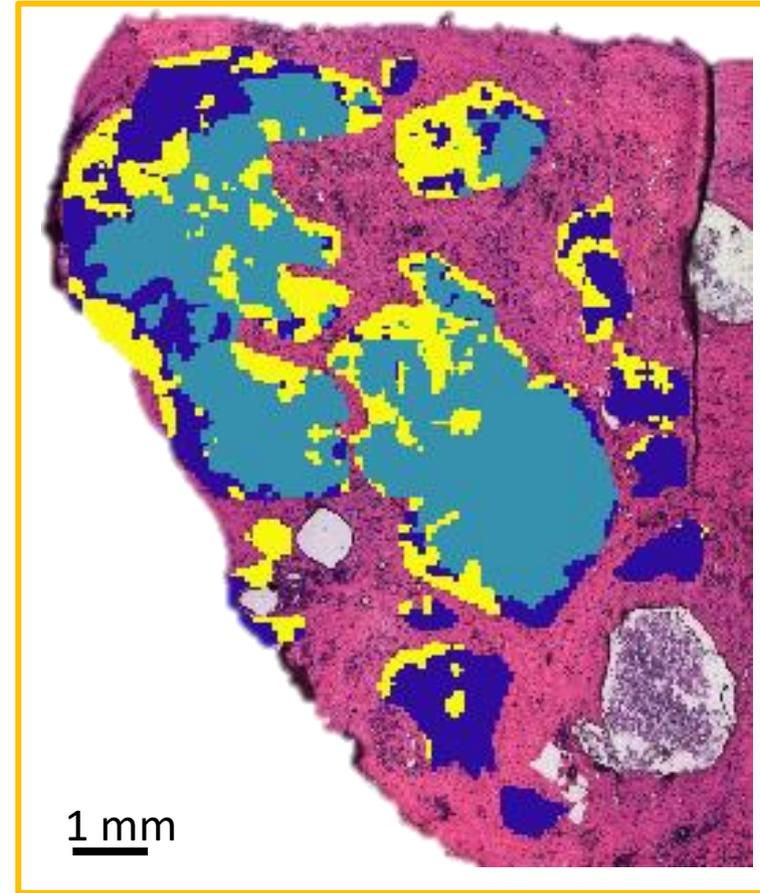
MALDI guided LMD and proteomics empowered by PASEF on one instrument.



Defining tumor subpopulations in breast cancer



Pathologist annotations

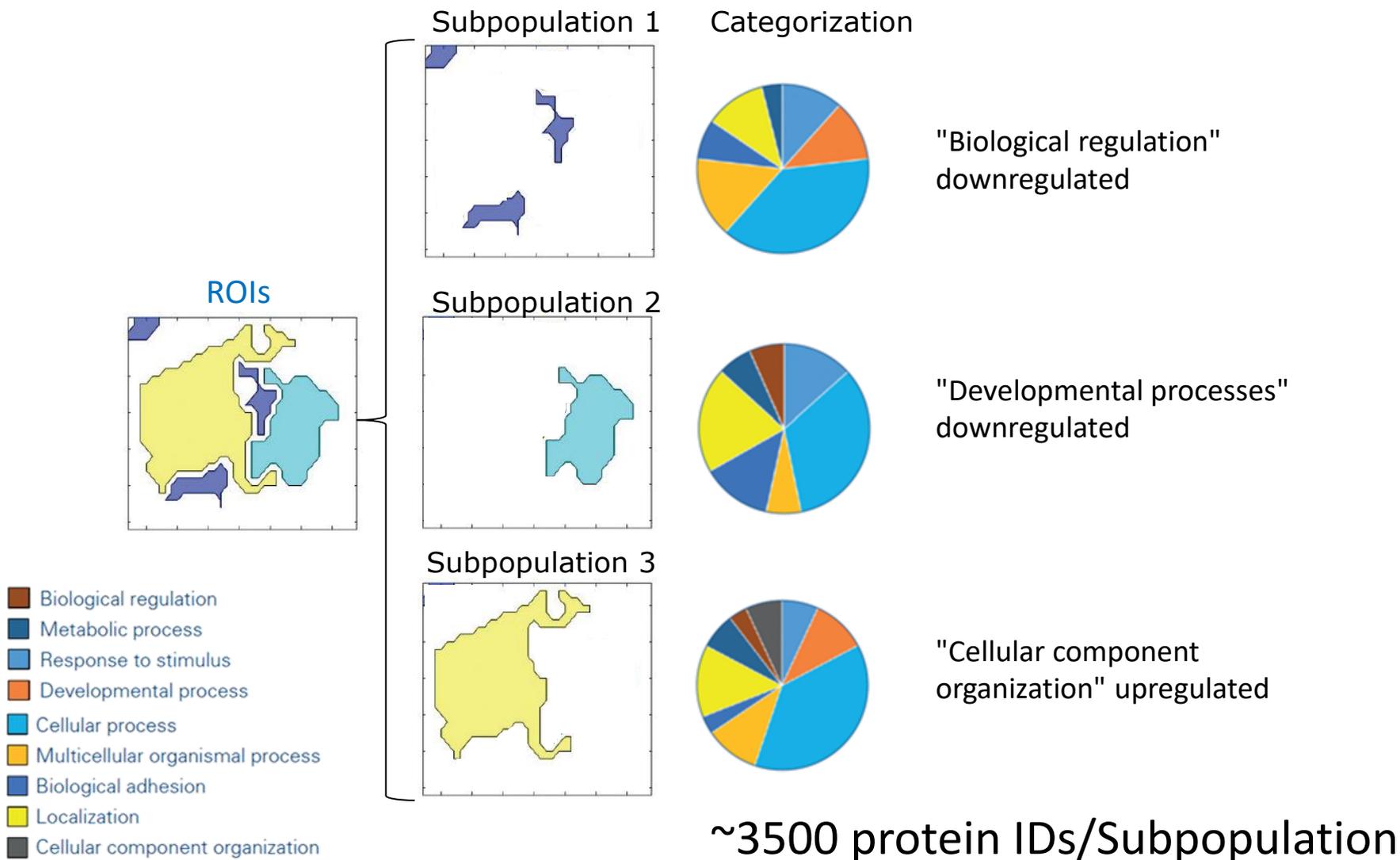


k-means segmentation of the tumor area

- Subpopulation 1
- Subpopulation 2
- Subpopulation 3



Protein IDs from about 2000 cells (estimated 160 ng) of sample



- SpatialOMx finds biologically relevant differences.
- Tissue context is important to understanding cellular biochemistry!
- Only SpatialOMx can provide the answer here.



Thank you for your attention!

Questions?

Please contact me for further information

Corinna.Henkel@Bruker.com

