

# STANFORD O'BRIEN UROLOGY RESEARCH CENTER

Focus on Benign Prostatic Hyperplasia

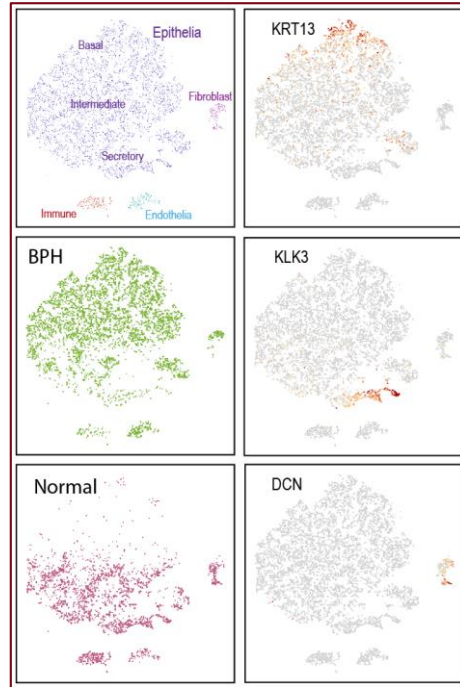
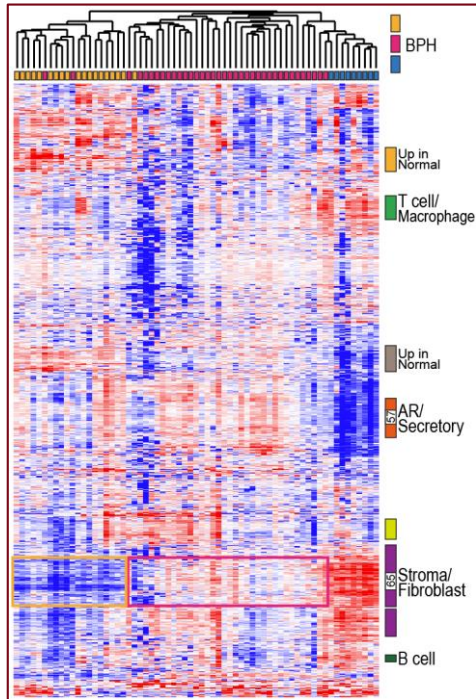
Jim Brooks (Director)

Jon Pollack

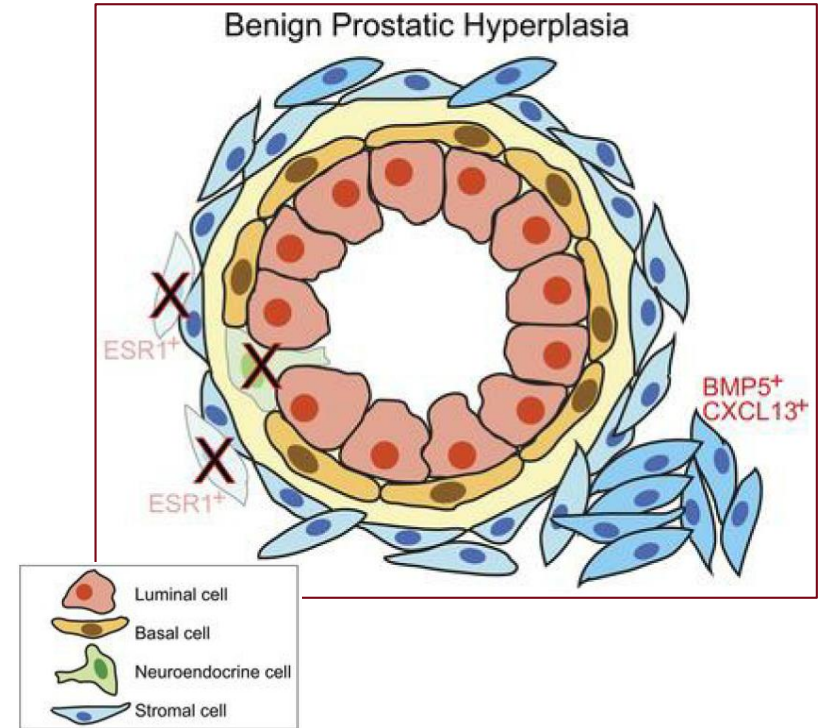
Rob West

# Center Overview

## P20: Genomic views of BPH



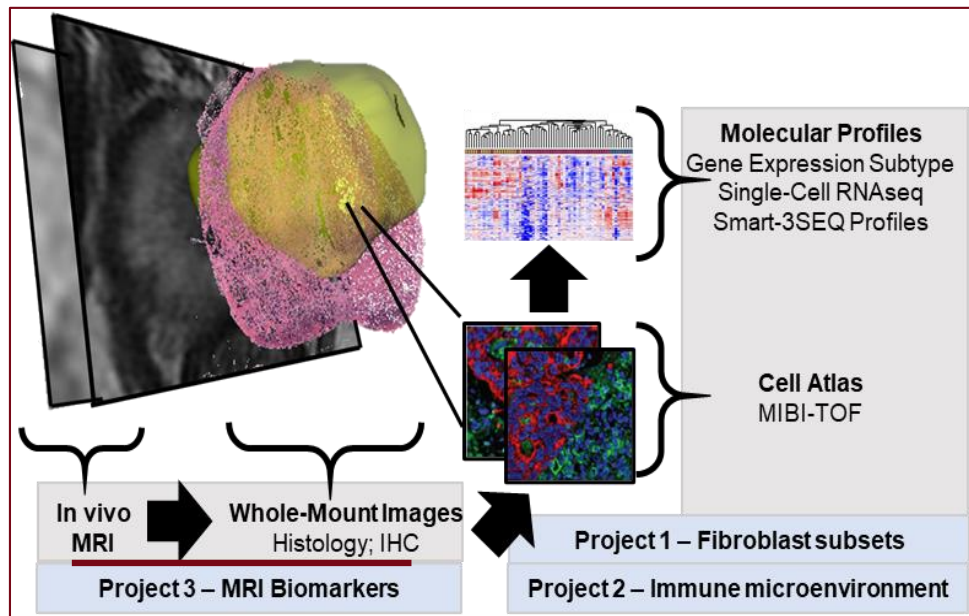
## BPH: Cellular “re-landscaping”



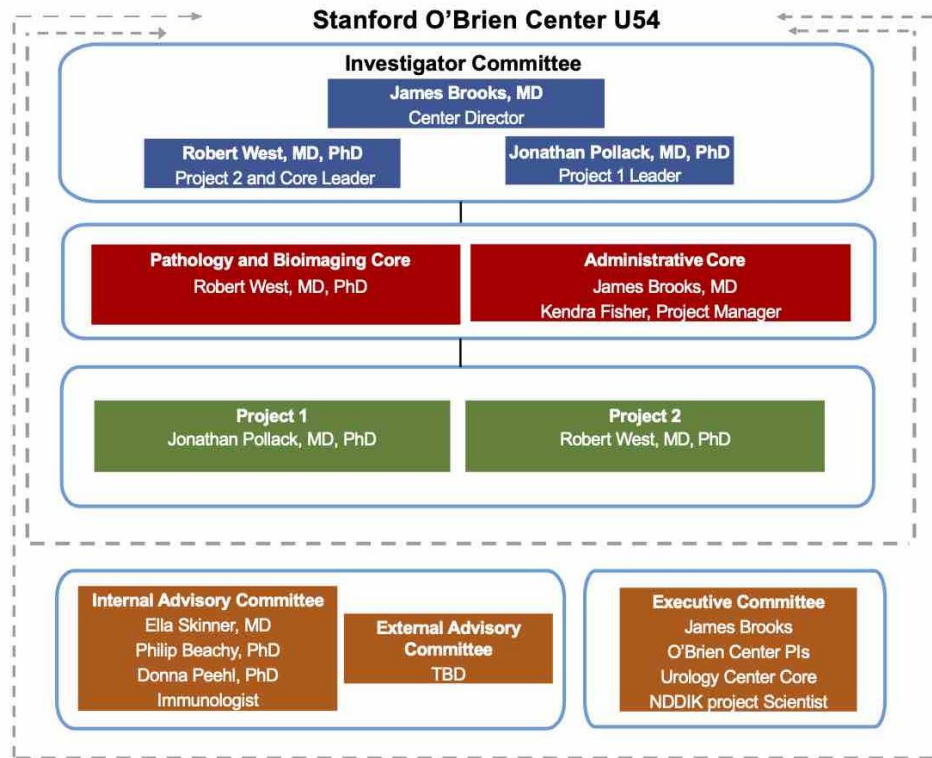
Middleton et al. JCI Insight, 2019

# Center goals: BPH Atlas

Multi-scale atlas of tissues,  
cells and molecules



## Center Structure

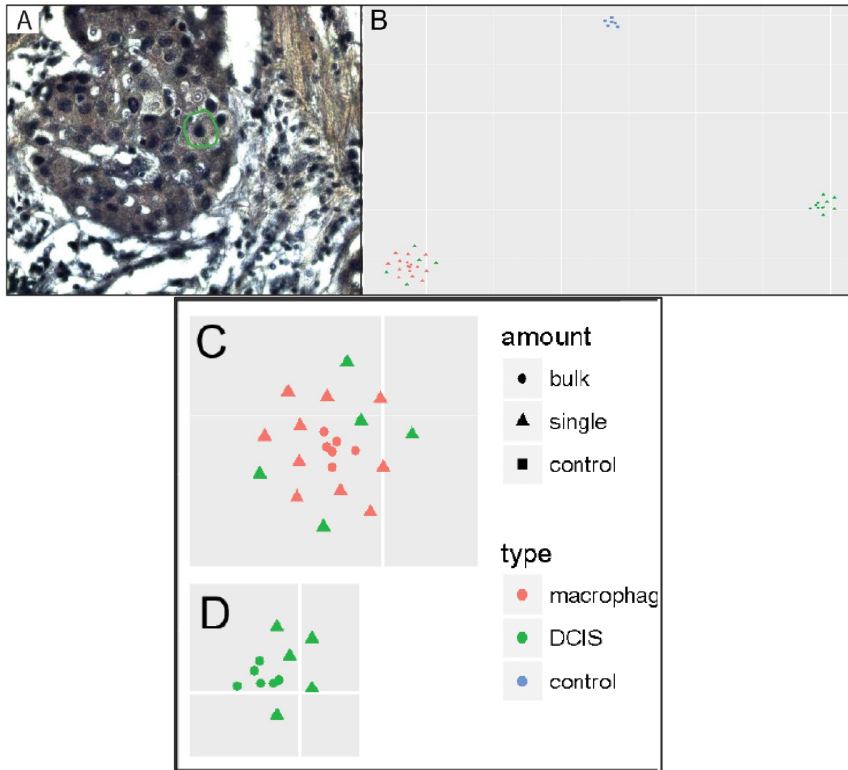


# Biospecimen/Bioimaging Core

- Procure needed prostate biospecimens
- Provide tissue characterization services
  - Tissue microarrays, laser microdissection, MIBI-TOF
- Archive MRI and digital histology/IHC images

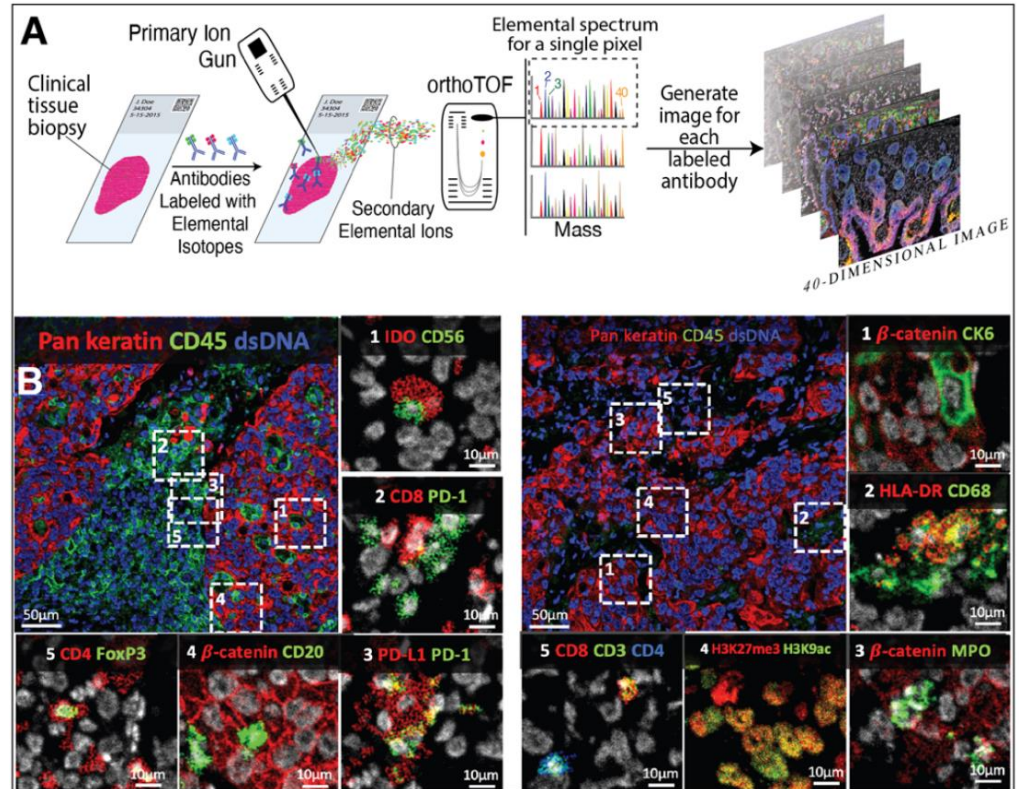
# Biospecimen/Bioimaging Core

## Spatial transcriptomics (LCM/Smart-3SEQ)



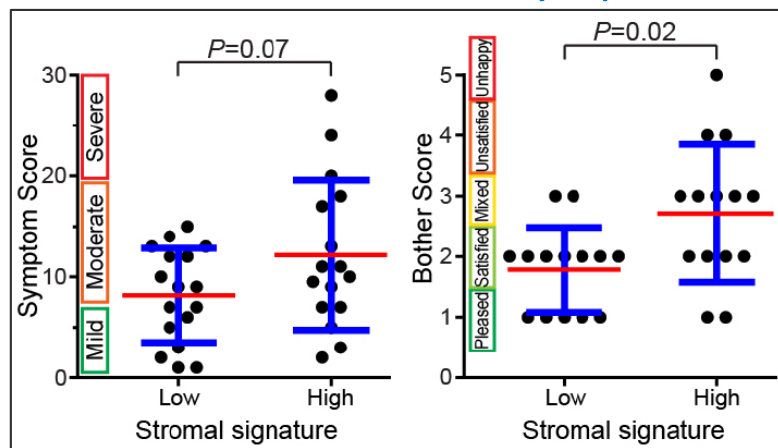
## Multiplex-IHC

### Multiplexed Ion Beam Imaging by Time of Flight (MIBI-TOF)

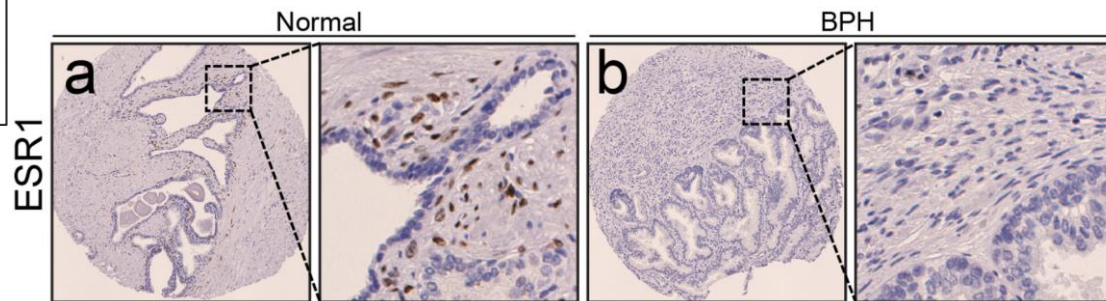
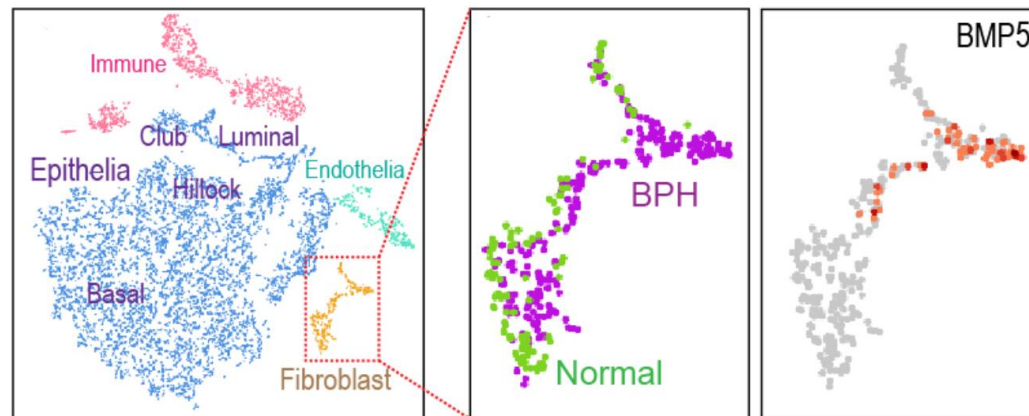


# Project 1: Stromal fibroblasts in BPH pathogenesis

Stromal fibroblast signature correlates with BPH symptoms



Altered fibroblast subsets in BPH



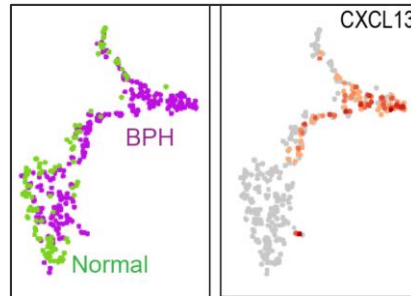
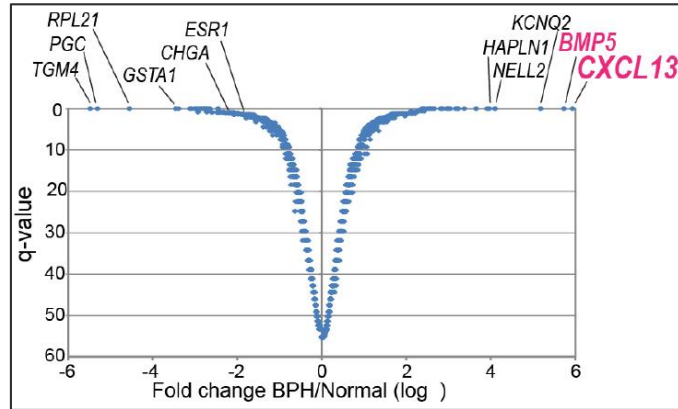
Middleton et al. JCI Insight, 2019

# Project 1: Fibroblast subsets in BPH pathogenesis

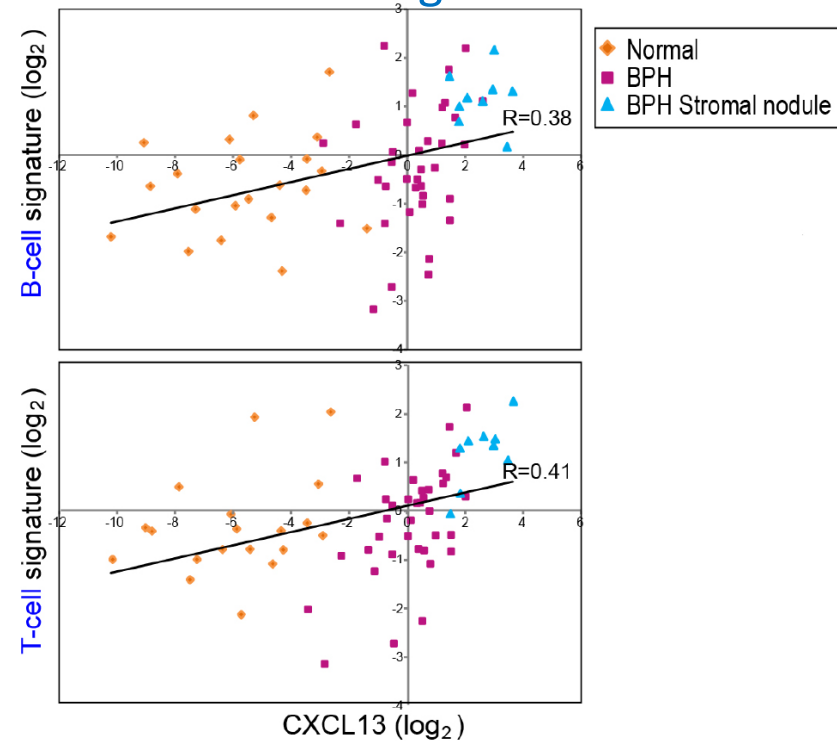
- Define the fibroblast subsets in BPH versus normal prostate
  - scRNAseq, MIBI-TOF, LCM/Smart-3SEQ
- Determine key interactions between BPH fibroblast subsets and prostate epithelium that drive prostate enlargement
  - Cell neighborhoods, co-expression analysis, cell/tissue models
- Distinguish between BPH stromal origins in embryonic re-awakening versus injury response
  - Differential enhancer usage

# Project 2: Immune microenvironment in BPH pathogenesis

CXCL13 is highly expressed in BPH stromal fibroblasts



CXCL13 expression correlates with immune signatures



Middleton et al. JCI Insight, 2019

# Project 2: Immune microenvironment in BPH pathogenesis

- Define immune cell populations in BPH by multiplex IHC  
-MIBI-TOF
- Understand immune cell function in BPH  
-Cell communities, computational modeling, clinical correlates
- Determine whether CXCL13 expression and accompanying immune cells is part of an immune response or a senescence response  
-Senescence markers, B/T cell clonality

# Future collaborations

- Investigations of BPH and LUTS
- Utilization of Center resources
  - Tissue microarrays, LCM/Smart-3seq, MIBI-TOF
- Training opportunities