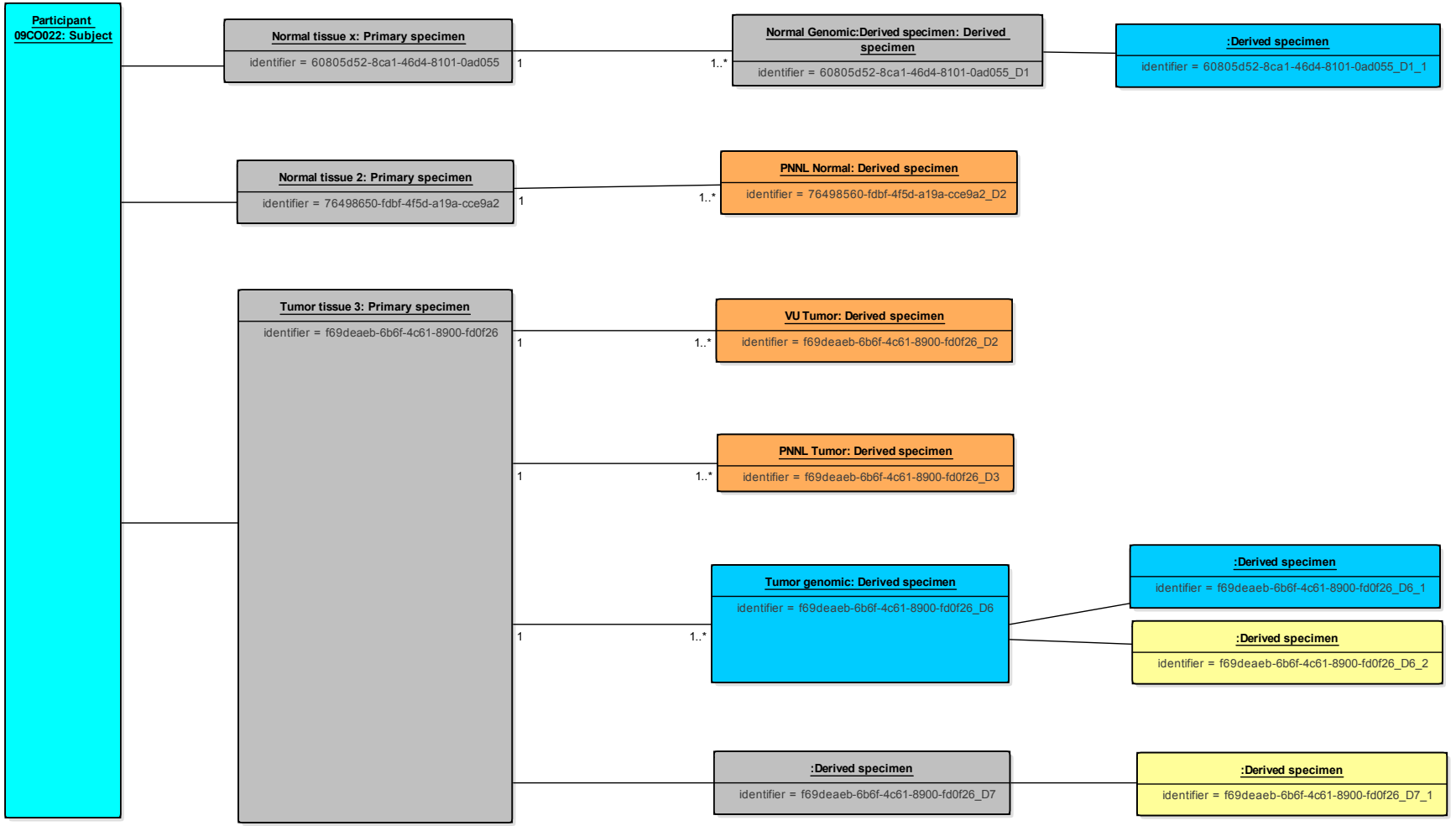
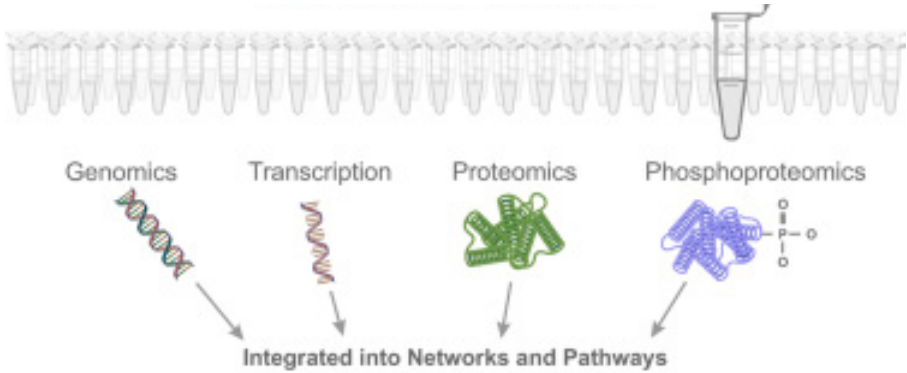
Slide 1 – Study design crosses nodes of the CRDC



Genomics
Proteomics
Imaging

Slide 2 – Use Case : Proteogenomic Integration

- Identify variant protein sequences corresponding to somatic mutations and to evaluate the relationship between mutation frequency and variant protein expression.
- Determine how copy number variation translates into protein expression differences.
- Evaluate the impact of genomic features on the status of signaling networks through direct analysis of phosphoprotein intermediates
- Derive preliminary associations with clinical characteristics, such as platinum resistance in ovarian cancer.



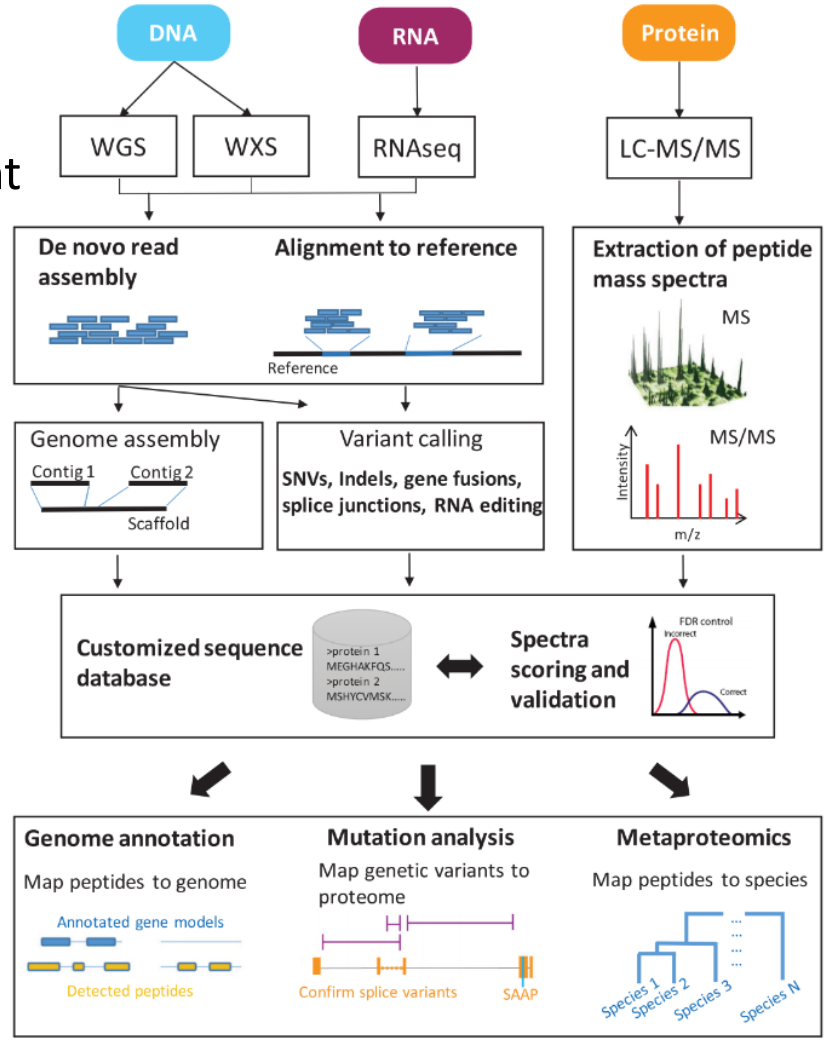
Proteogenomics connects somatic mutations to signaling in breast cancer

Proteogenomic characterization of human colon and rectal cancer

Integrated proteogenomic characterization of human high grade serous ovarian cancer

Slide 3 – Use Case : Proteogenomic Integration

1) Sequence-centric Proteogenomics:
describes aspects of sequence-centric proteogenomics and the combined use of genomic and proteomic data to augment gene or protein annotation

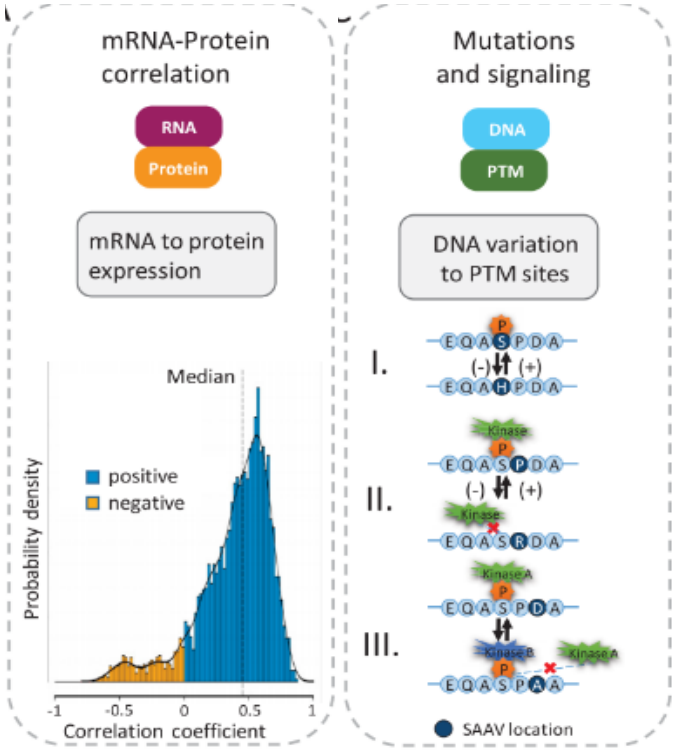


Molecular & Cellular Proteomics, 959–981, 2017.

Slide 4 – Use Case : Proteogenomic Integration

1) Sequence-centric Proteogenomics:
describes aspects of sequence-centric proteogenomics and the combined use of genomic and proteomic data to augment gene or protein annotation

2) Analysis of Proteogenomic Relationships:
explores relationships between genomic and proteomic data using correlation, with application to deciphering the effect of mutations on signaling



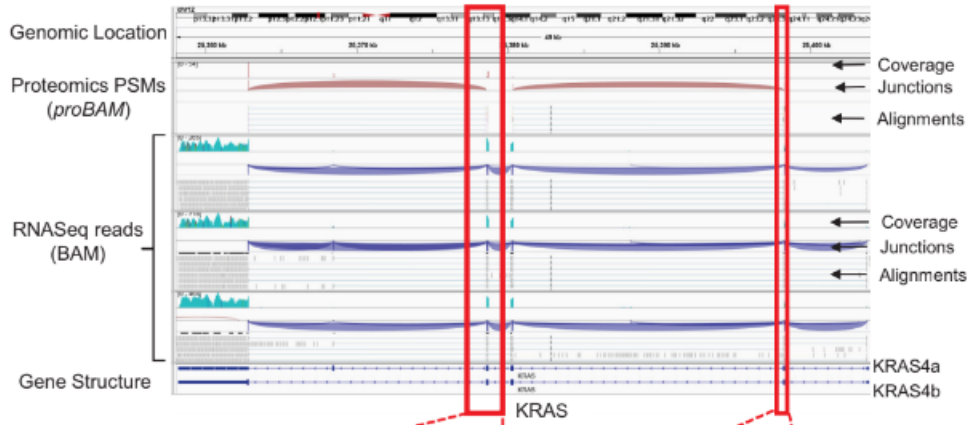
Molecular & Cellular Proteomics, 959–981, 2017.

Slide 5 – Use Case : Proteogenomic Integration

1) Sequence-centric Proteogenomics:
describes aspects of sequence-centric proteogenomics and the combined use of genomic and proteomic data to augment gene or protein annotation

2) Analysis of Proteogenomic Relationships:
explores relationships between genomic and proteomic data using correlation, with application to deciphering the effect of mutations on signaling

3) Data Visualization:
integrate mass spectrometry data with the genome.



Molecular & Cellular Proteomics, 959–981, 2017.

Slide 6 – Use Case : Proteogenomic Integration

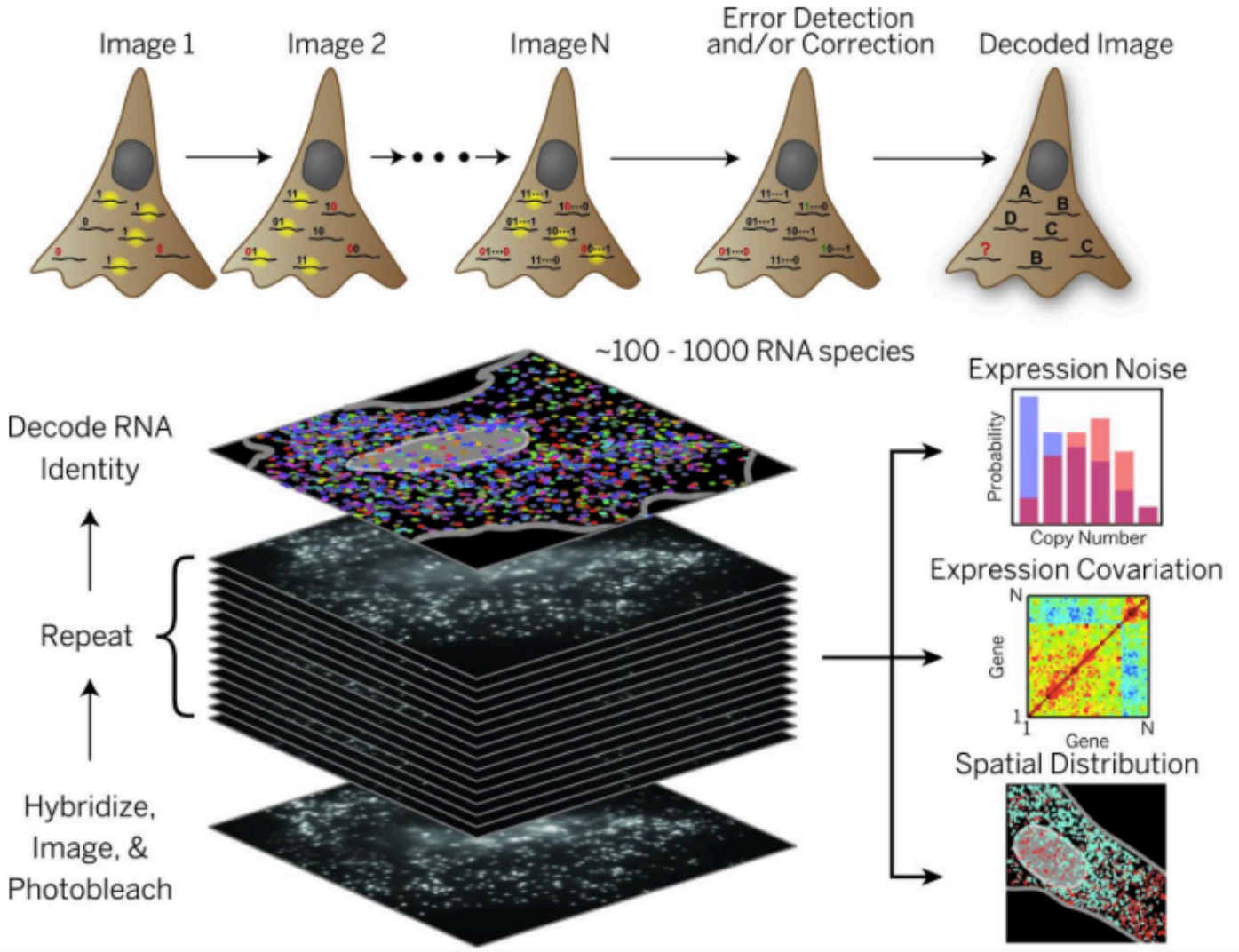
Find all the **Program / Project / Study** in **PDC / GDC / IDC** that have g **Proteomic / Genomic / Imaging** data

Get **RNA-Seq BAM file / Variant file / RNA-Seq Junction file** for a **Case/s / Sample/s / Aliqot/s**

Get **Copy Number Data / Expression Data** for a **Project / Study**

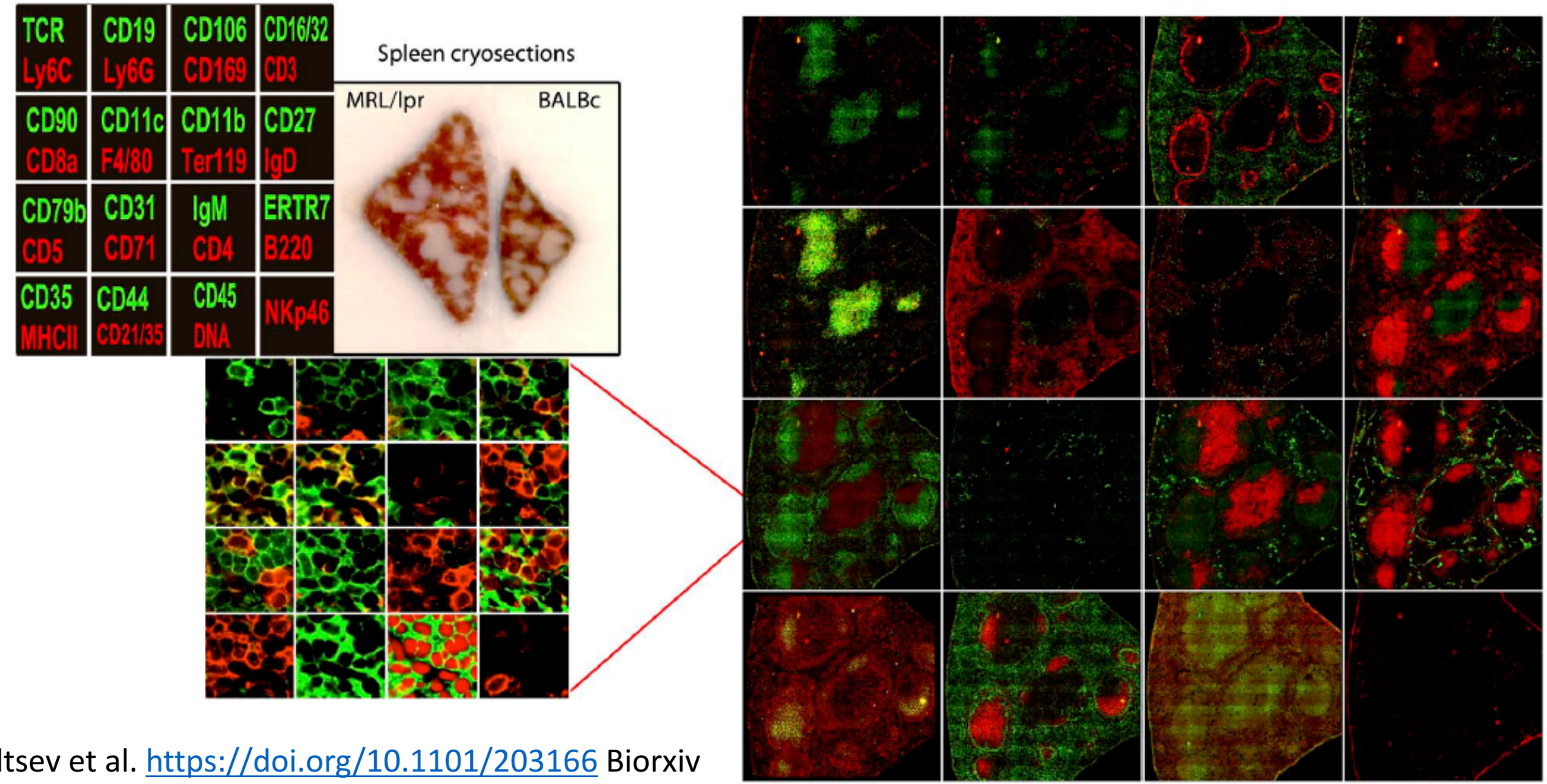
I know there is genomic information available for the PDC proteomic study I am interested in. How can I seamlessly integrate the somatic/germline variant, RNA-seq predicted junctions and fusion, etc to create a custom sample specific database to search against?

Slide 7 – Spatially resolved expression levels of 100s+ genes



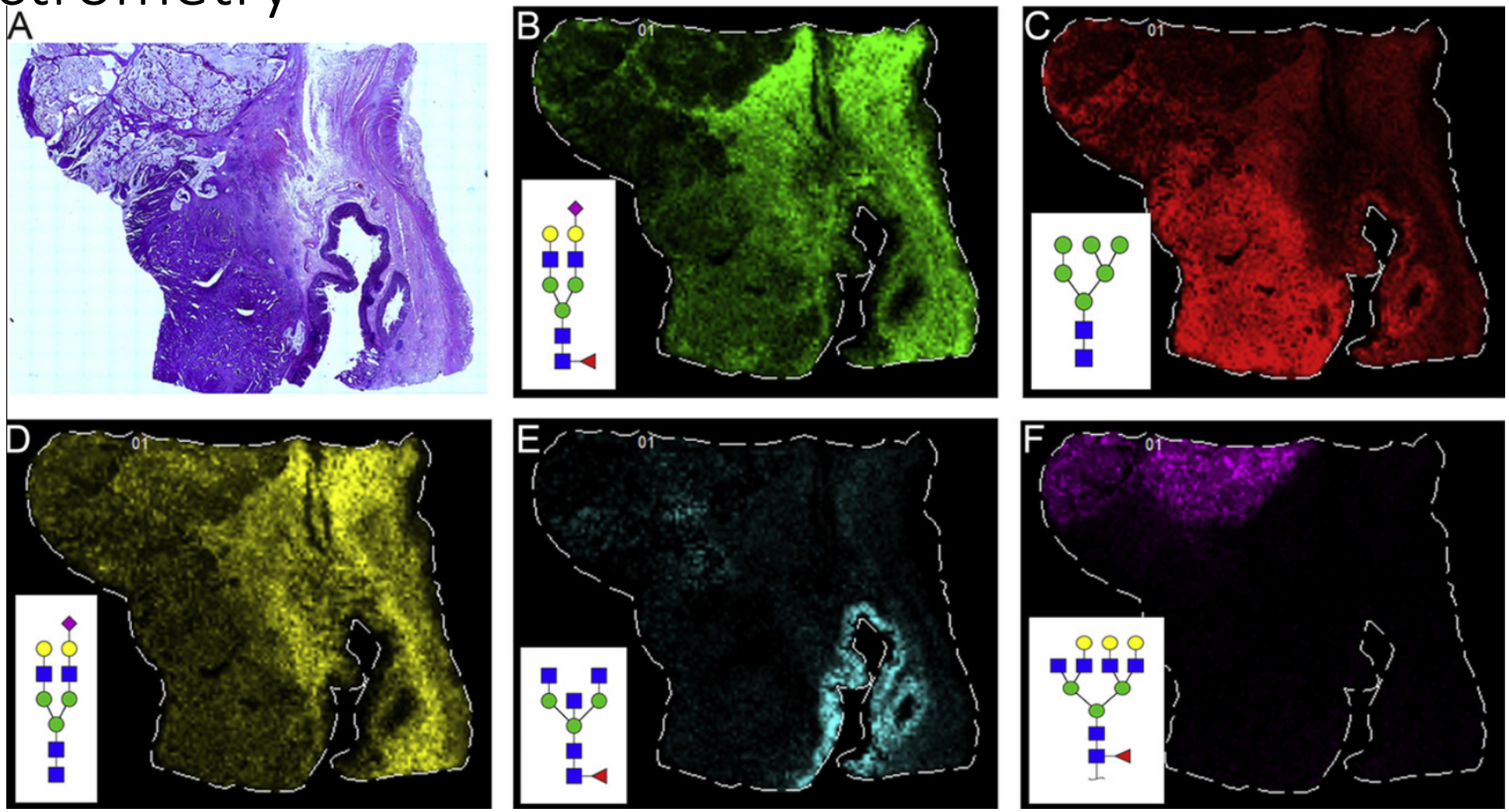
K.H. Chen, A.N. Boettiger, J.R. Moffitt, S. Wang, X. Zhuang ***Science*** *348* aaa6090 (2015)

Slide 8 – Immunofluorescence of up to 100 markers on the same tissue



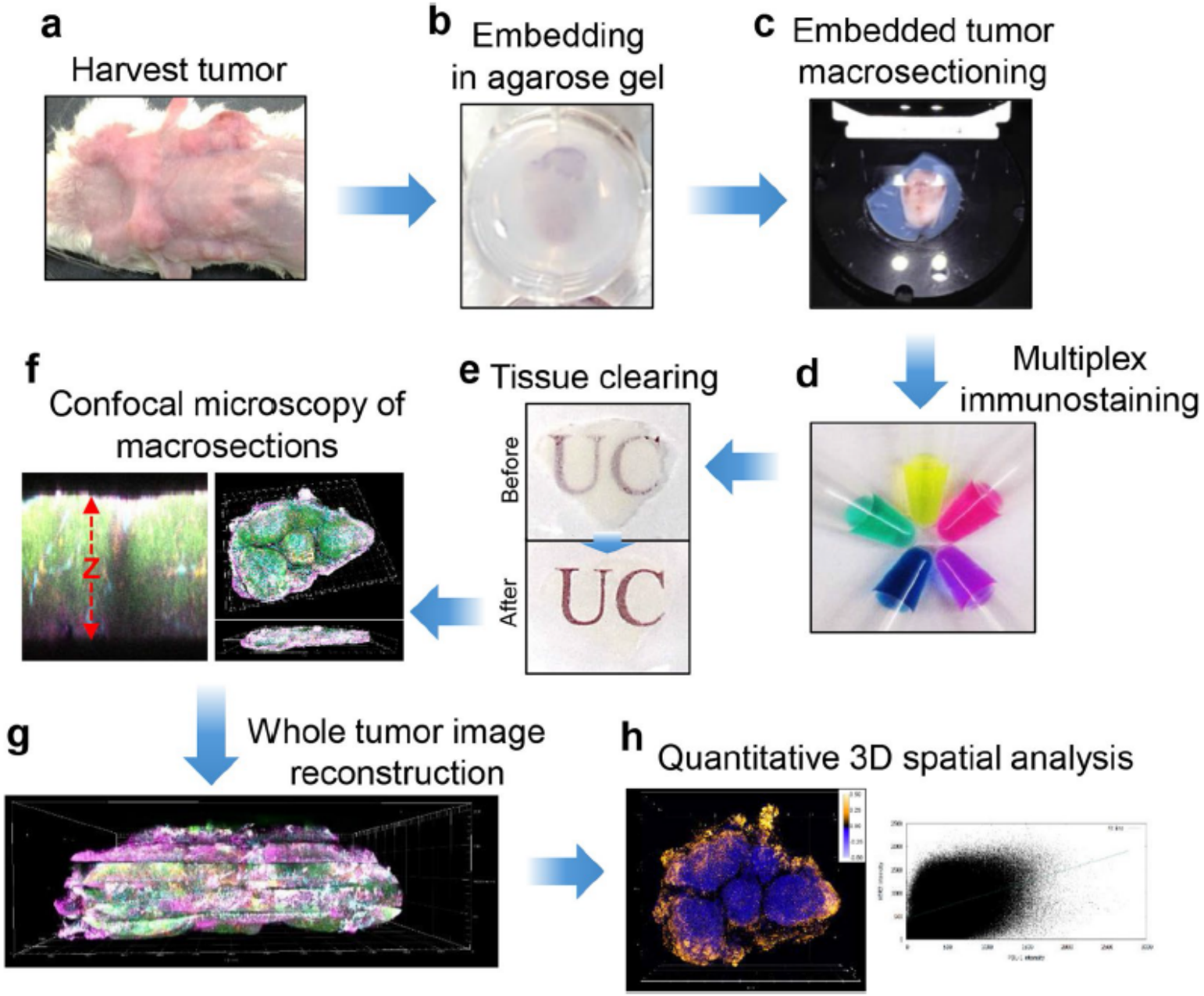
Goltsev et al. https://doi.org/10.1101/203166 Biorxiv

Slide 9 – Label free imaging using MALDI Mass Spectrometry



Drake et al. Link

Slide 10 – 3D Tissue Imaging



Lee et al. Scientific Reports, Nov 2017