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Pseudo-temporal mapping of transcriptomics changes to prostate cancer disease progression

Transcriptomic?



Transcriptome:



Gene Expression: How much gene product is being produced?



Transcription: Producing RNA from Genes



Quantified using RNAseq

Sudo-temporal changes?



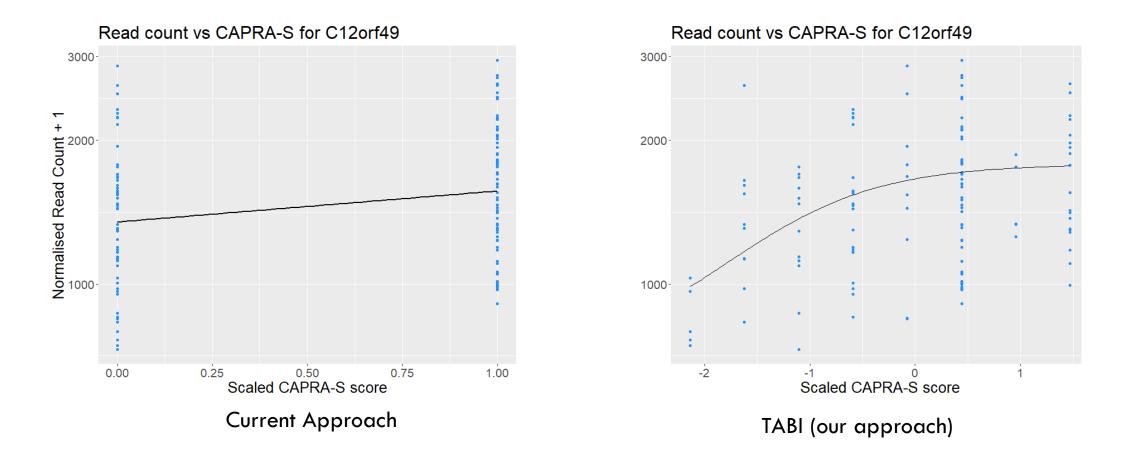
Which genes change expression?



When do these changes happen?



In progression of disease (prostate cancer CAPRA-S score)



How to find the when?

Results: Pattern of Gene Expression Changes

Late Prostate Cancer Early Prostate Cancer Direction of change **Cell cycle & Chromosomal Organisation** Skeletal and cardiac muscle contraction + positive E.g. E.g. mitotic spindle assembly (GO:0090307) skeletal muscle thin filament assembly (GO:0030240) Stage of prostate cancer Cell differentiation and adhesion **Immunological Processes Neuronal and synaptic development** negative E.g. complement activation, classical pathway E.g. (GO:0006958) neuron differentiation (GO:0030182)

Biggest learning?



BAYESIAN STATISTICS

Conclusion:

- New approach to 'when' in gene expression
- Finding the 'what and 'when' can reveal interesting patterns and tell us a lot about disease progression

Next Steps:

- Simulating Datasets
- Expanding to different cancers / diseases

