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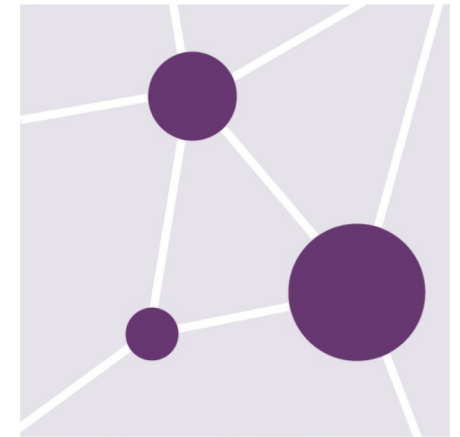


Module 2a Lab

Constance Li

Pathway and Network Analysis

May 12, 2026



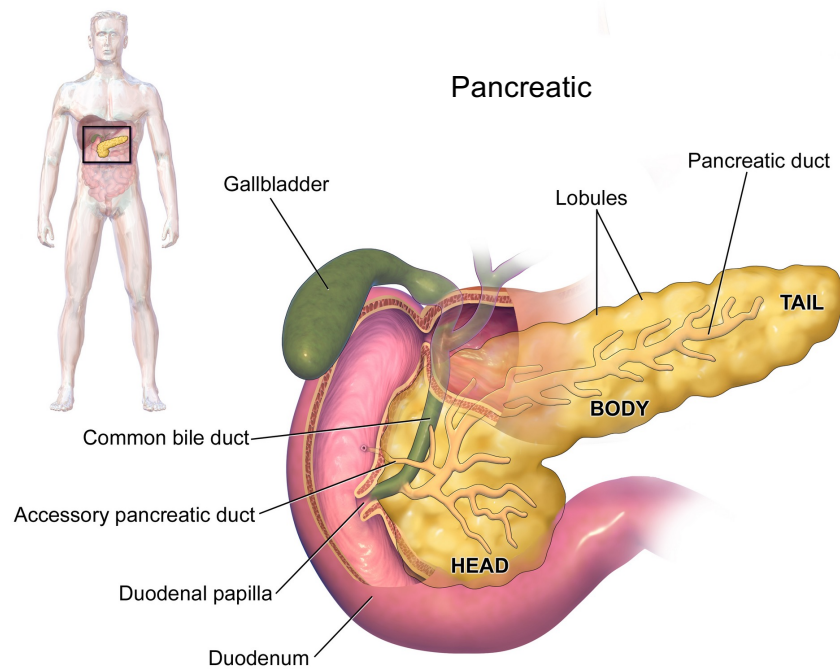


Learning Objectives

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 analysis



Pancreatic Ductal Carcinoma (PDAC)



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



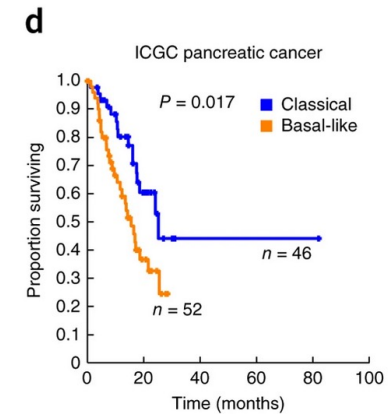
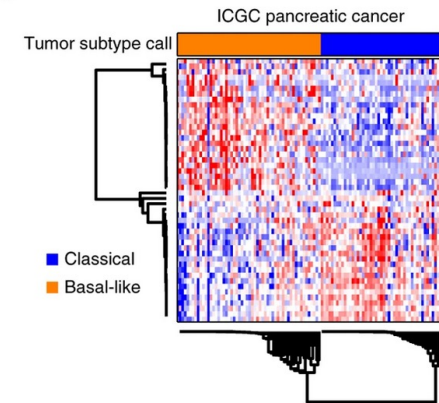
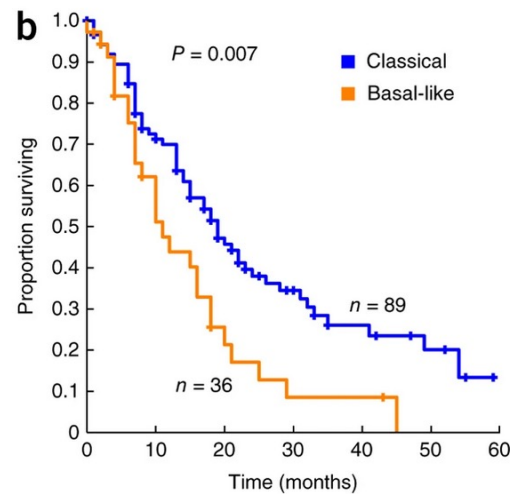
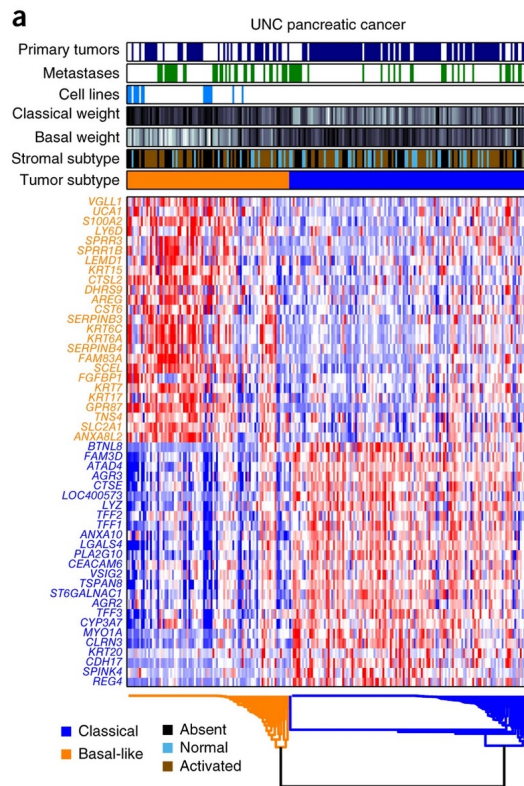
Molecular subtypes in PDAC





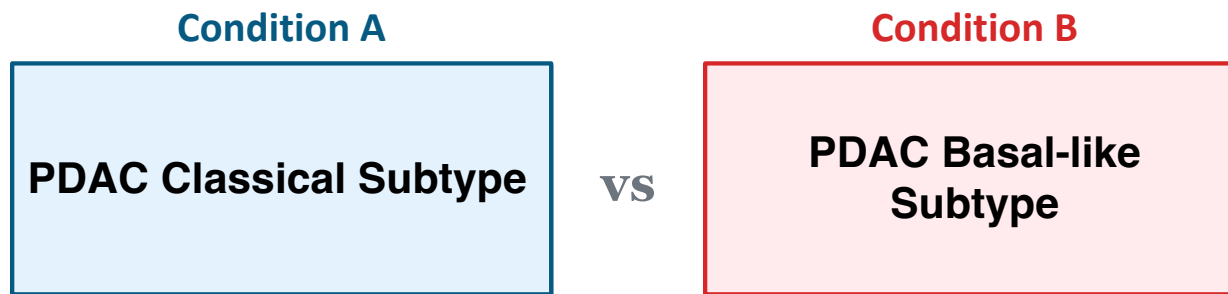
Moffitt subtyping has prognostic relevance

c





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](https://doi.org/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](https://doi.org/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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