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The emergence of proteomic big data research for precision medicine

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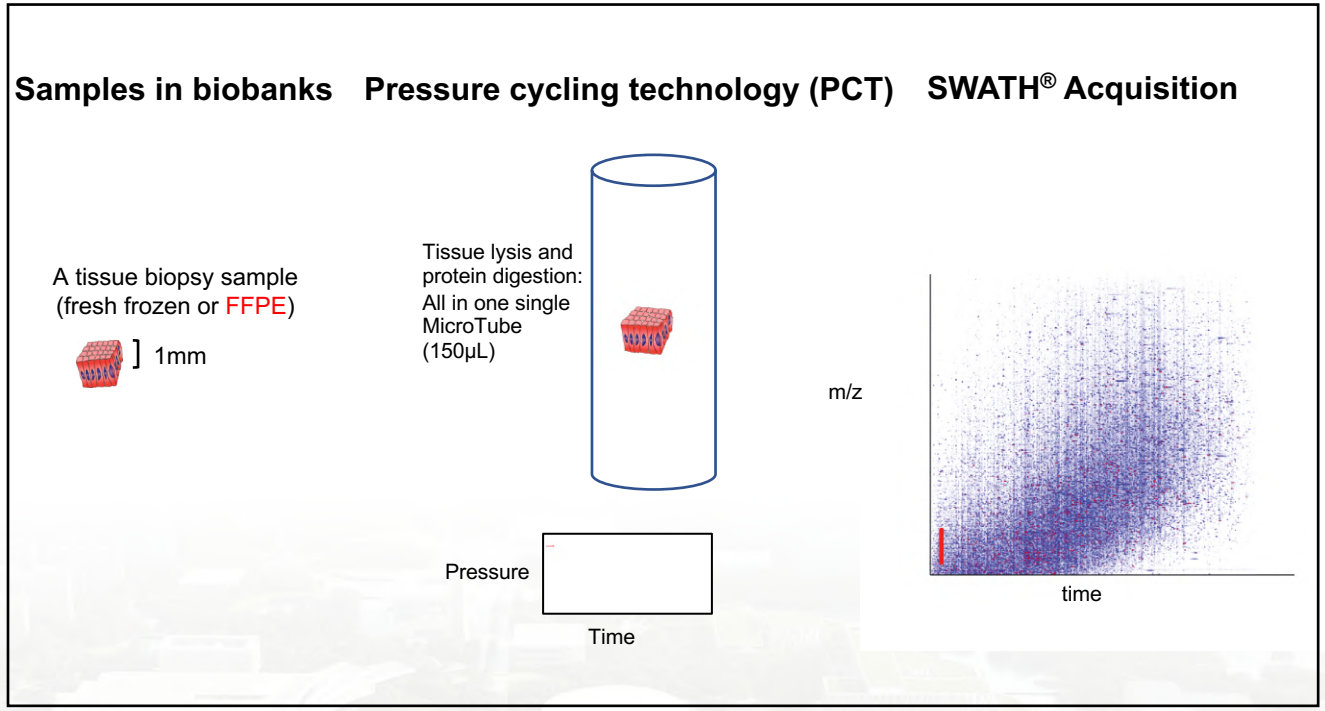
Proteome profiling of clinical tissues

Hurdles

- Cost
- Sample amount
- Precision
- Accuracy
- Stability
- Heterogeneity
- Depth
- FFPE
- Batch effect
- Missing values
- Data mining
- ……

Clinical study design



Guo, et al. Nature Medicine. 2015

- Protein biomarkers
- Biology

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Proteome stability

Hurdles

- Cost
- Sample amount
- Precision
- Accuracy
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- Heterogeneity
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- FFPE
- Batch effect
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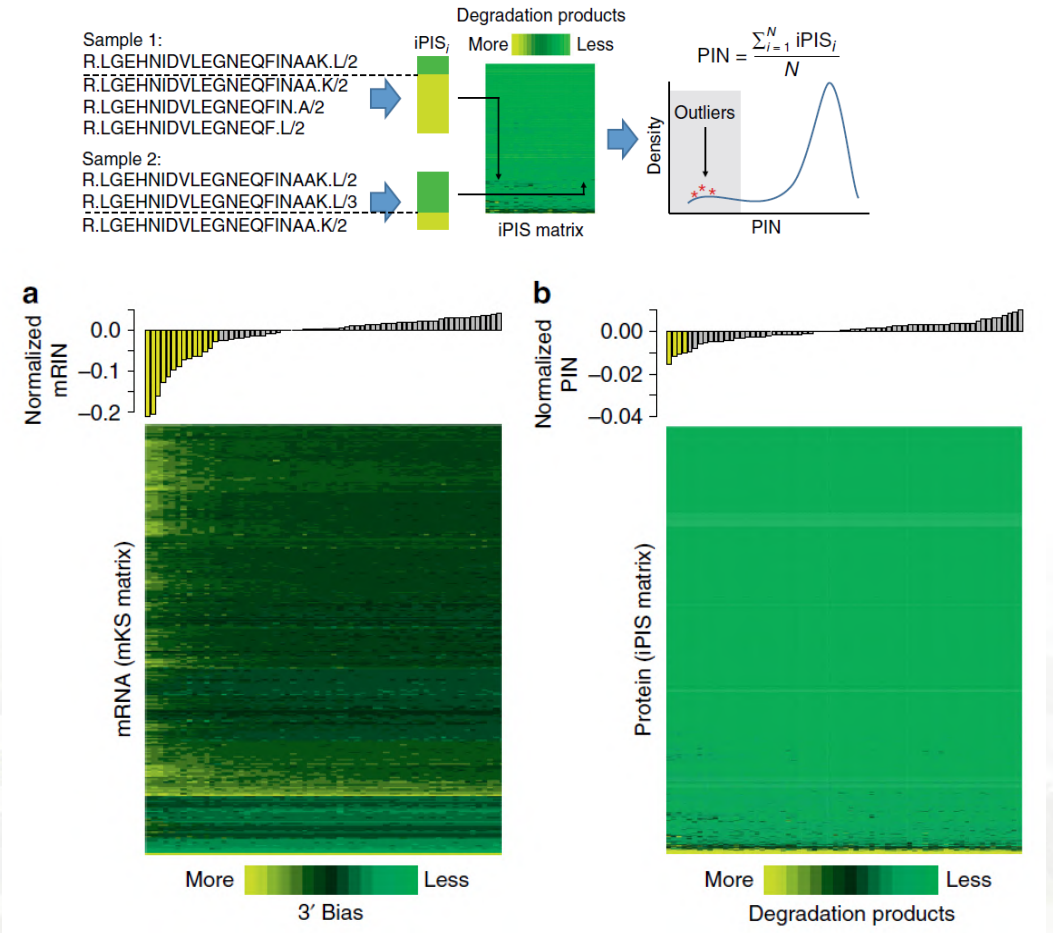
- .....

Index for proteome degradation



Shao *, Guo *#, et al, Wild #, Aebersold #. 2019 Nature Communications

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Intra-tissue proteome heterogeneity

Hurdles

- Cost
- Sample amount
- Precision
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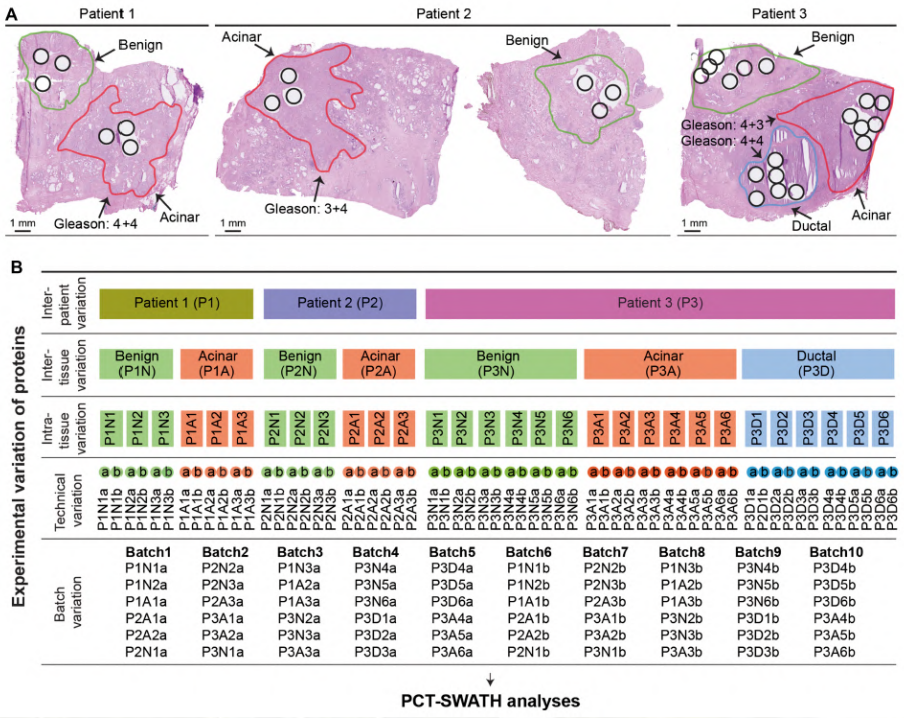
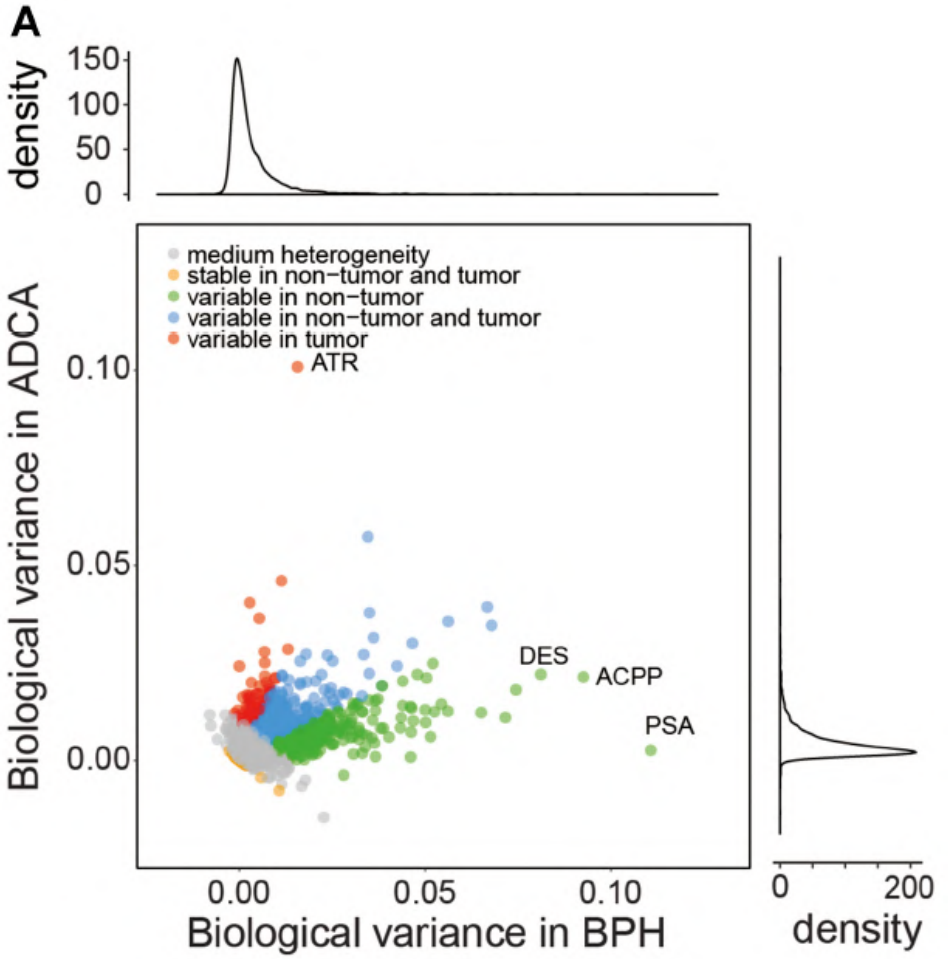
- .....





Guo, et al. Life Science Alliance. 2018

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High throughput analysis of FFPE proteomes

Hurdles

- Cost
- Sample amount
- Precision
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- Stability
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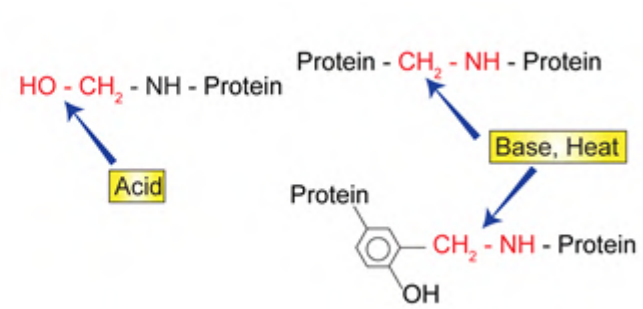
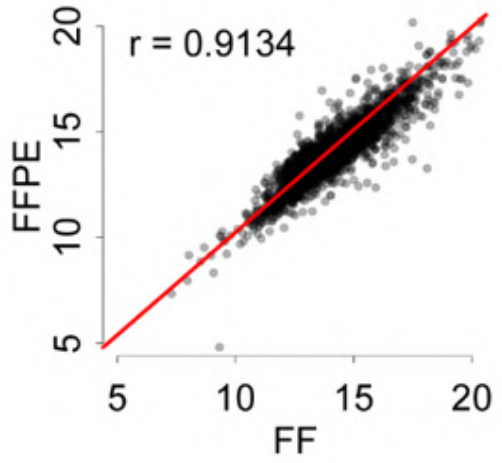
- .....





Zhu, Weiss, et al, Wild, Aebersold, Guo. Molecular Oncology. 2019

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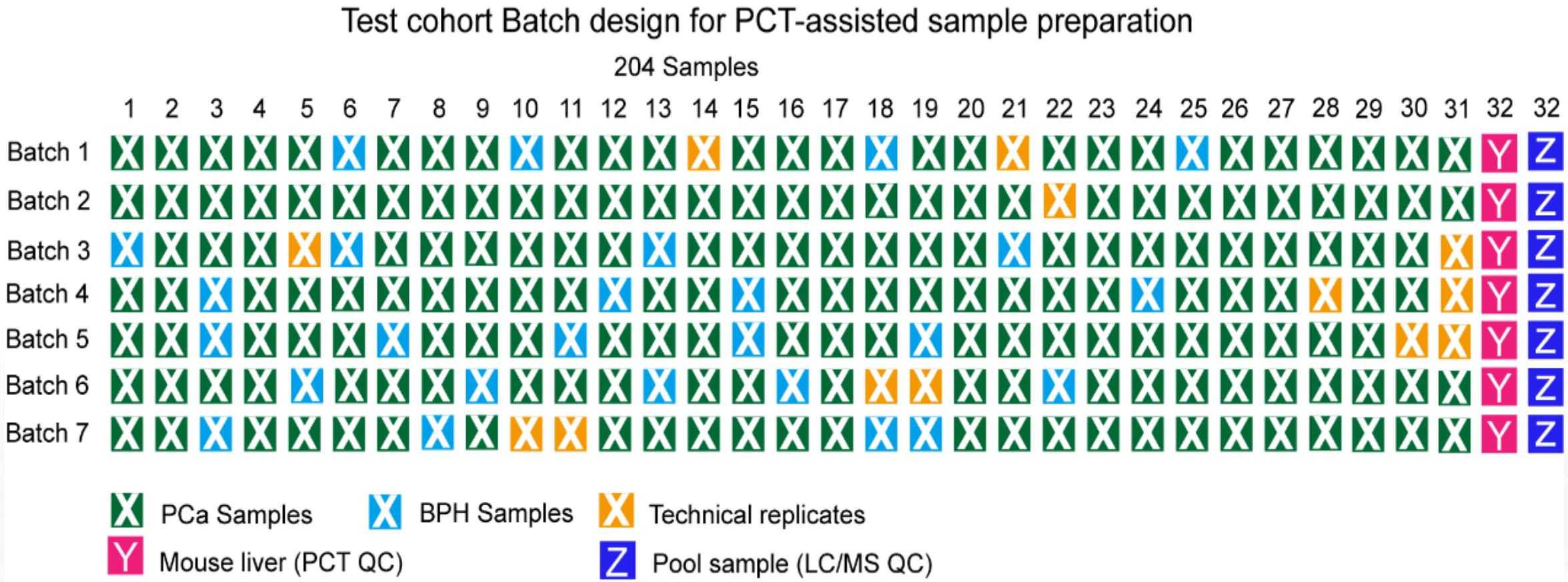
A prostate cancer study cohort

58 PCa patients and 10 benign hyperplasia (BPH) in triplicates



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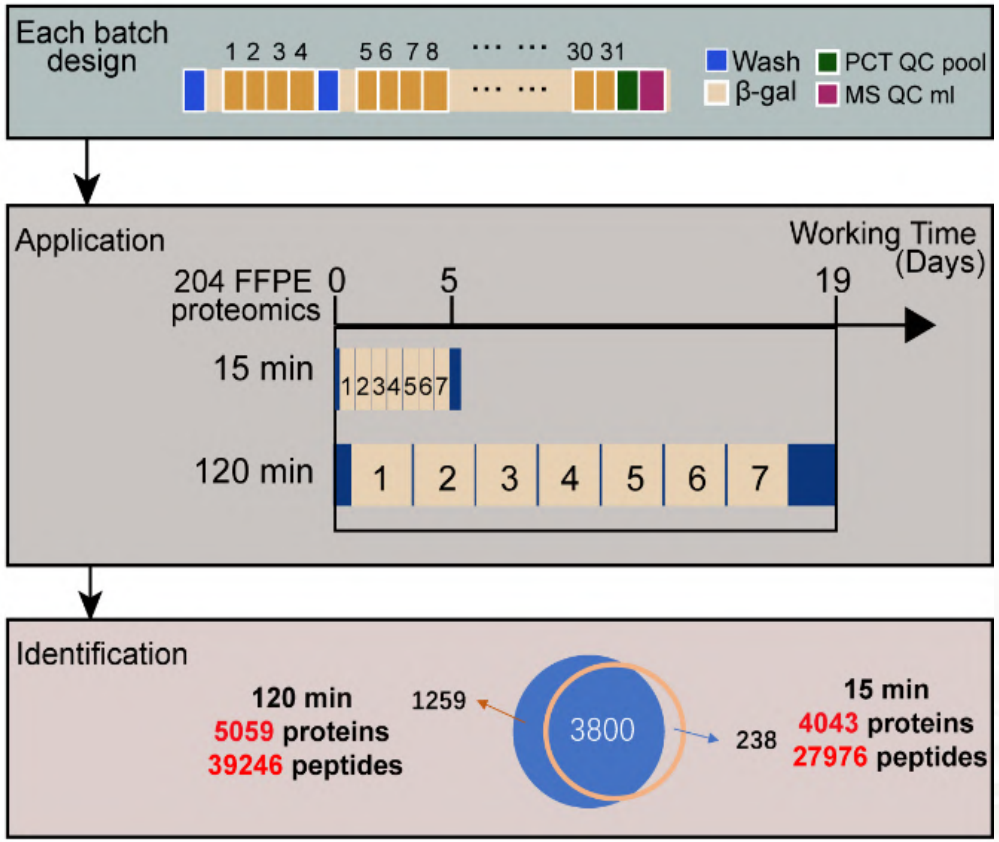
Comparison of 120min and 15min gradient

a

Parameters	15 min	120 min
Liquid chromtograph		
injection time (min)	4	4
load time (min)	1.5	7
gradient (buffer B)	3- 28%	5- 30%
gradient time (min)	15	120
wash time (min)	3	4
balance time (min)	2	5
Mass spectrometry		
MS		
variable windows	100	48
accumulati on time (ms)	150	150
MSMS		
mass range	100- 1500	
accumulation time (ms)	25	60
cycle time (s)	2.7	3.2

b



without protein grouping

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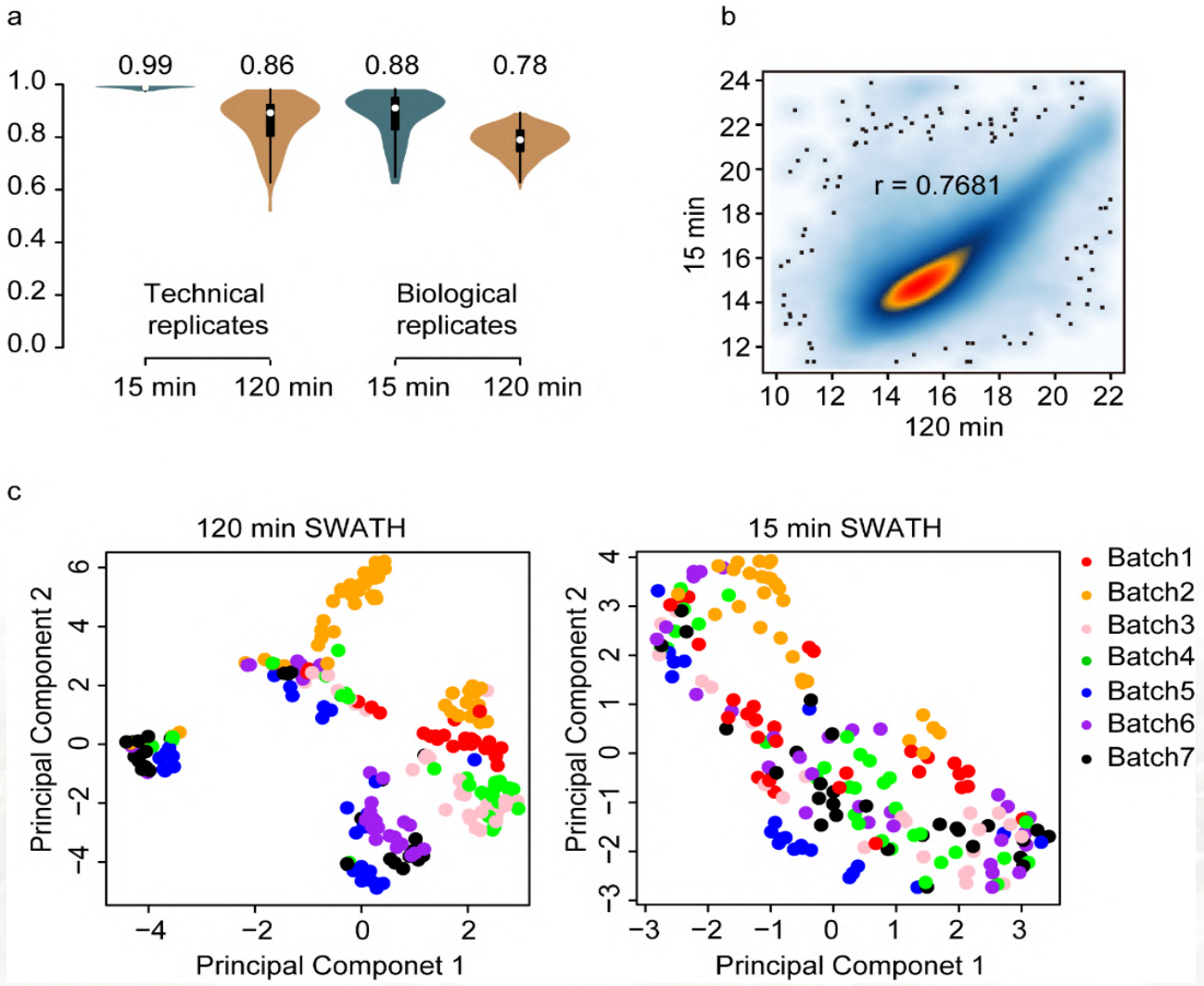
Quantitative reproducibility and batch effect



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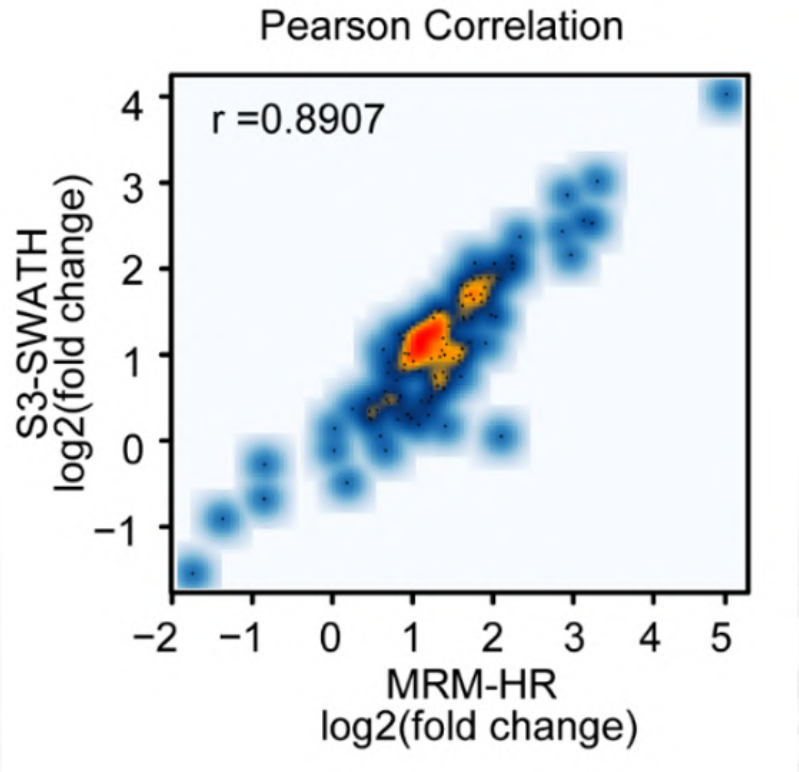
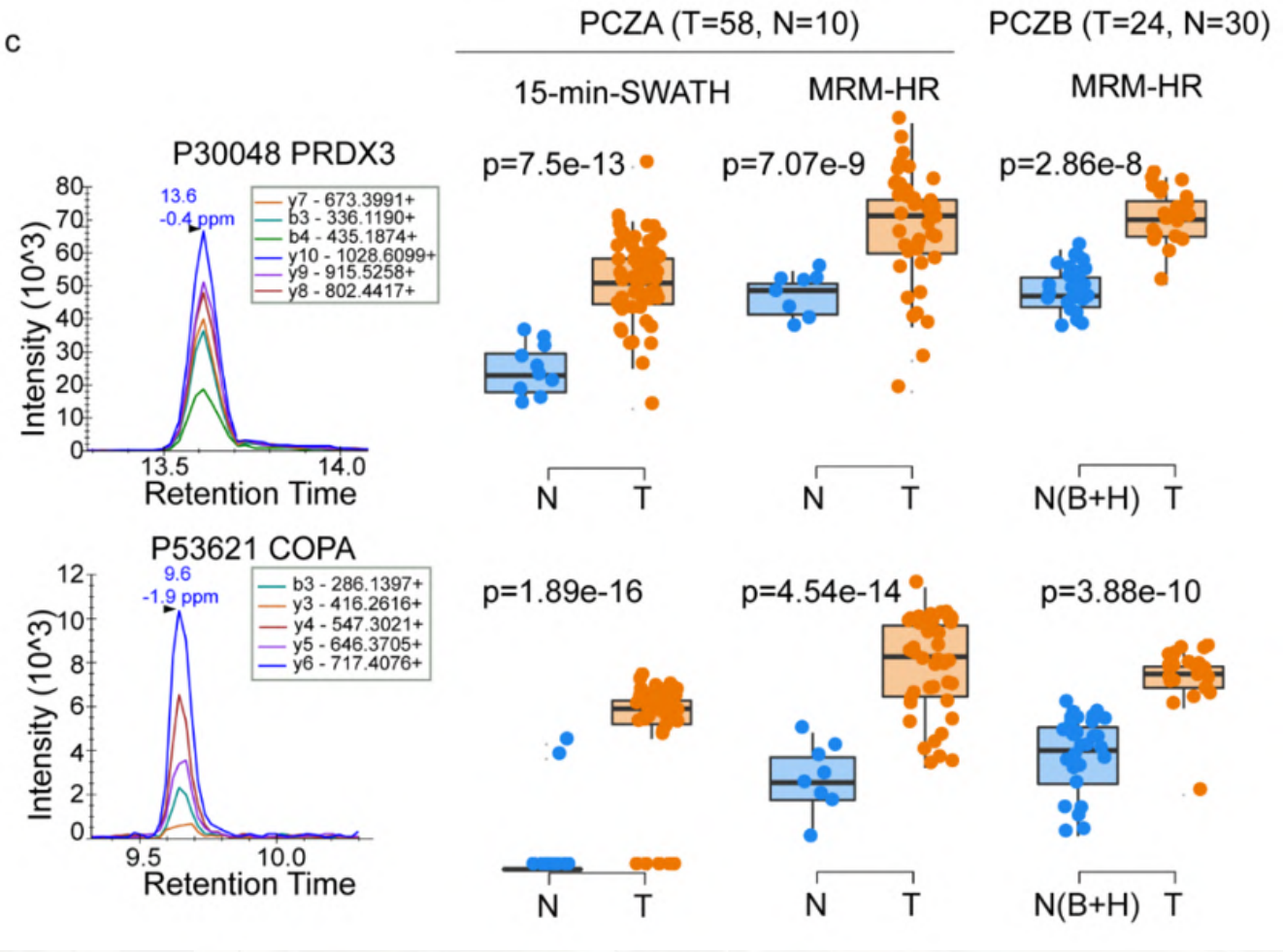
Validation of 134 peptides from 75 proteins





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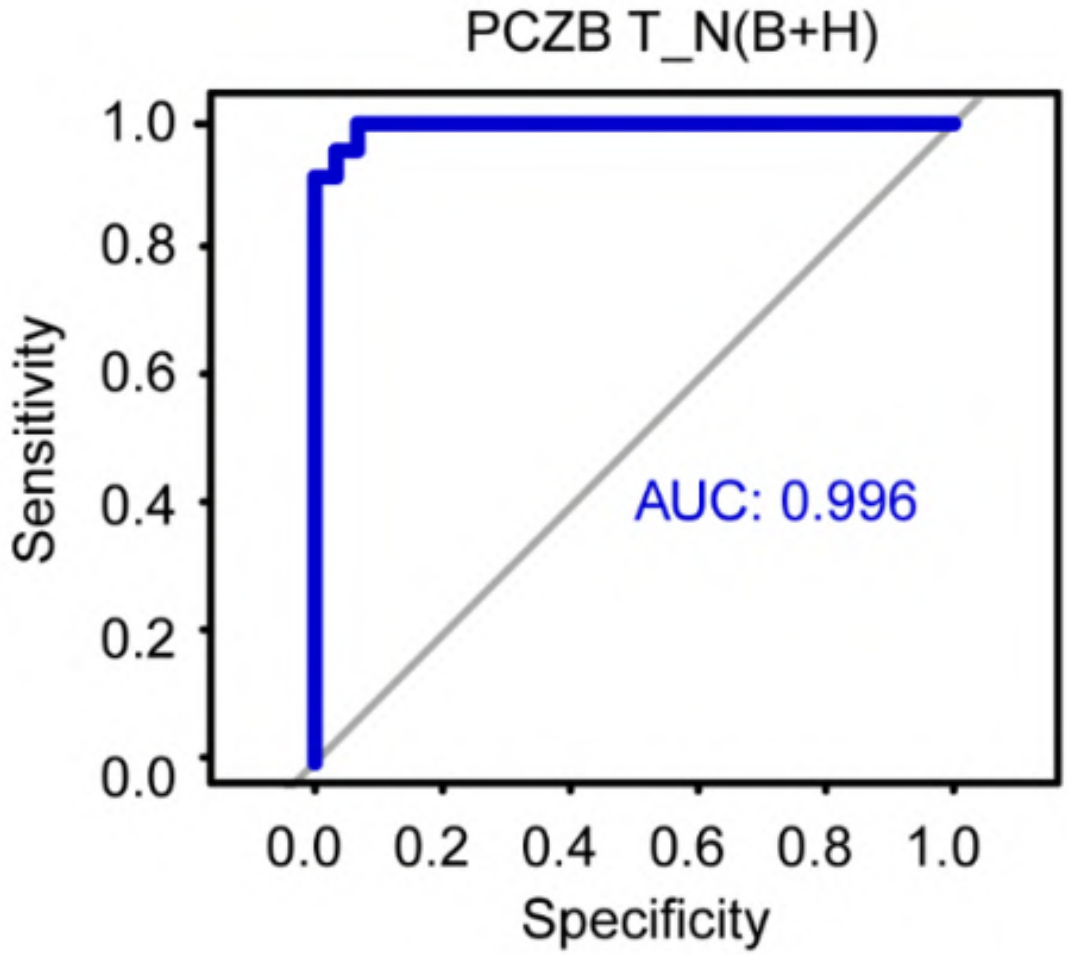
Validation in an independent cohort PCZB

PRM of a protein panel in PCZB (30 BPH and 24 PCa) in biological duplicates



GUOMICS -since 2017

Thank you for your attention!

Guomics Laboratory of Proteomic Big Data

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