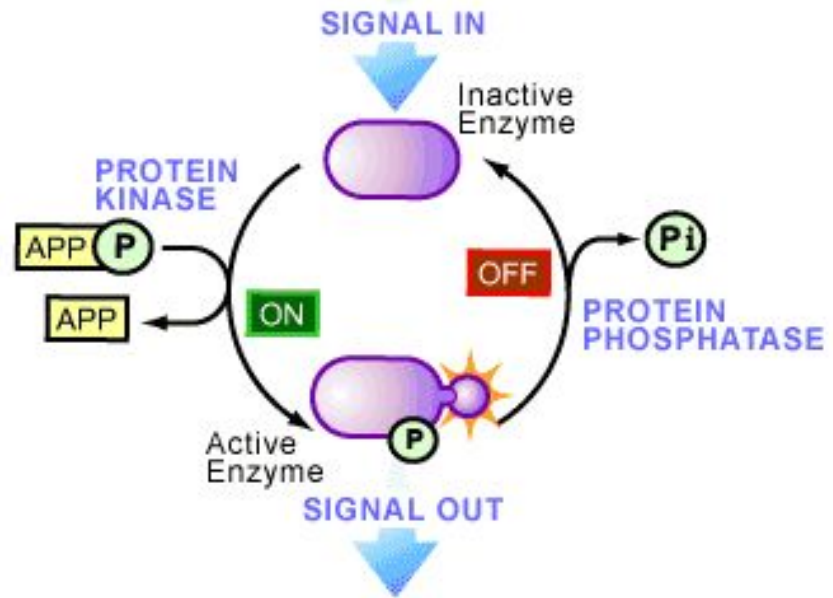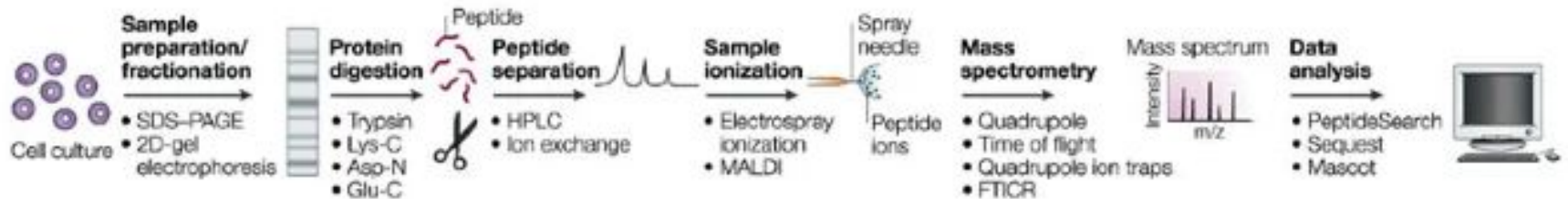# Cell Type Deconvolution by Phosphoproteomics

Background

- Signal transduction
- Protein phosphorylation
  - Kinases
  - Phosphatases
  - Adapter proteins
- Cancer

Background

- Phosphoproteomics
- Mass spectrometry

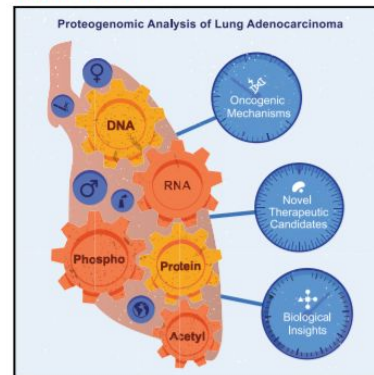Nature Reviews | Molecular Cell Biology

Project Overview

- Identify cell types in tumor tissue samples based on bulk phosphoproteomic data
- Data from a 2020 study in *Cell*
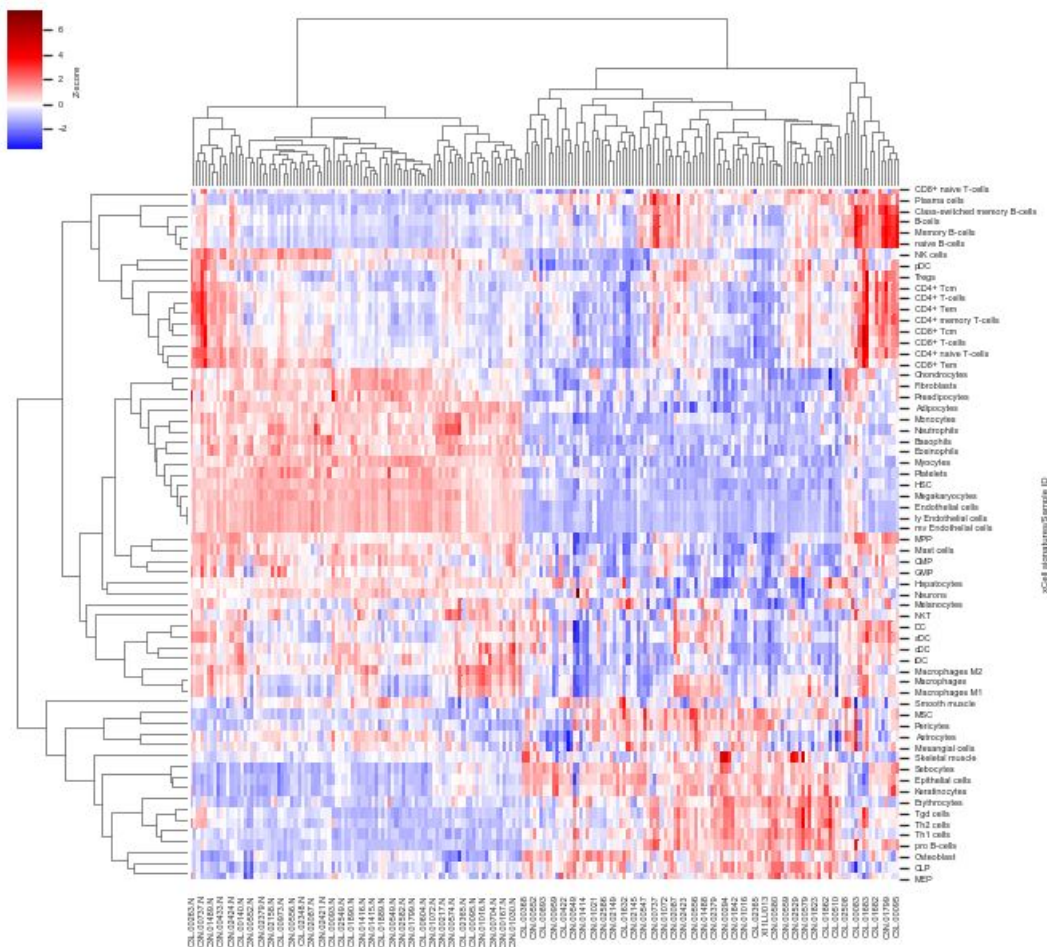- Started by doing correlation analysis

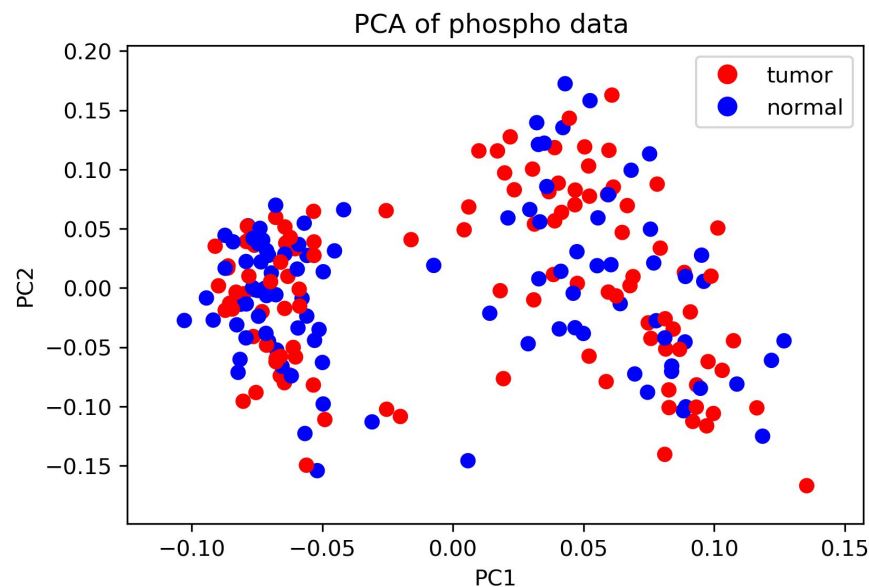# Phosphopeptide vs. Sample Heatmap
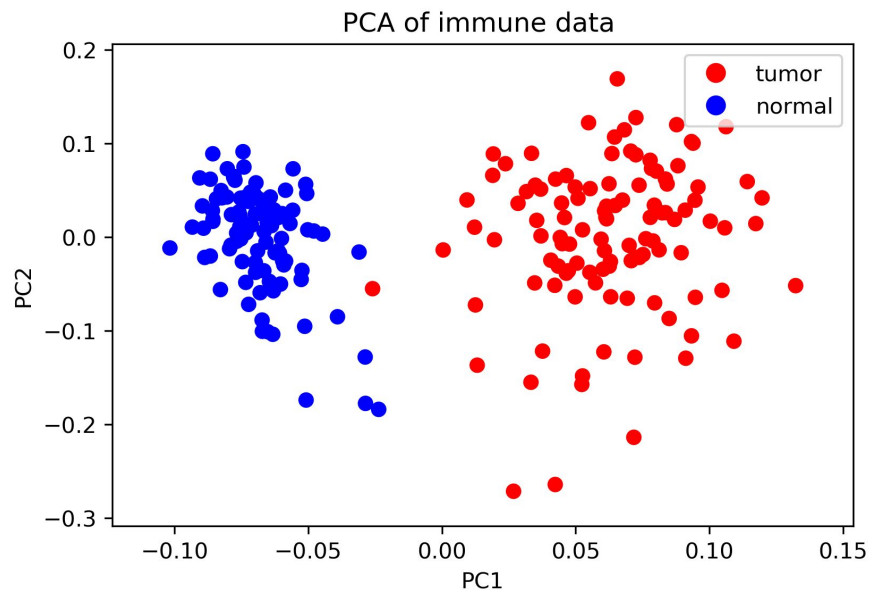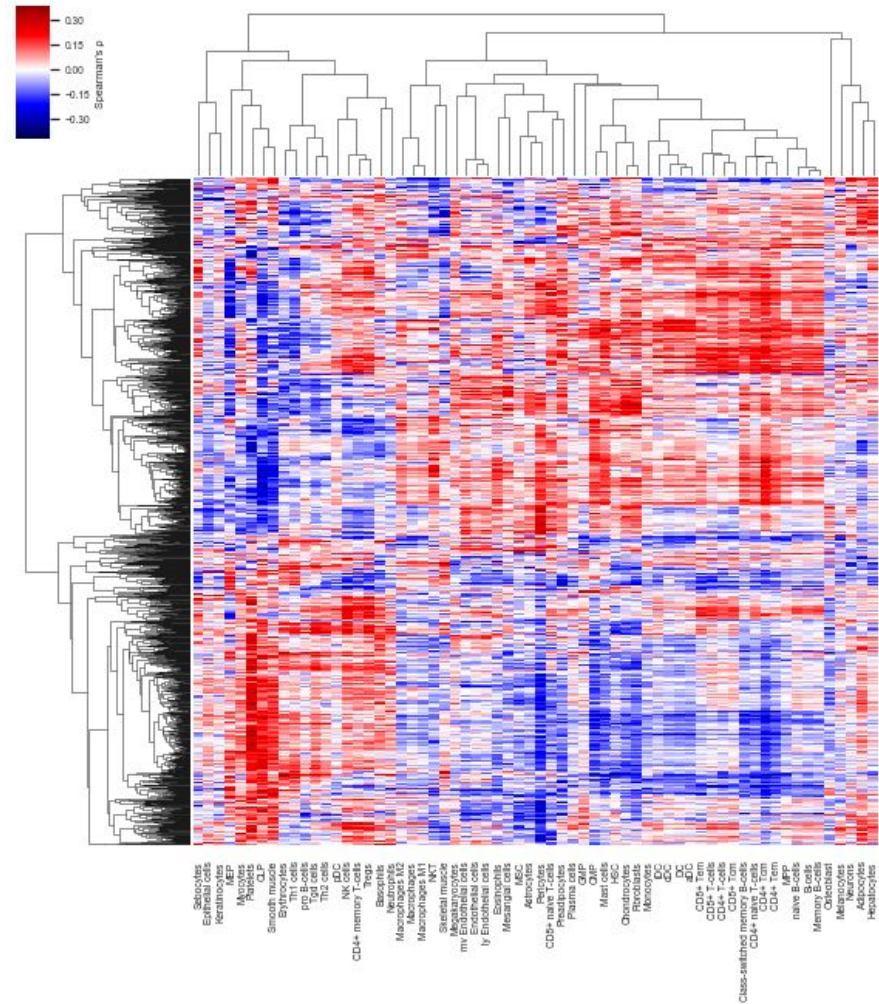
- 5256 peptides
- 211 samples
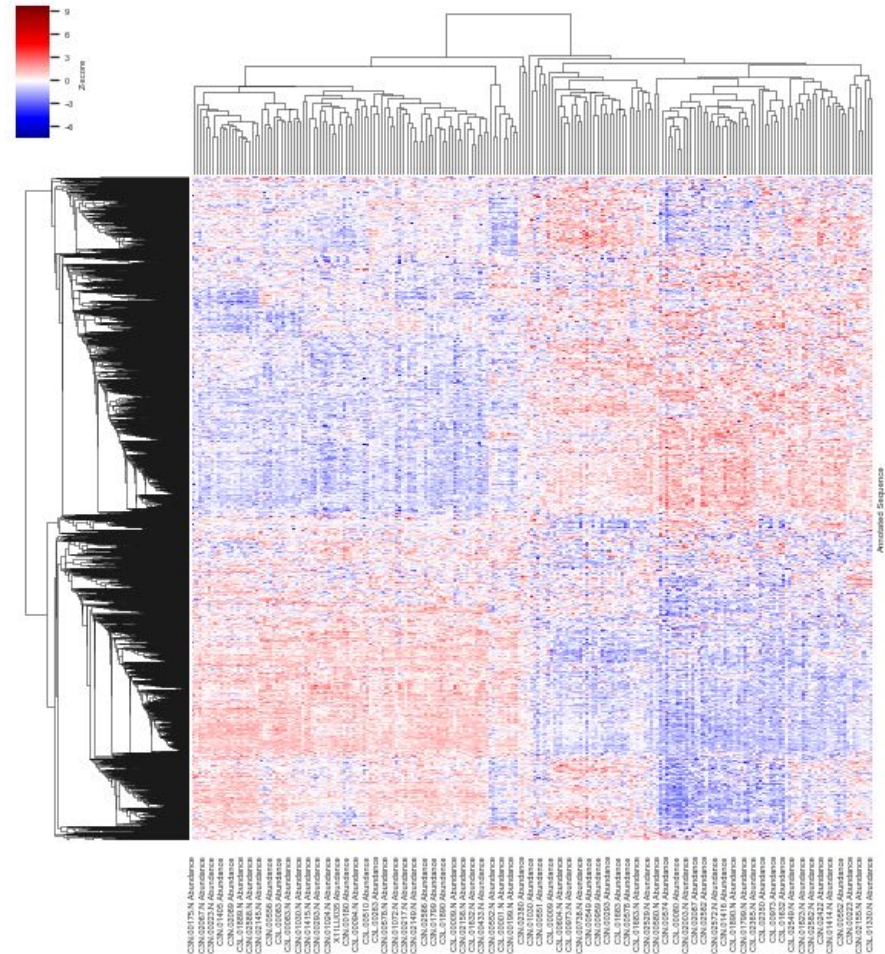
Immune Cell vs. Sample Heatmap

- 64 immune cells
- 211 samples

Principal Component Analysis (PCA)

Phosphopeptide vs. Immune Cell Heatmap
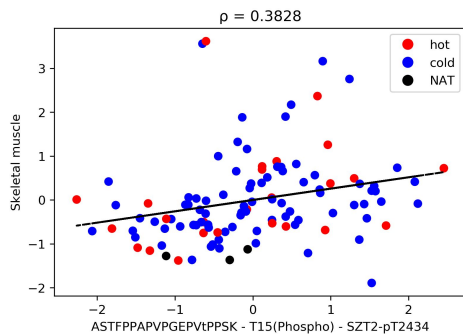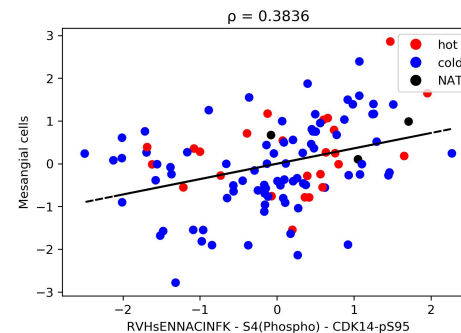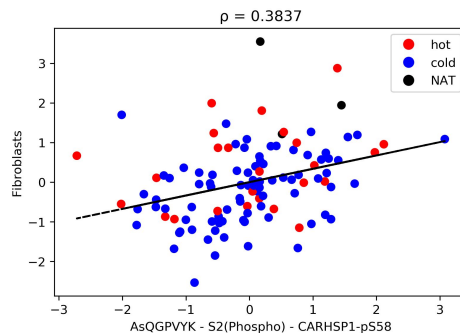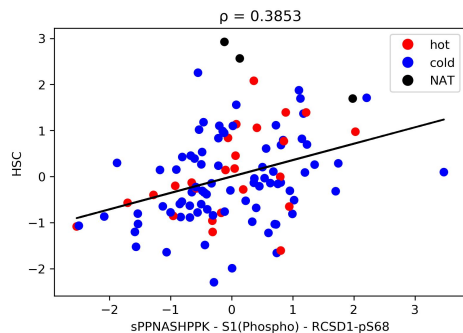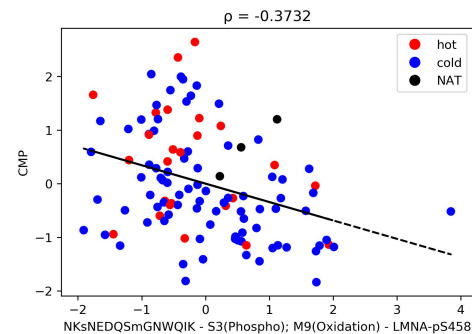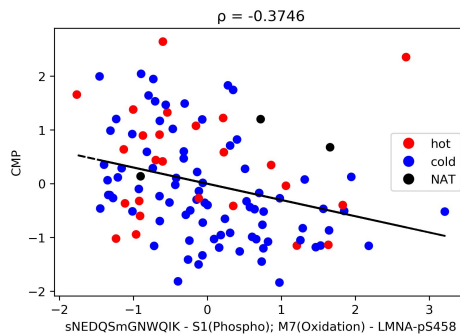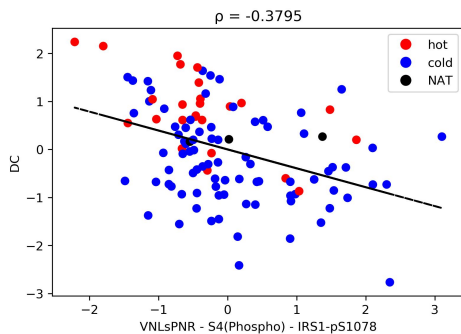
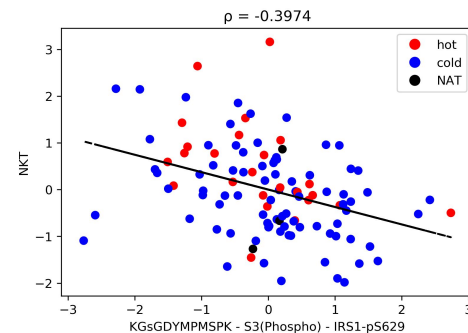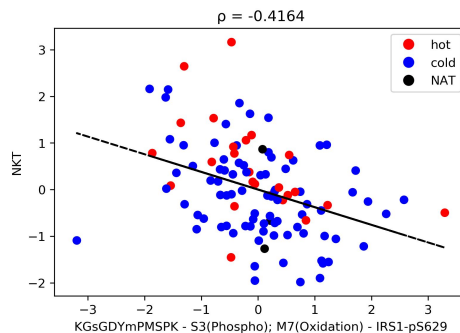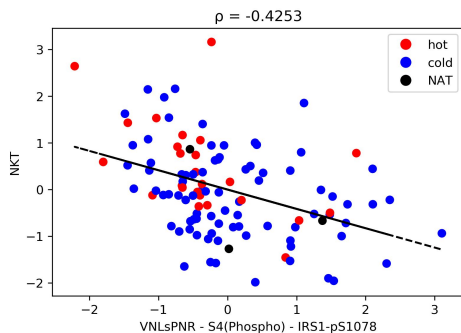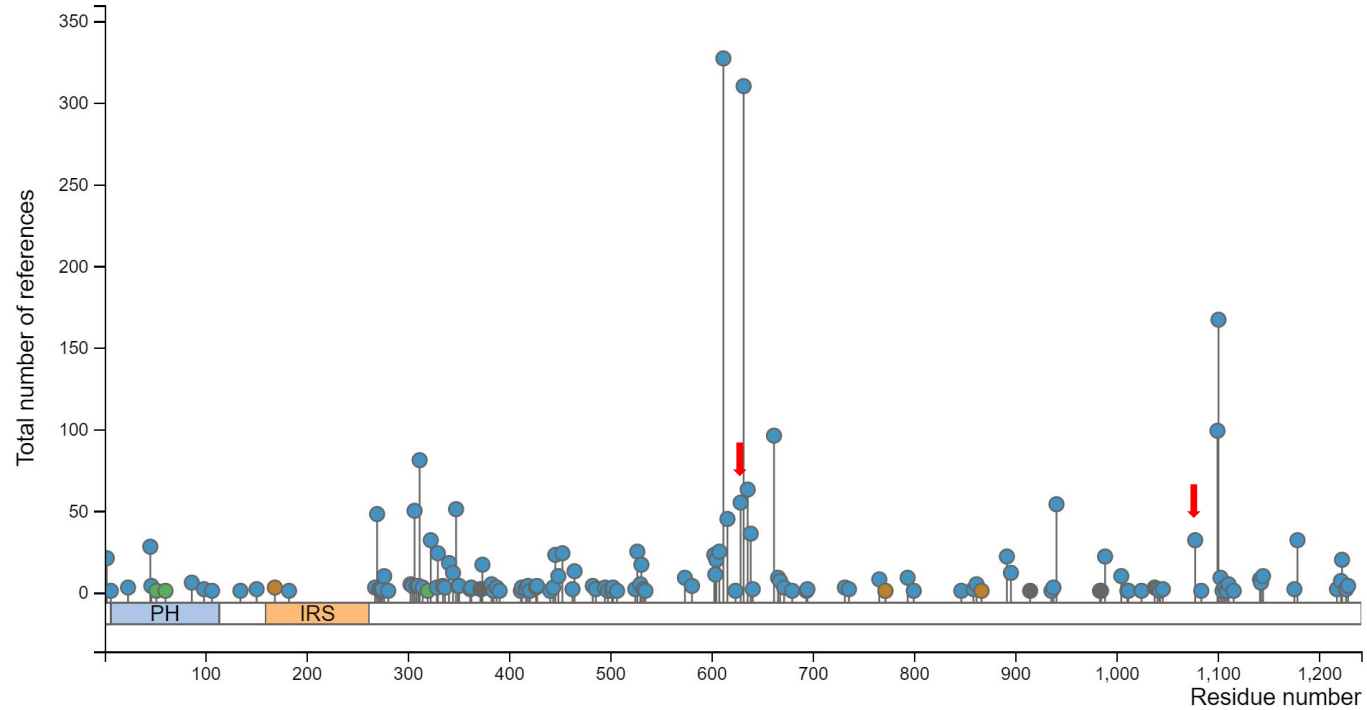- 1584 peptides
- 64 immune cells

Most Correlated Peptides and Immune Cells
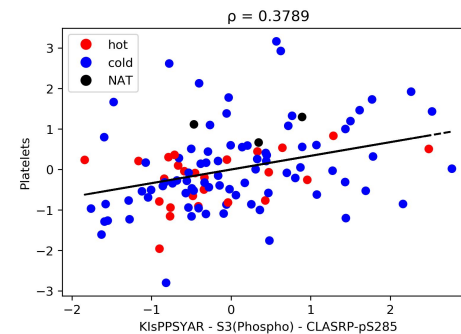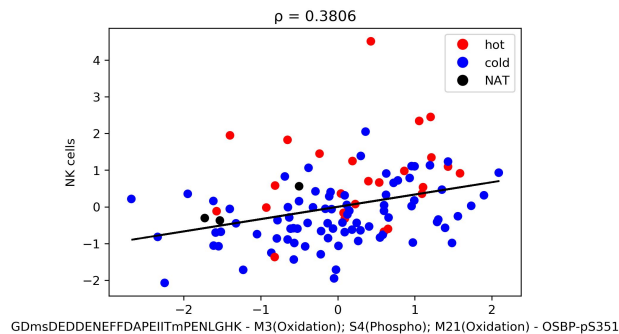
Least Correlated Peptides and Immune Cells

Insulin Receptor Substrate 1 (IRS1)

Future Work

- Biomarker analysis
  - Found matches between sample peptides and biomarkers
  - ['NES', 'VIM', 'NRP1', 'SPN', 'RORA', 'S100A9', 'NFKB1', 'STAT1', 'C5AR1', 'CD44', 'GP1BB', 'KIT', 'STAT3', 'RUNX1', 'ALDOC', 'PECAM1', 'PTPRC', 'AQP4', 'PEA15', 'ITGA4', 'FOXO1', 'NDRG2', 'MSR1', 'VPS54']
- Predictions based on signatures
- Other datasets