

Differential Expression Analysis Techniques for Single-Cell RNA-seq Experiments

for the Computational Biology Doctoral Seminar (CMPBIO 293),
organized by N. Yosef & T. Ashuach, Spring 2018, UC Berkeley

Kevin Benac and Nima Hejazi

Group in Biostatistics,
University of California, Berkeley

11 April 2018

Outline

Introduction

Data

Objective

Methodology

ZINB-WaVE

DropLasso

Comparison

Conclusions

Review

The Data: Single-Cell RNA-seq



...

The Data: Single-Cell RNA-seq



The Data: Single-Cell RNA-seq



Outline

Introduction

Data

Objective

Methodology

ZINB-WaVE

DropLasso

Comparison

Conclusions

Review

The Objective: Differential Expression



The Objective: Differential Expression



The Objective: Differential Expression



...

Outline

Introduction

Data

Objective

Methodology

ZINB-WaVE

DropLasso

Comparison

Conclusions

Review

ZINB-WaVE I

► ...

► ...

ZINB-WaVE II

► ...

► ...

ZINB-WaVE III

► ...

► ...

ZINB-WaVE IV

► ...

► ...

ZINB-WaVE V

► ...

► ...

Outline

Introduction

Data

Objective

Methodology

ZINB-WaVE

DropLasso

Comparison

Conclusions

Review

DropLasso I

► ...

► ...

DropLasso II

► ...

► ...

DropLasso III

► ...

► ...

DropLasso IV

► ...

► ...

DropLasso V

► ...

► ...

Outline

Introduction

Data

Objective

Methodology

ZINB-WaVE

DropLasso

Comparison

Conclusions

Review

ZINB-WaVE v. DropLasso I

► ...

► ...

ZINB-WaVE v. DropLasso II

► ...

► ...

ZINB-WaVE v. DropLasso III

► ...

► ...

Outline

Introduction

- Data

- Objective

Methodology

- ZINB-WaVE

- DropLasso

- Comparison

Conclusions

- Review

Review

► ...

► ...

References I

- Beyrem Khalfaoui and Jean-Philippe Vert. DropLasso: A robust variant of Lasso for single-cell RNA-seq data. *arXiv preprint arXiv:1802.09381*, 2018.
- Davide Risso, Fanny Perraudeau, Svetlana Gribkova, Sandrine Dudoit, and Jean-Philippe Vert. ZINB-WaVE: A general and flexible method for signal extraction from single-cell RNA-seq data. *bioRxiv*, 2017.