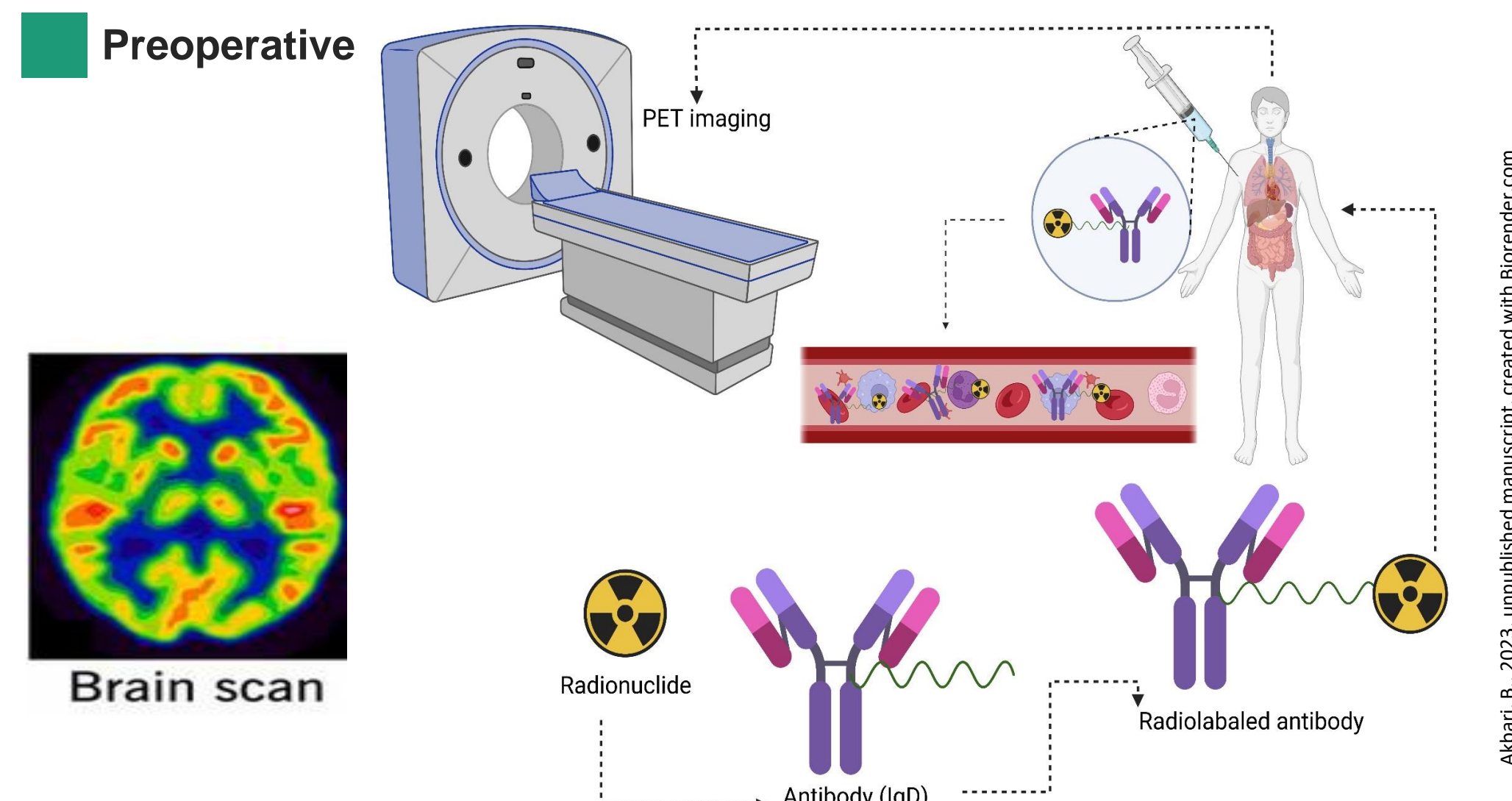
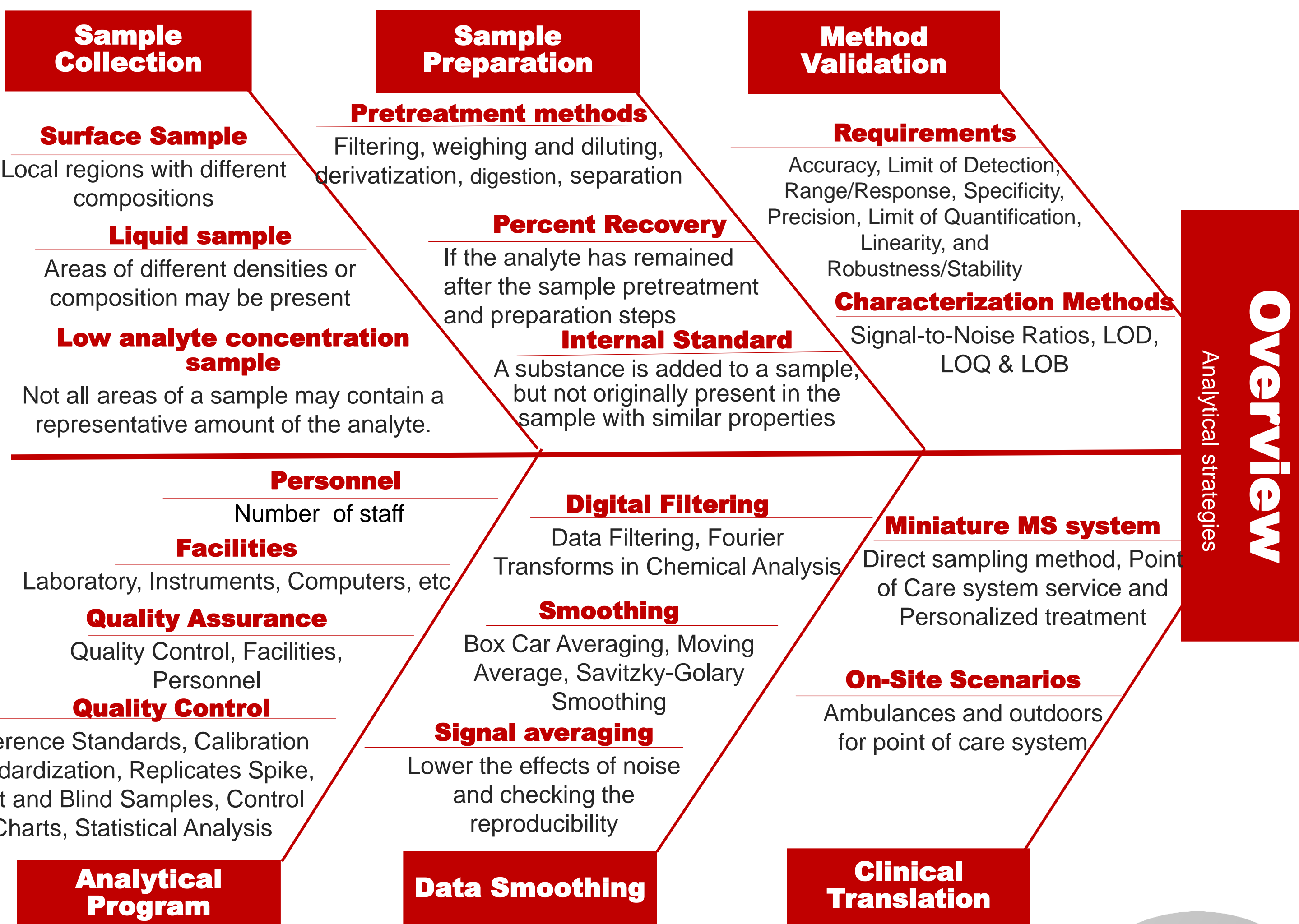
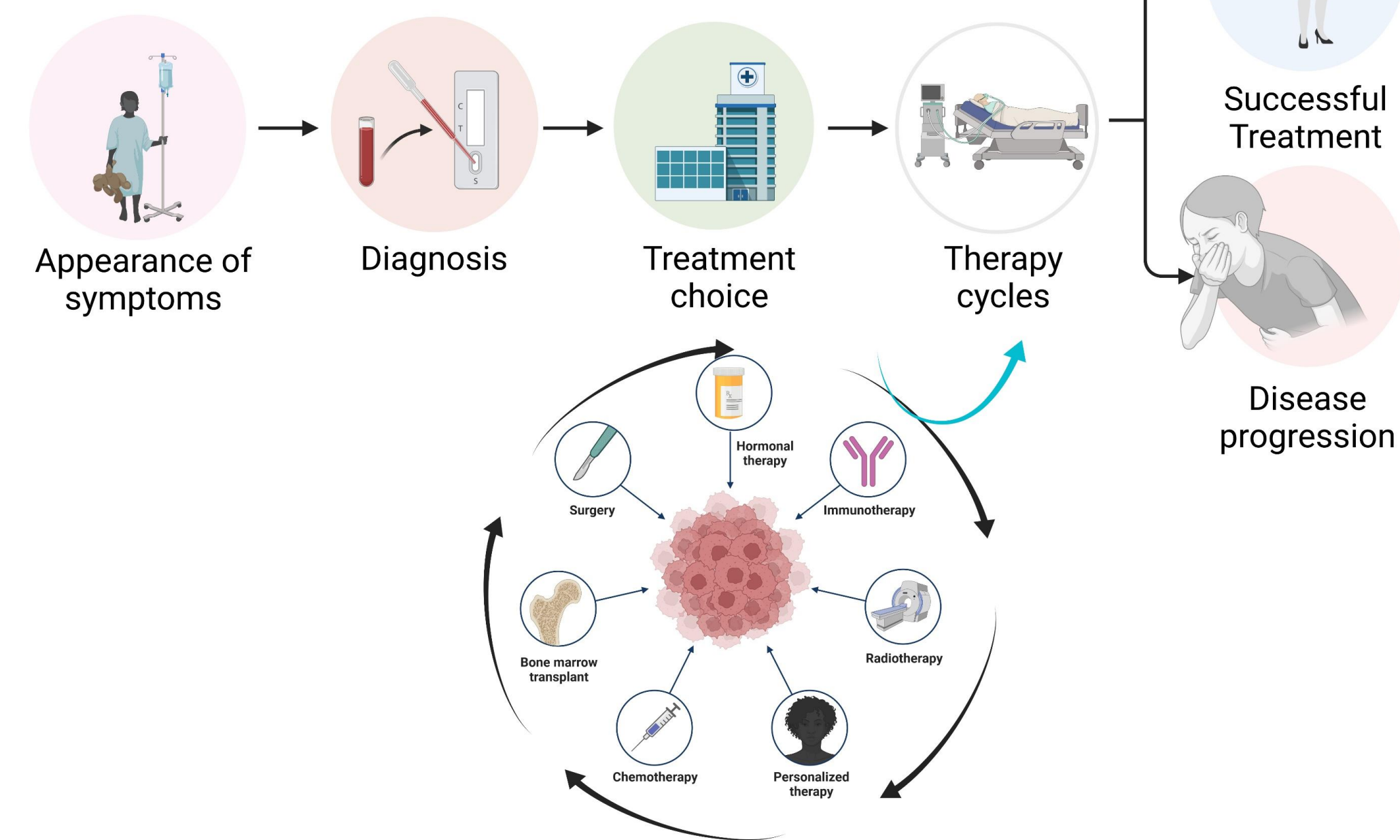


## Introduction



**Positron Emission Tomography (PET) imaging**

PET imaging gives a 3D images along with monitoring metabolic or biochemical function of tissues and organs, uses a radioactive drug (tracer) to show both normal and abnormal activities, and measures blood flow, oxygen use and blood sugar (glucose) metabolism.

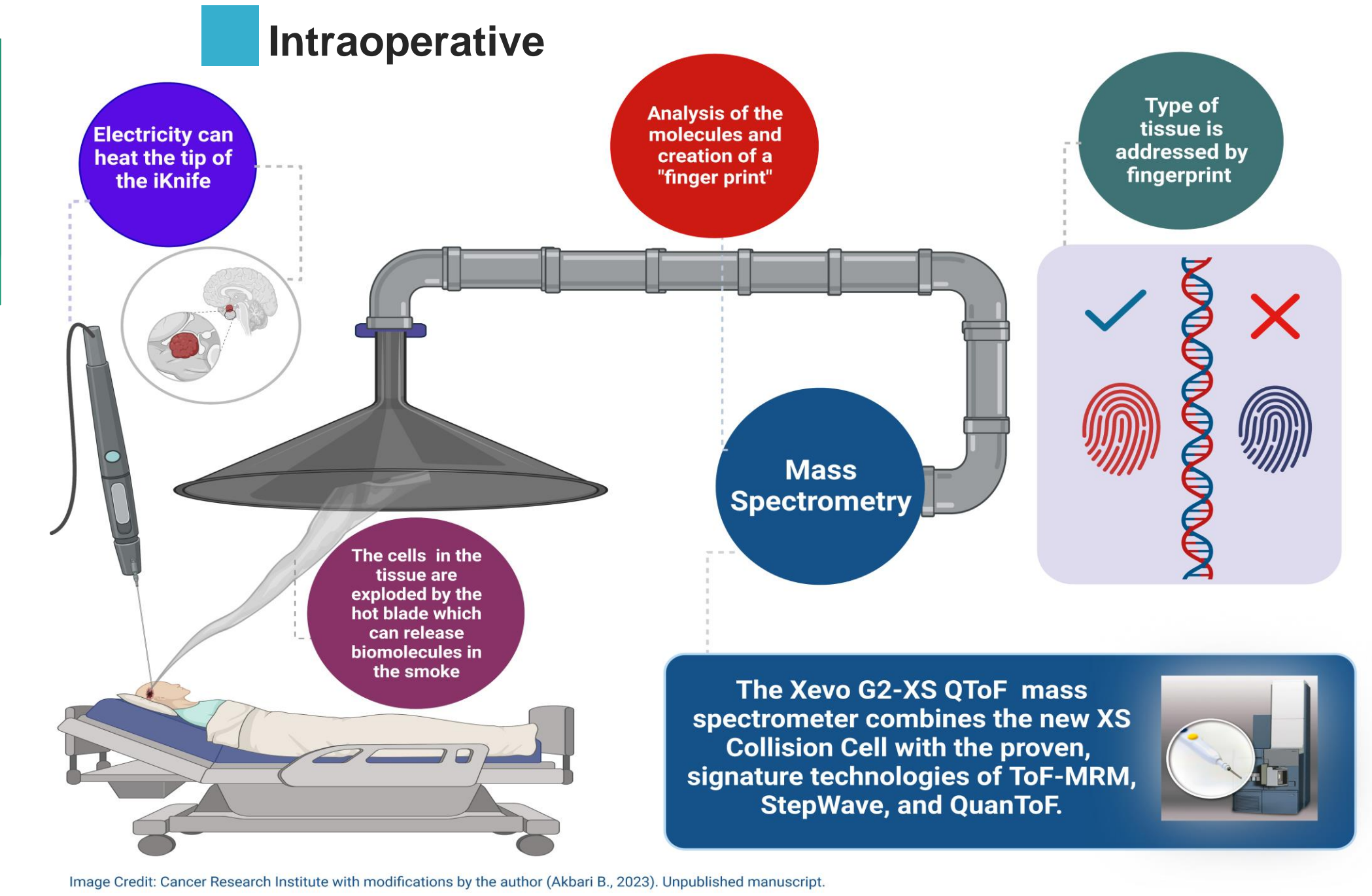
**In vivo:** MRI/CT, PET/MRI, MRA, MRS, MRSI, iMRI

	MRI	CT	PET
<b>Technology</b>	Magnets + Radiowave	X-rays (3D)	Radiation Tracers with CT scan
<b>Detect</b>	Soft Tissue, Tendon, Ligament, Brain	Bony Structure and Blood Vessels	Cancer Heart Brain
<b>Procedure/Time</b>	30 minutes	5-10 minutes	60-90 minutes

## Guiding Principles

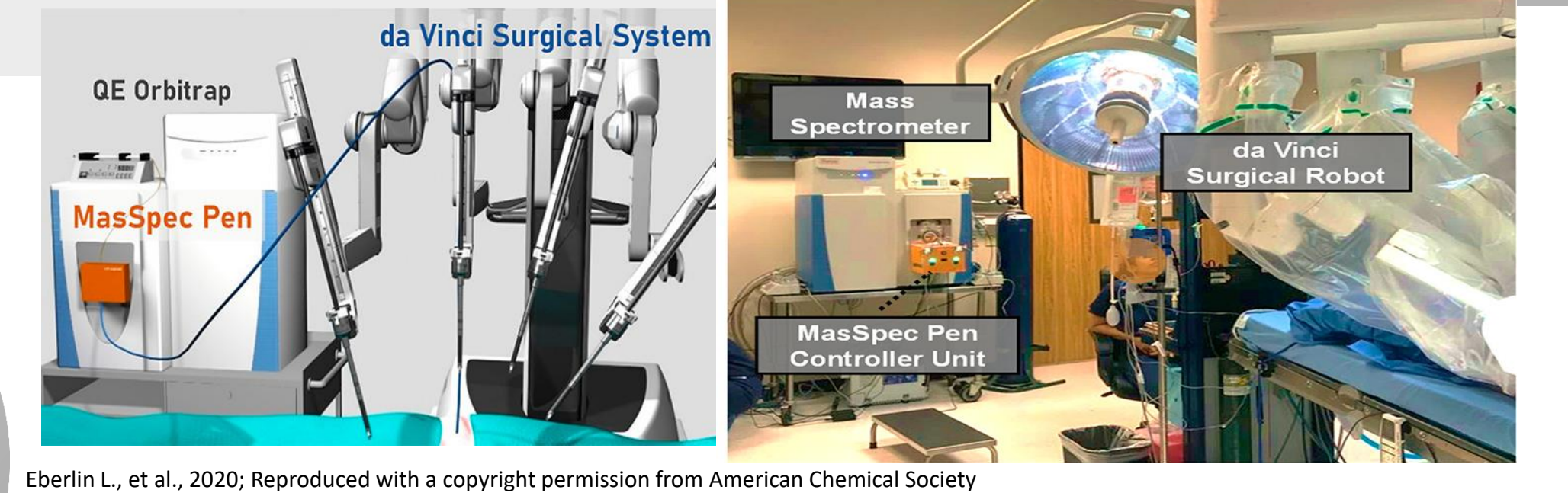
- Preoperative
- Intraoperative
- Post Operative
- Key Features and Applications
- Alternatives

## Pre-operative



iKnife does not need sample treatment or LC; At a fast pace, it determines differences within and between tissue samples; other sampling techniques can be potentially combined towards an untargeted profiling strategy (in vivo and ex vivo biopsy); The Takats group discovered iKnife in 2009 for routine surgical instruments;

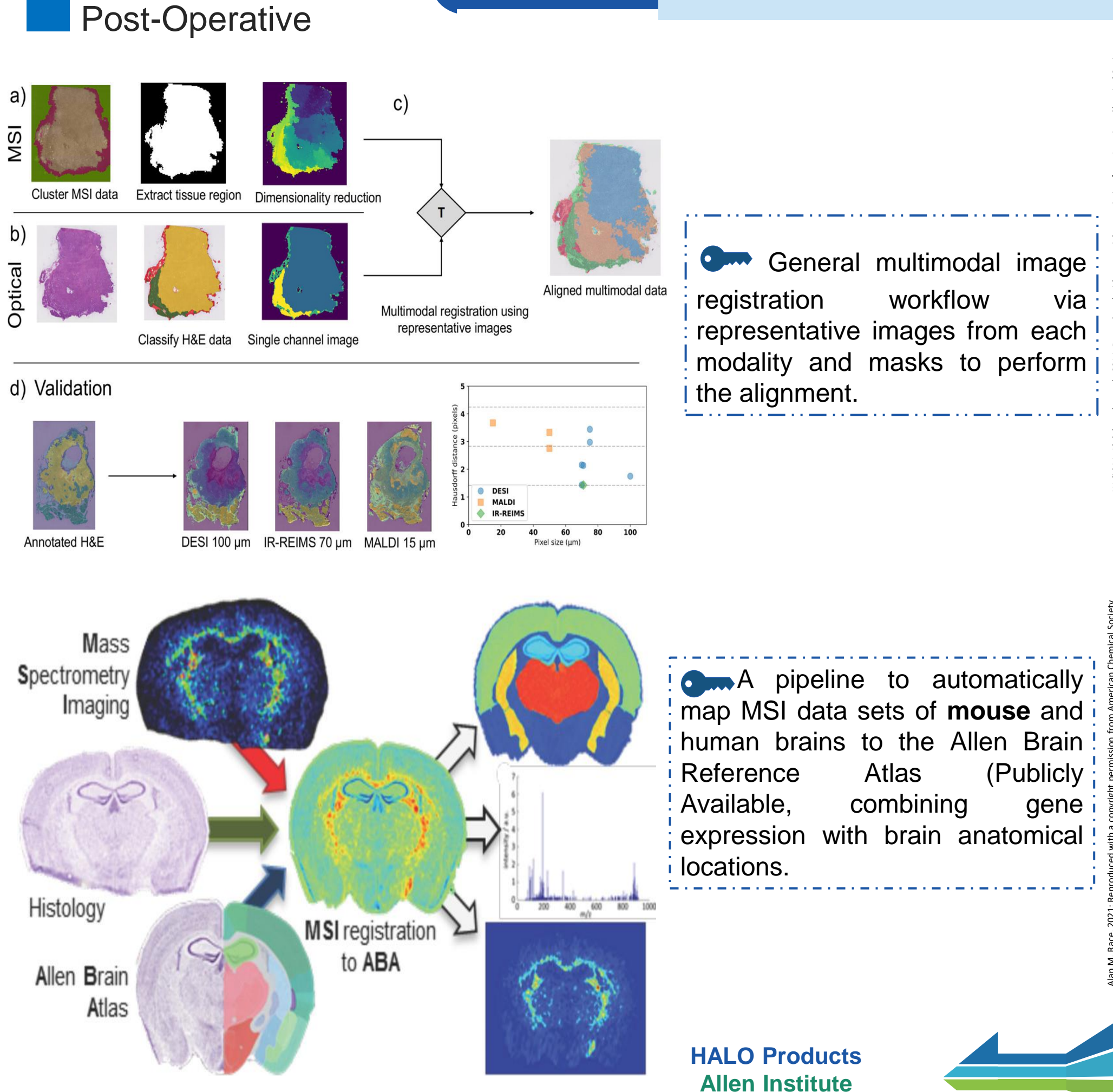
## Intra-Operative



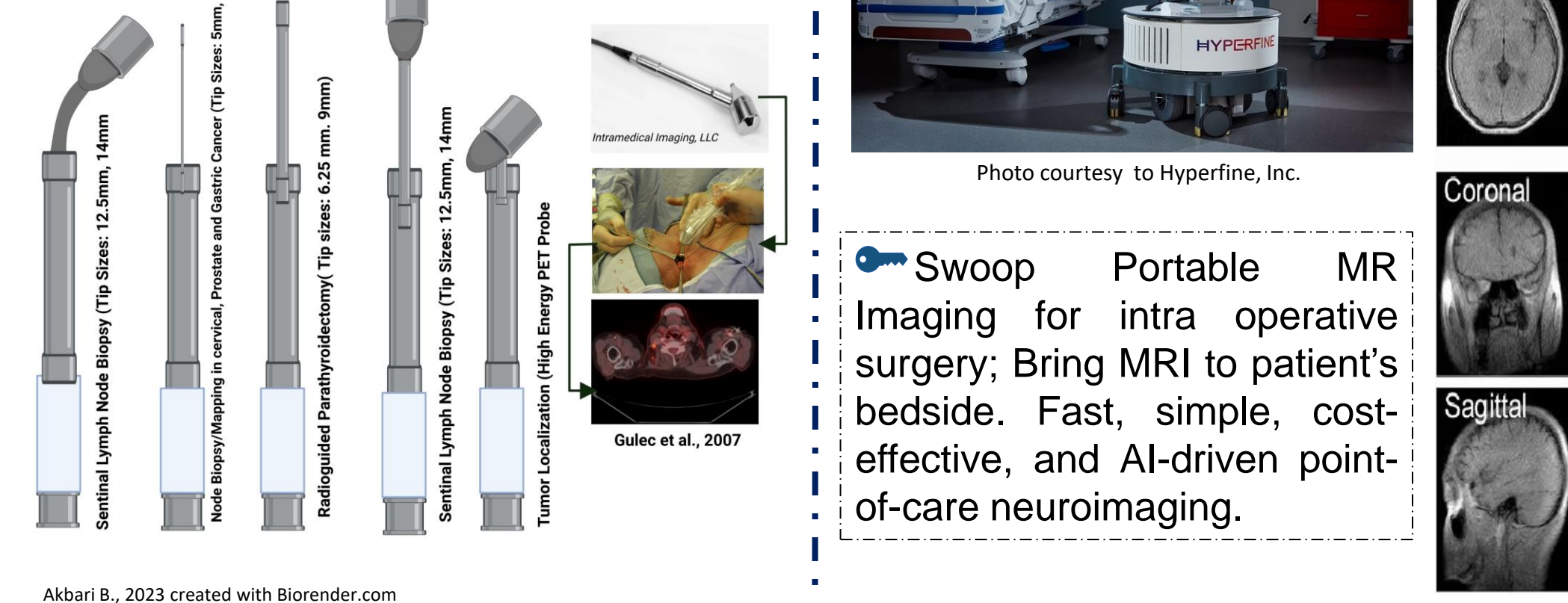
Setup for in vivo drop-in MasSpec Pen experiments; For traditional histopathology works, the average wait time is 40 minutes or more but with mass spec pen, it is ~10 seconds — without leaving the operating room or tissue removal from the patient to wait for traditional histopathology results

**DESI** is an ambient ionization surface analysis technique (Pancreatic cancer tissue, breast cancer tissues, Lymphnodes, surgical glioma patients), **Mass Spec pen** ( ex vivo; Human breast, lung, ovary cancer), Picosecond infrared laser (**PiRL**) [Medulloblastoma xenografts], **Robot-Assisted SpiderMass** (ex vivo; Fresh human abdominal skin discs (12 mm diameter))

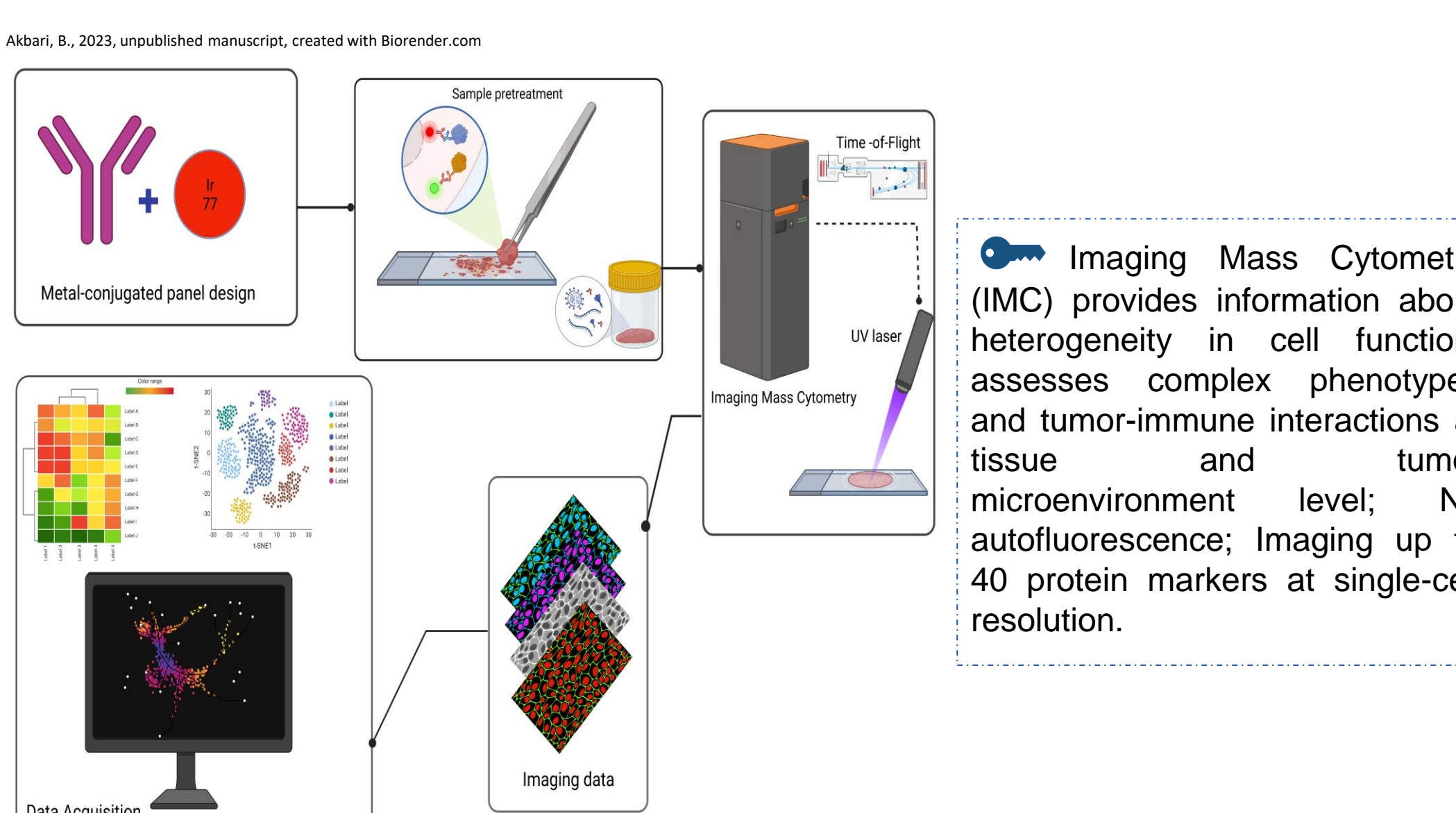
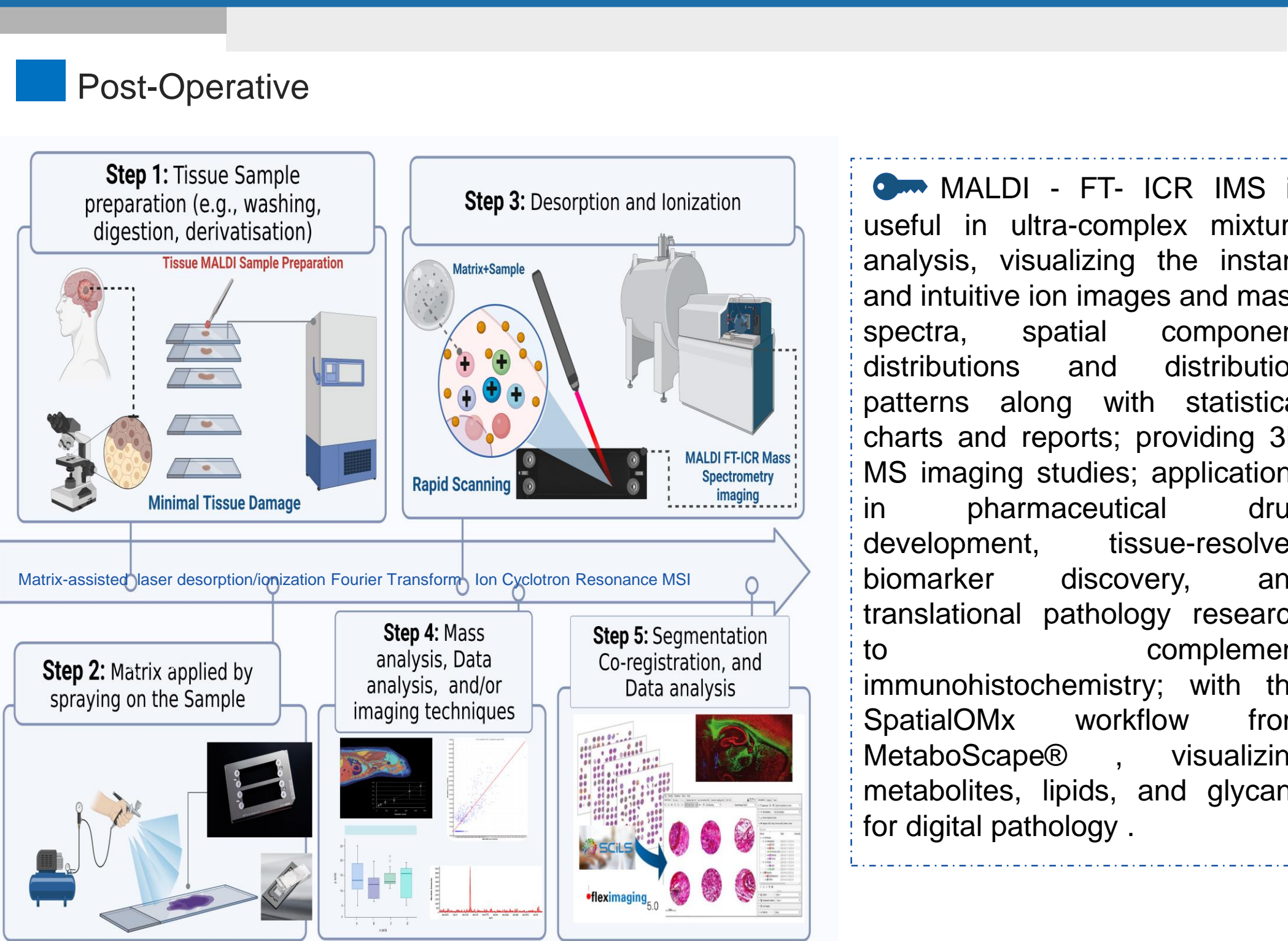
## Multi-Modal Imaging



## Intraoperative

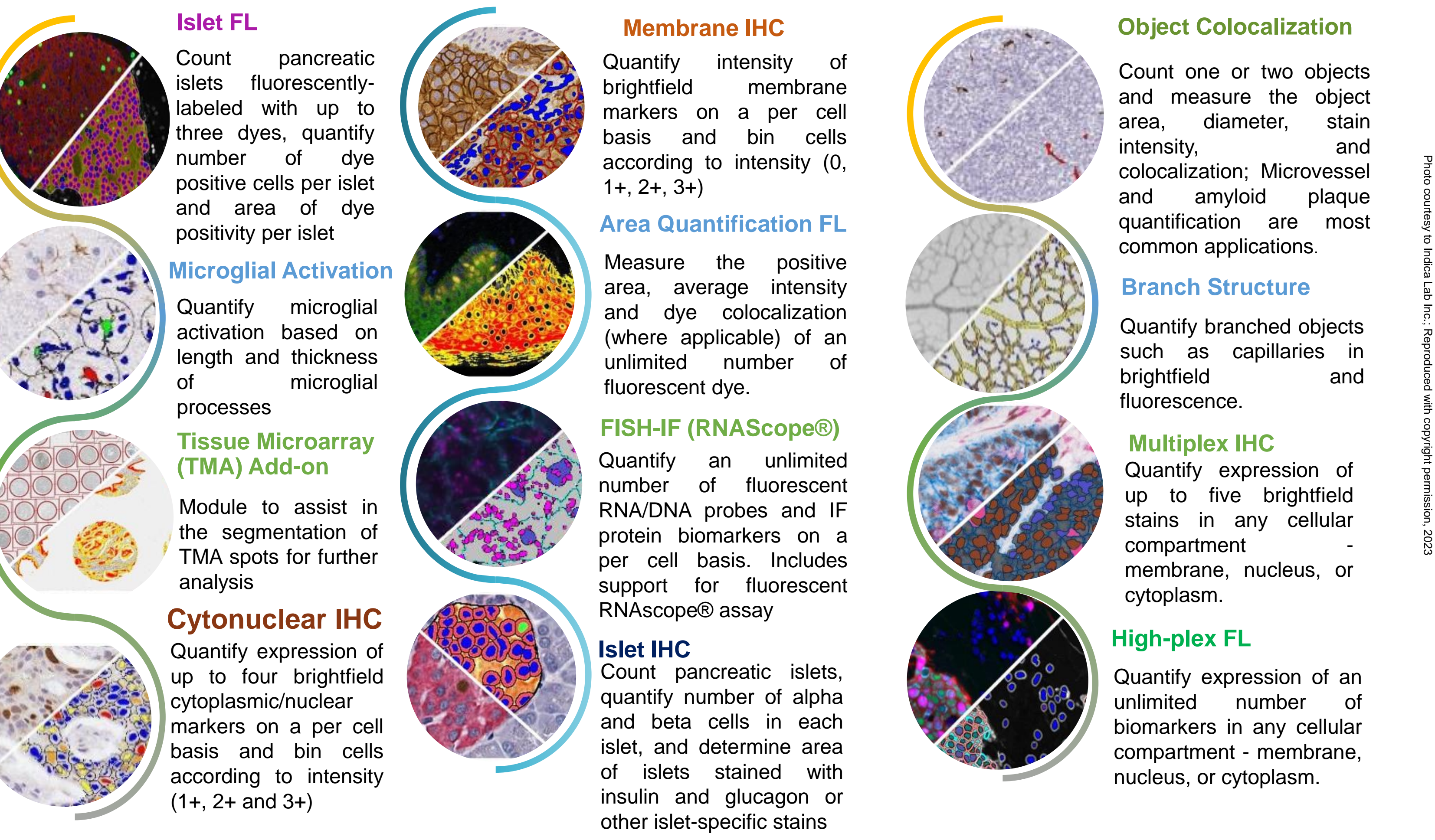


## Post-Operative



## Pathology Workstations

HALO products are a Gold standard image analysis platform to do quantitative tissue analysis in digital pathology; Fast, ease-of-use in pharmaceutical, healthcare and research organizations in oncology, neuroscience, metabolism, toxicology and more; No autofluorescence



**Summary**

The infographic IMS project incorporated educational technology and engaged the multi disciplinary team (chemists, pathologists, and surgeons) in clinical laboratories. Several beneficial features, such as a quick overview of IMS technology in the clinical setting and multimodal imaging integration, could promote visual literacy and develop creativity in the imaging domain.

**Outlook**

It is very likely that PET imaging is combined with IMS to unravel many biological questions in preoperative and intraoperative surgery. Also, multimodal imaging can potentially support clinical opportunities, from special phenotyping to diagnose and assess the stage of diseases (e.g., cancer, infections, and rare diseases (including benign))

