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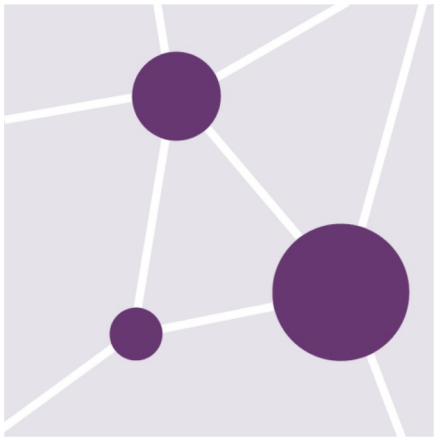
Canadian Bioinformatics Workshops



Module 2a Lab

Constance Li

Pathway and Network Analysis

May 12, 2026

UNIVERSITY OF CALGARY

Arnie Charbonneau Cancer Institute

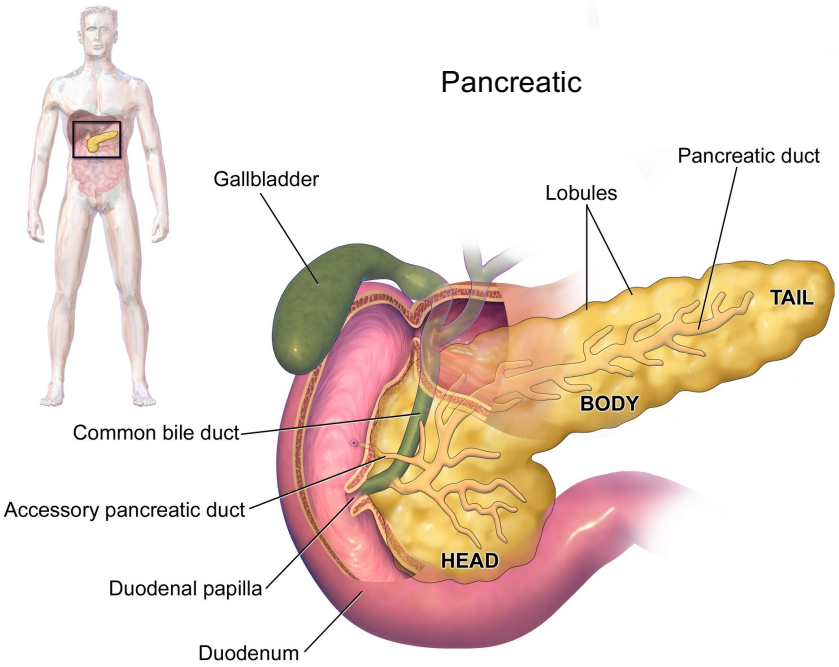
UNIVERSITY OF CALGARY

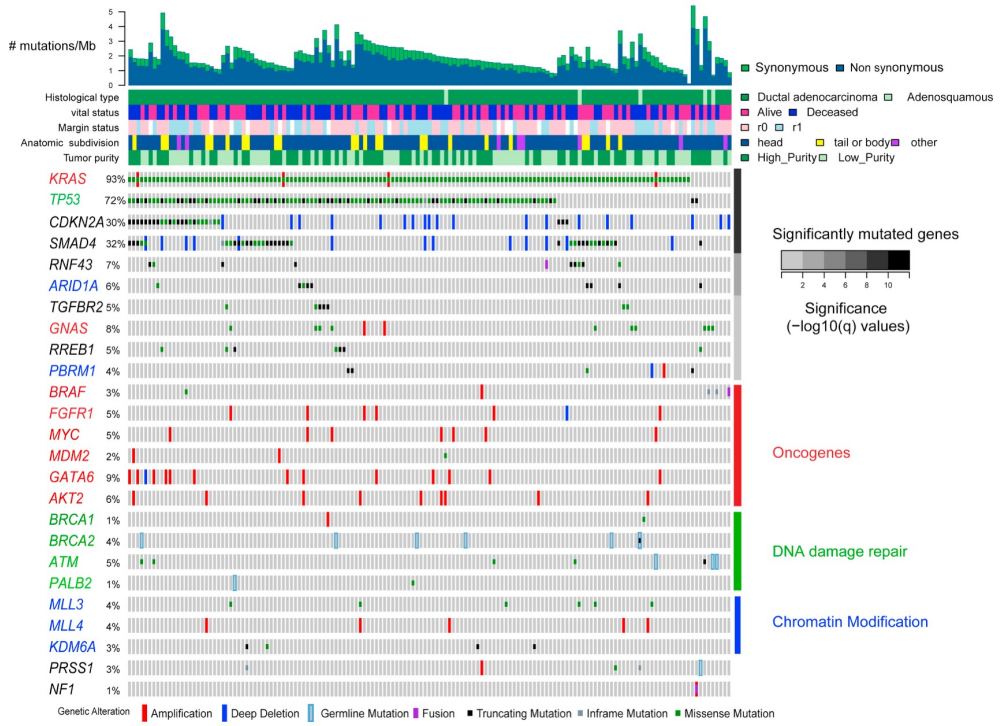
Alberta Health Services

Learning Objectives

1. Execute a differential expression analysis
2. Interpret its statistical outputs
3. Create and interpret common differential expression visualizations
4. Create defined gene lists and ranked gene lists for downstream anlaysis

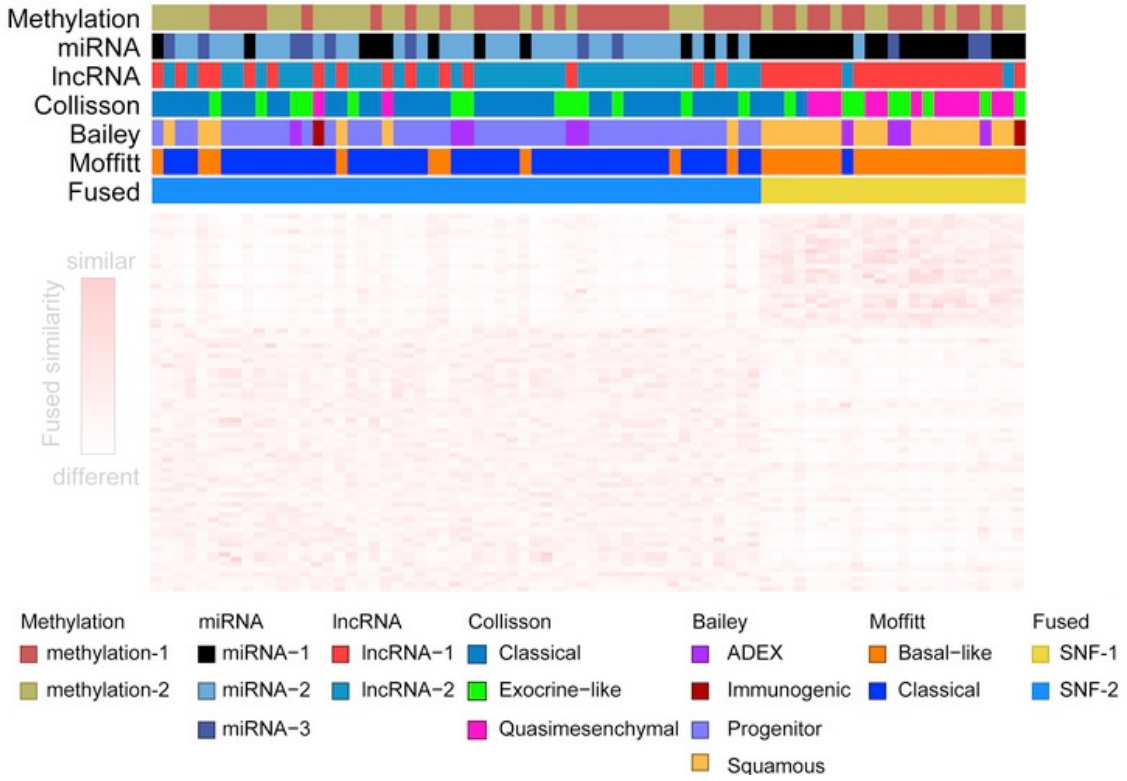
Pancreatic Ductal Carcinoma (PDAC)



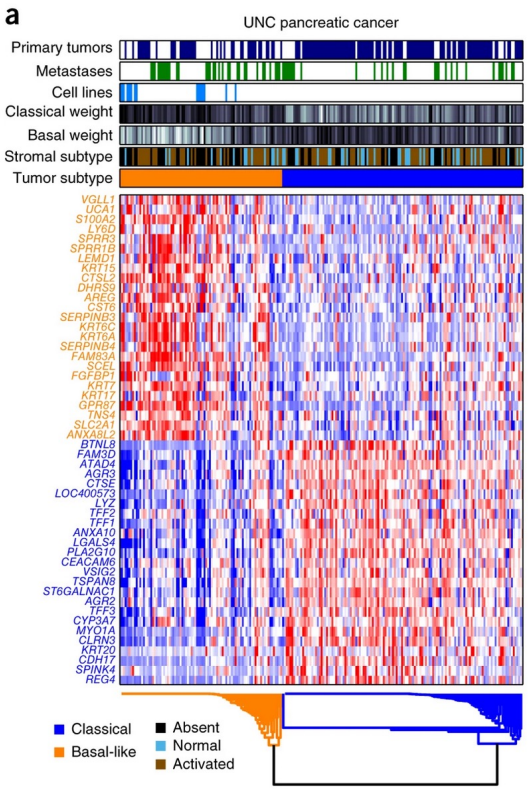


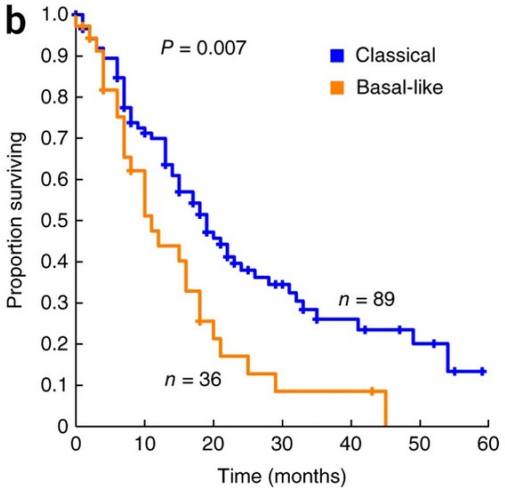
https://en.wikipedia.org/wiki/Pancreas

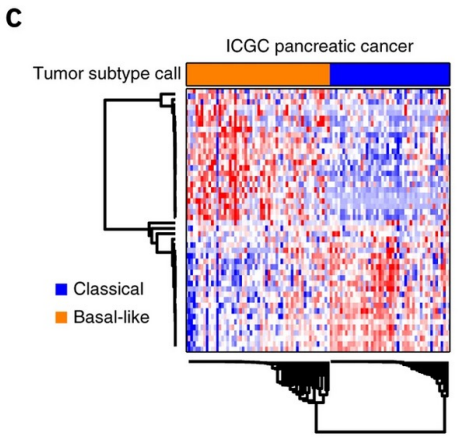
Molecular subtypes in PDAC

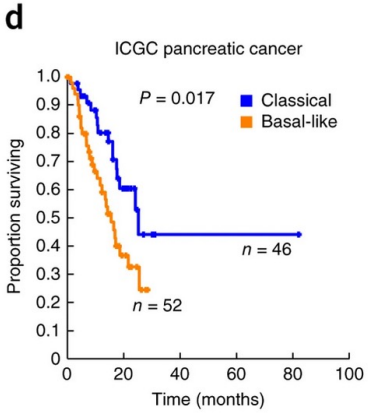


Moffitt subtyping has prognostic relevance

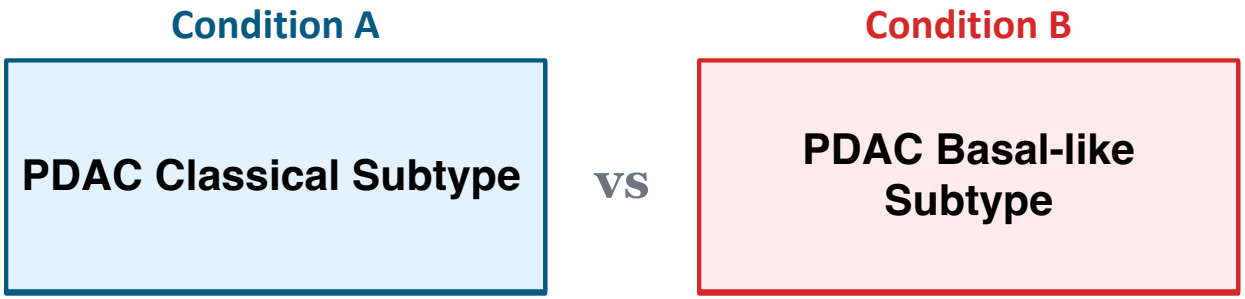








Differential (gene) expression



What are the transcriptional differences between the classical and basal-like subtypes?

- What are our expectations?

Let's get started

- Download the lab materials:
  - https://bioinformaticsdotca.github.io/PNA_CalSask-2605/module-2.html
  - Module 2a: R scripts, data
- Make sure R is installed
  - Check the required packages
- Two versions: R beginners & Intermediate R users

Information and data sources

Moffitt subtype paper

- Moffitt RA, Marayati R, Flate EL, Volmar KE, Loeza SGH, Hoadley KA, et al. Virtual microdissection identifies distinct tumor- and stroma-specific subtypes of pancreatic ductal adenocarcinoma. Nat Genet. 2015 Oct;47(10):1168–78. doi:10.1038/ng.3398

Clinical & molecular metadata

- Raphael BJ, Hruban RH, Aguirre AJ, Moffitt RA, Yeh JJ, Stewart C, et al. Integrated Genomic Characterization of Pancreatic Ductal Adenocarcinoma. Cancer Cell. 2017 Aug;32(2):185-203.e13. doi:10.1016/j.ccell.2017.07.007

RNA-seq counts data

- https://gdac.broadinstitute.org/

We'll take lunch break after Lab 2a

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