



IPA robustness analysis *v1.1*

June 15/17, 2020

July 1/3, 2020

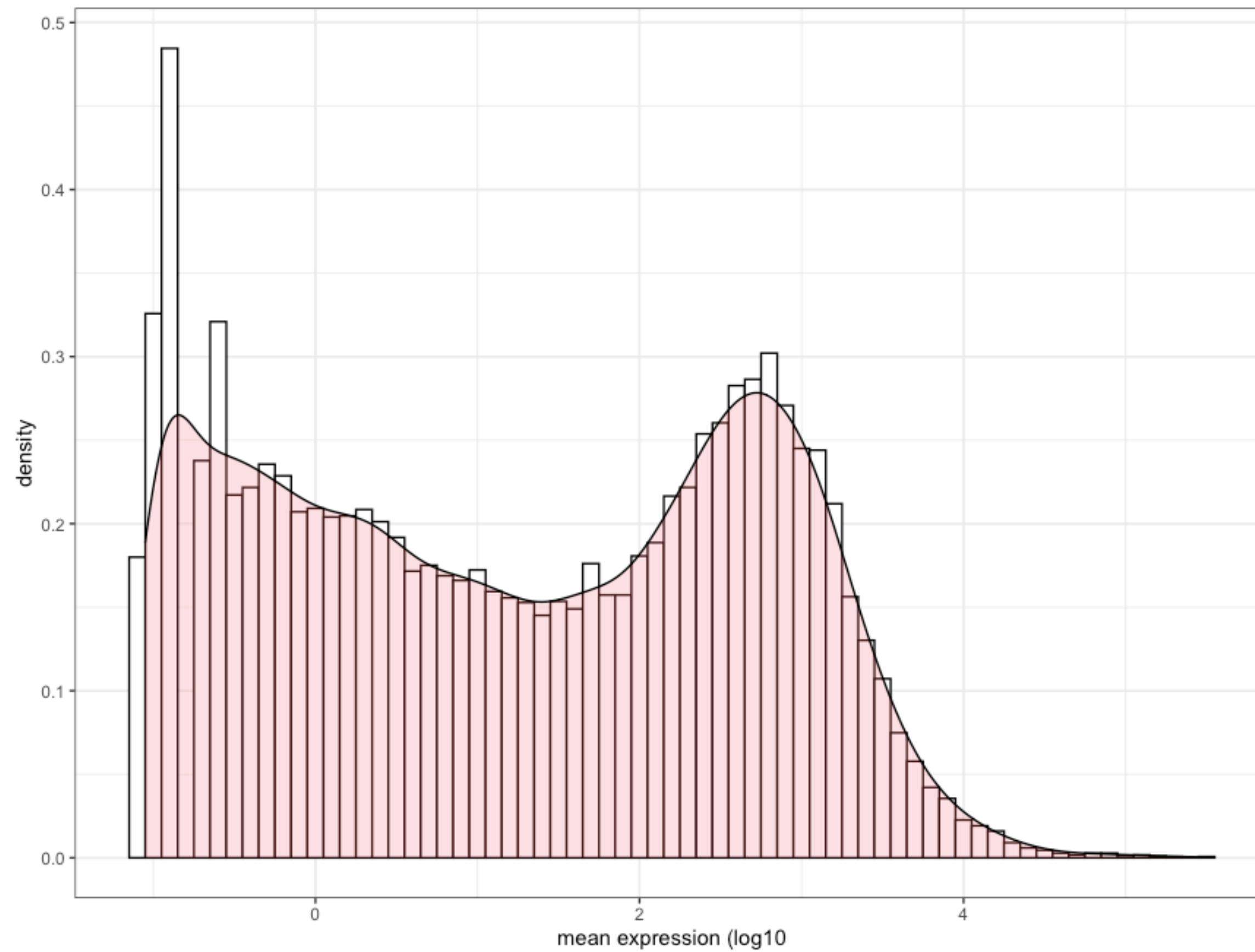
For feedback or questions, please email bits@vib.be

Stephane Plaisance (stephane.plaisance@vib.be)



quick exploration of our dataset

Distribution of expression levels 'across all samples'



Low ← expression level → High

Differential expression Dex / Cont

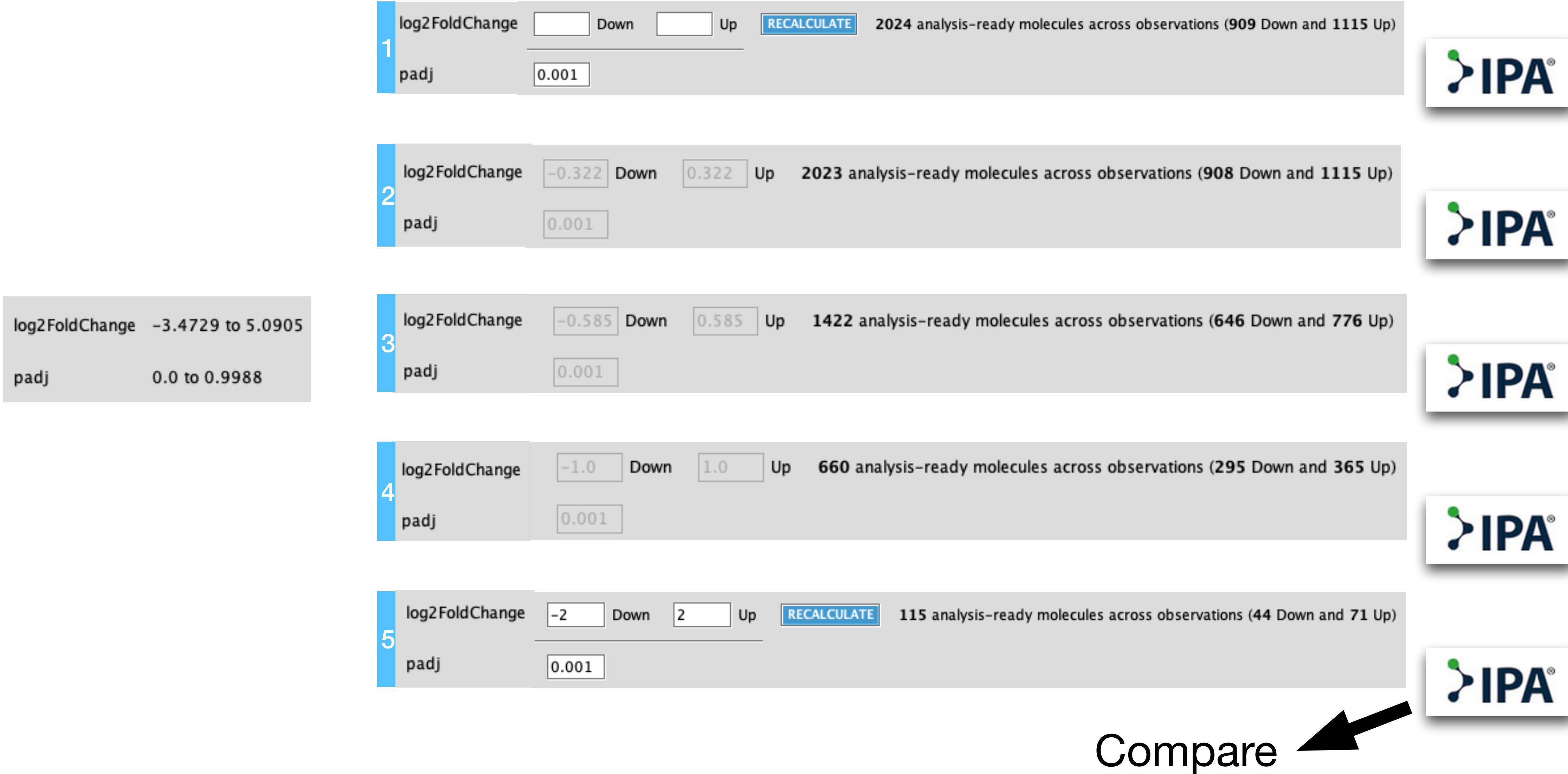


Down → Up

IPA robustness analyses

- applying different cutoffs to DE data
- data acquired with a low sensitivity technology
- data acquired with a low coverage technology
- Importance of the background

DE cutoff effect

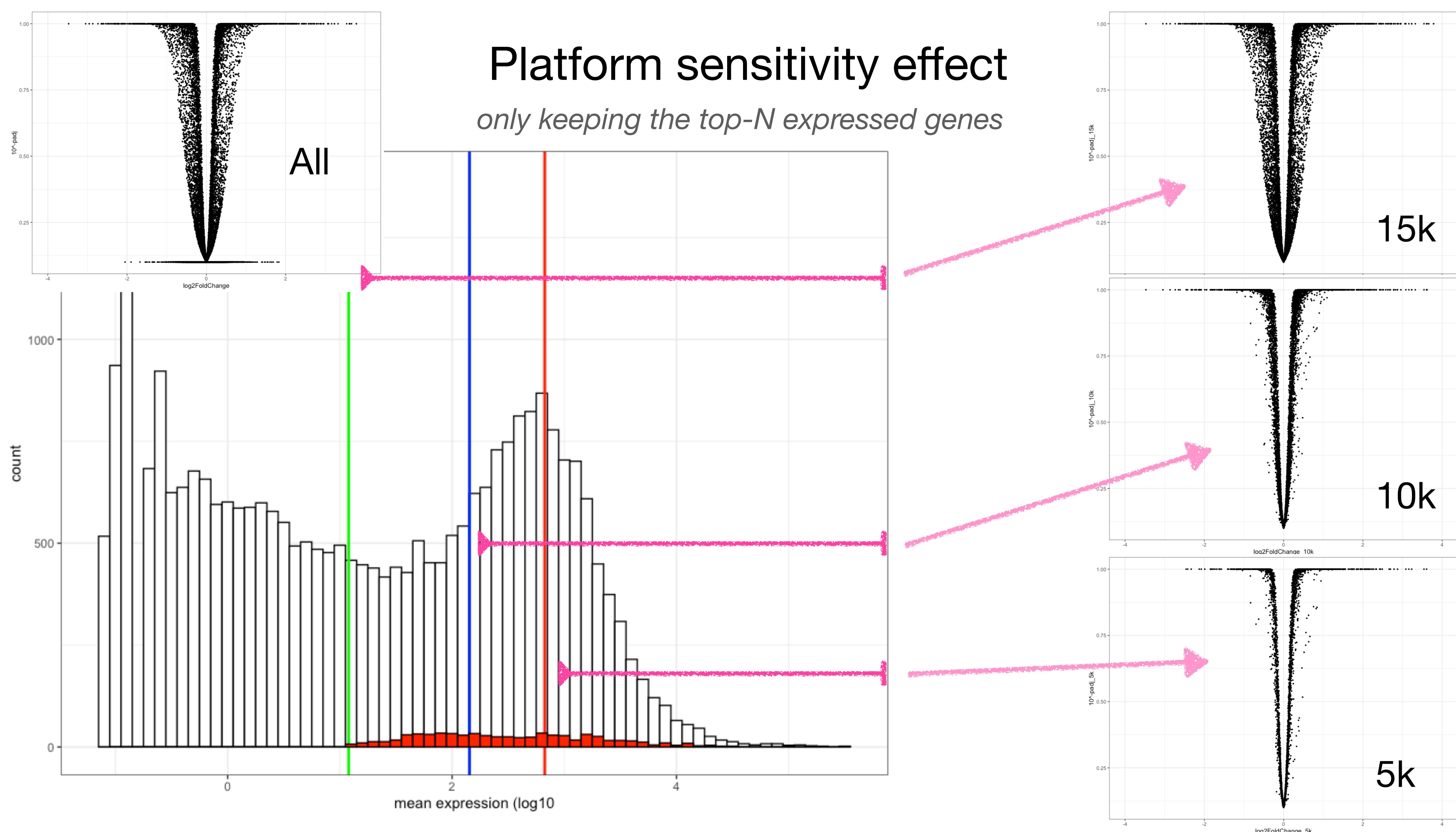


IPA robustness analyses

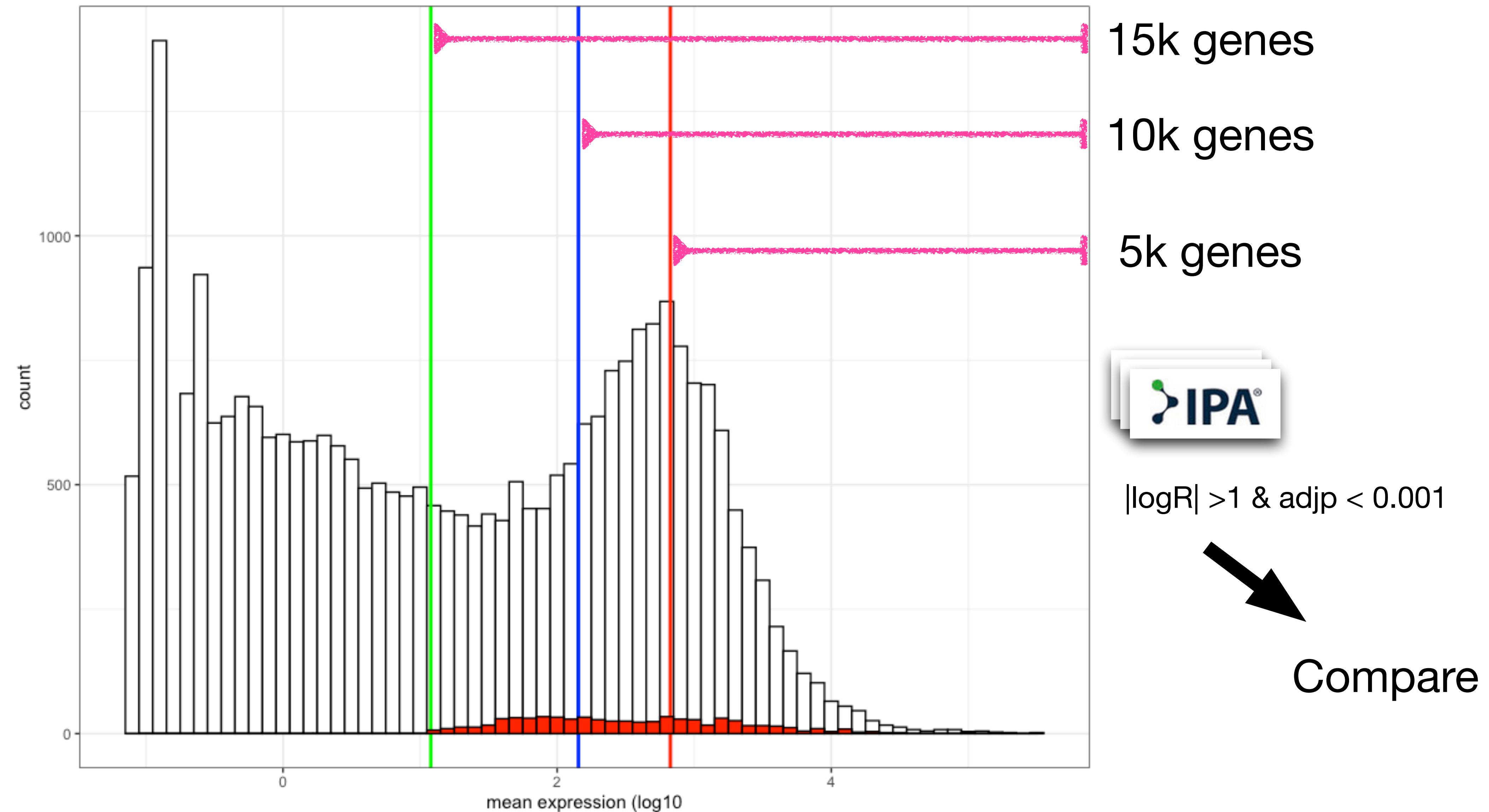
- applying different cutoffs to DE data
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Platform sensitivity effect

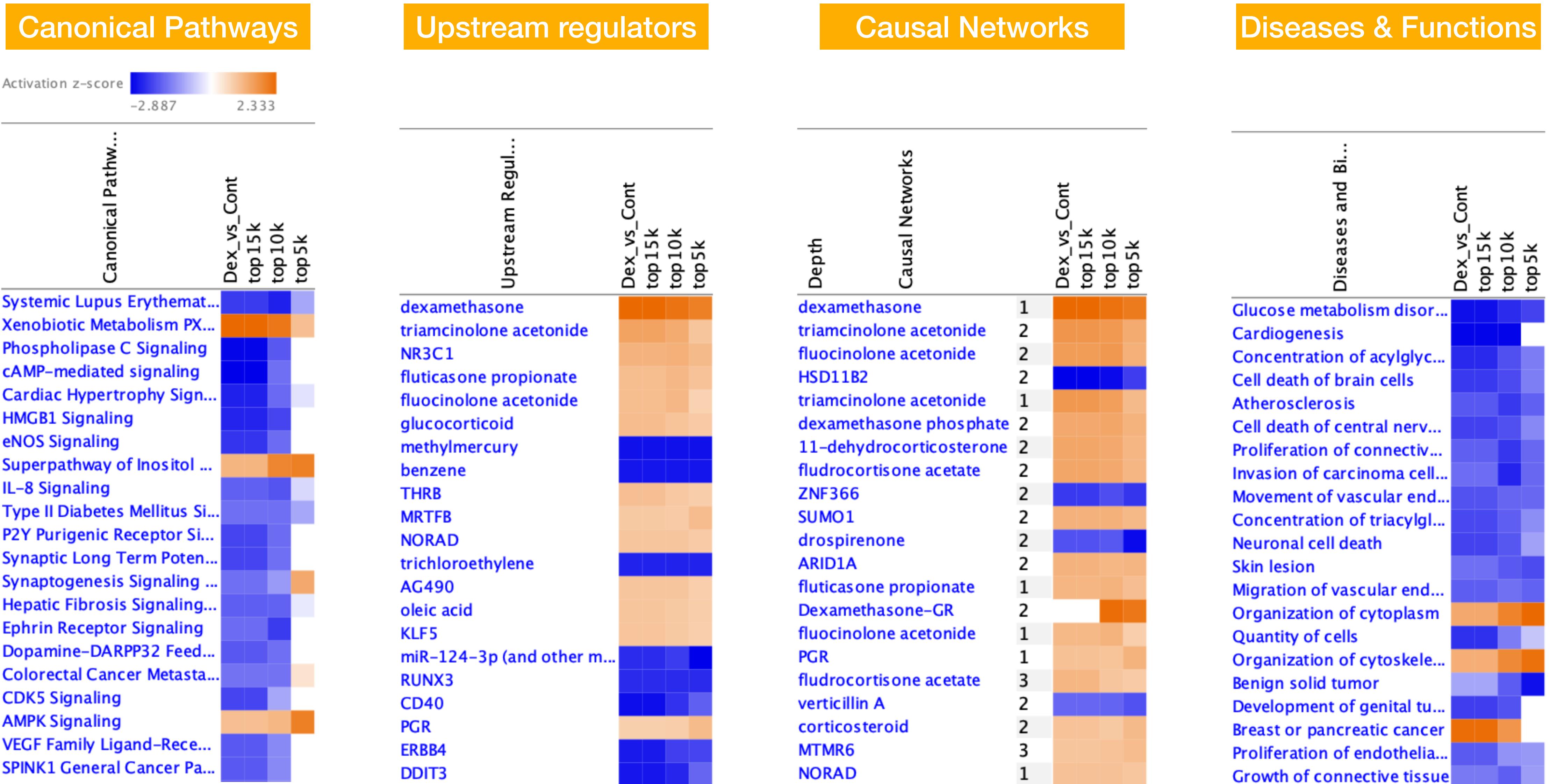
only keeping the top-N expressed genes



robustness to sensibility of detection



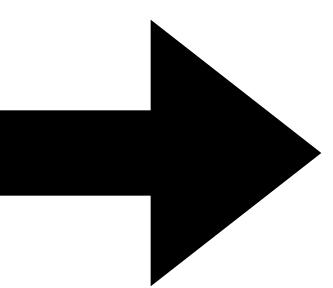
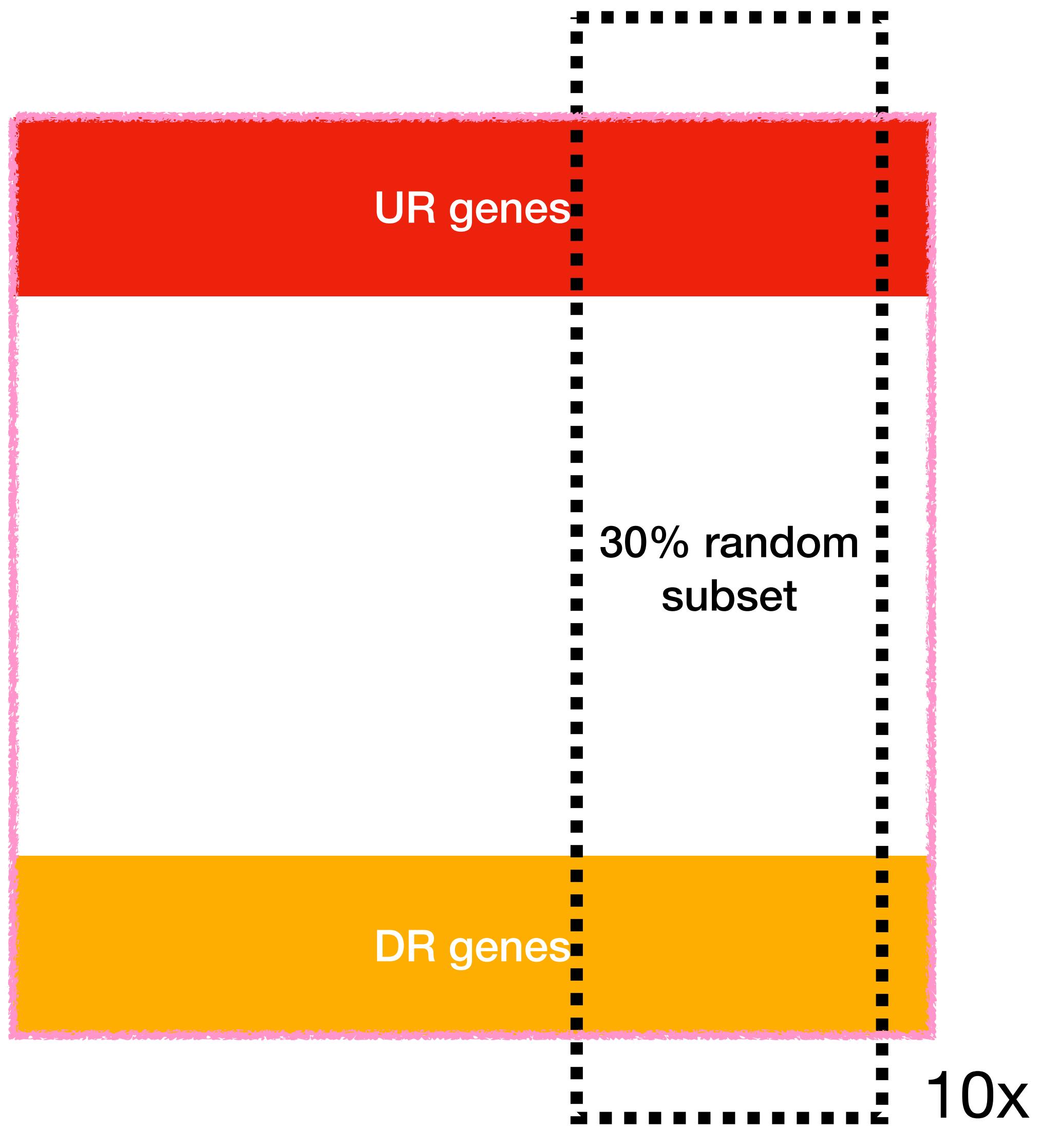
large data loss leads to less sensitivity due to loss of lower-expression DE genes



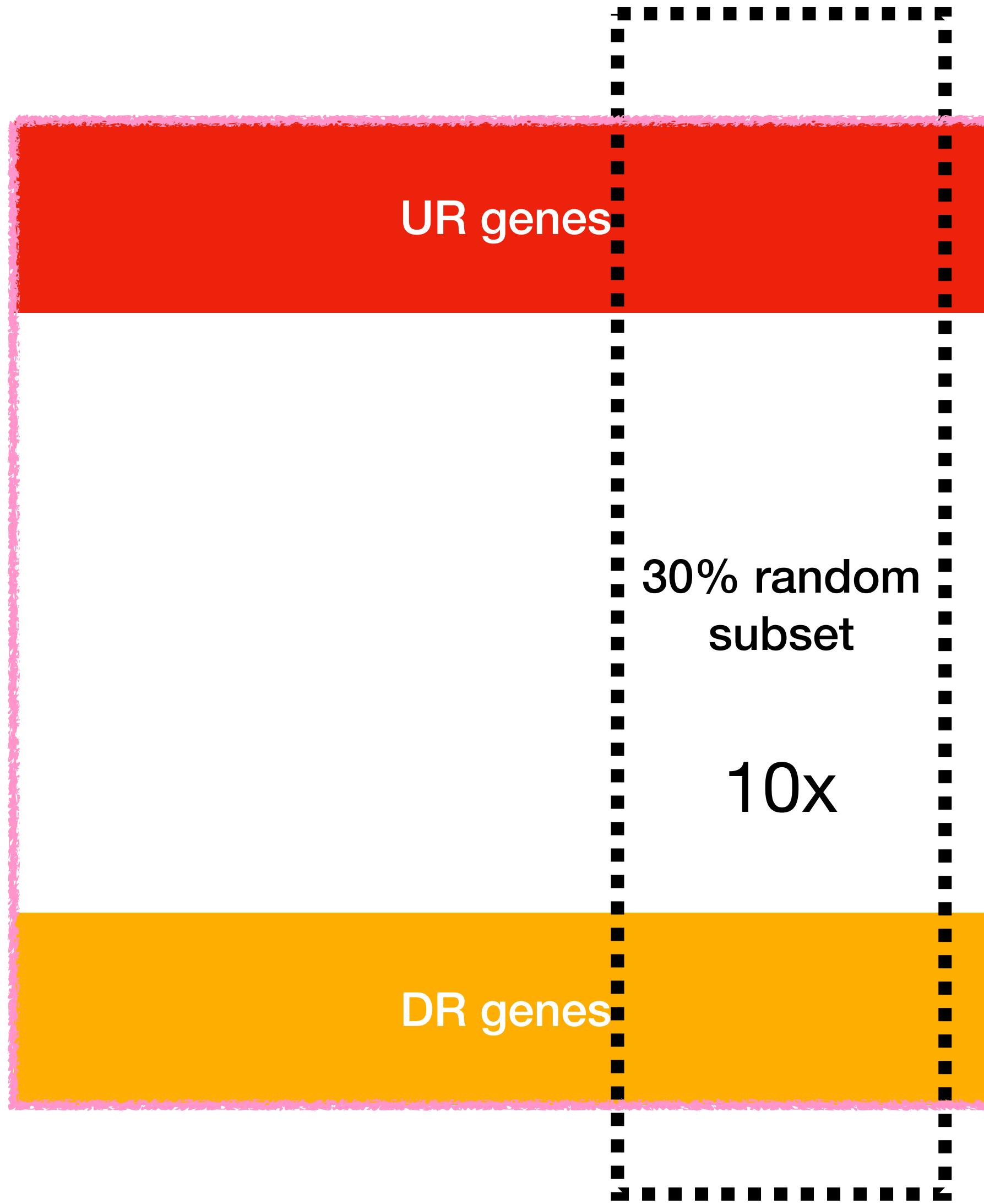
IPA robustness analyses

- applying different cutoffs to DE data
- data acquired with a low sensitivity technology
- **data acquired with a low coverage technology**
- Importance of the background

Sampling effect



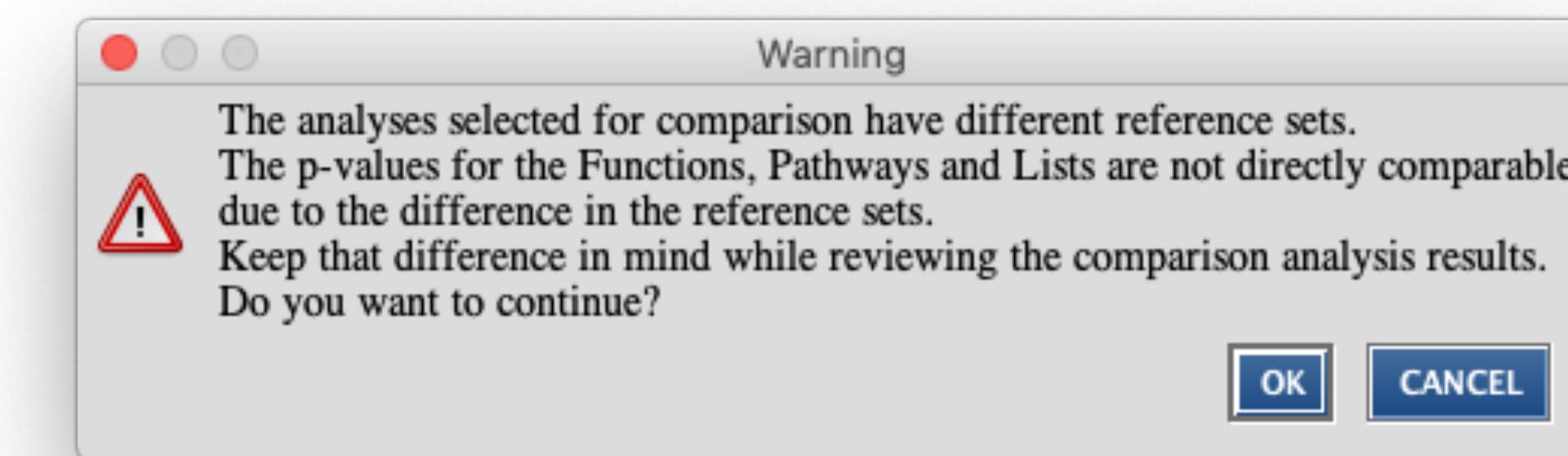
Robustness to random sampling



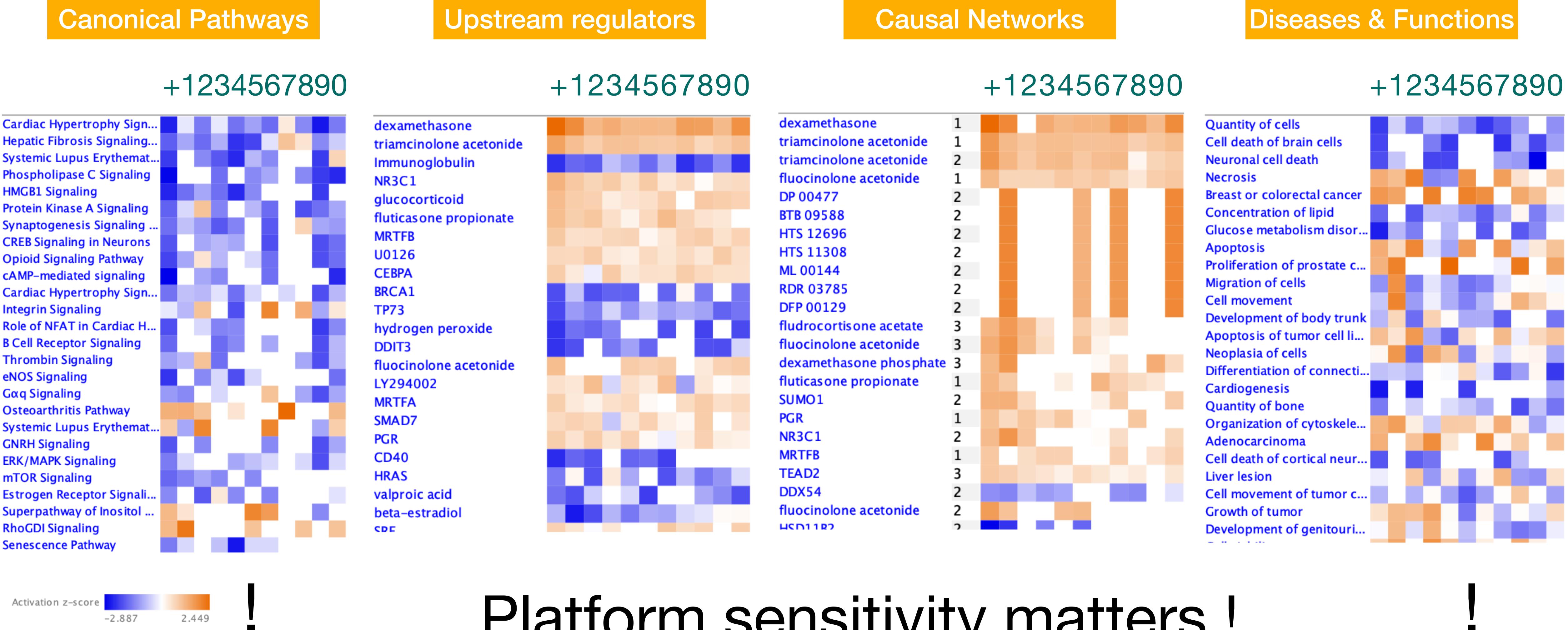
10x core analysis
KB as background

$|logR| > 1$ & $adjp < 0.001$

Compare



Platforms that only ‘see’ a fraction of the truth are less robust although globally IPA resists well to random sampling

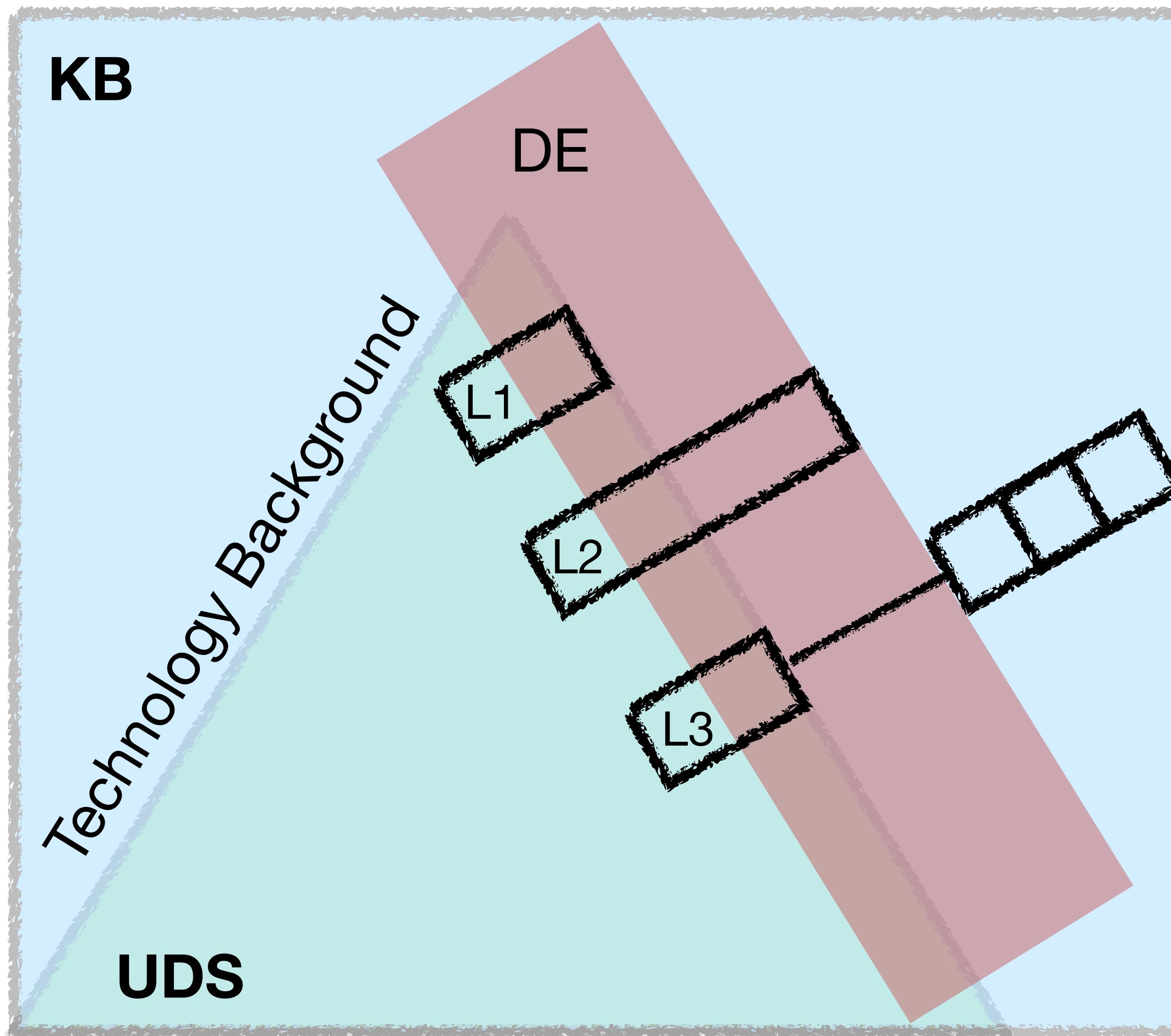


IPA robustness analyses

- applying different cutoffs to DE data
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- Importance of the background

Background effect

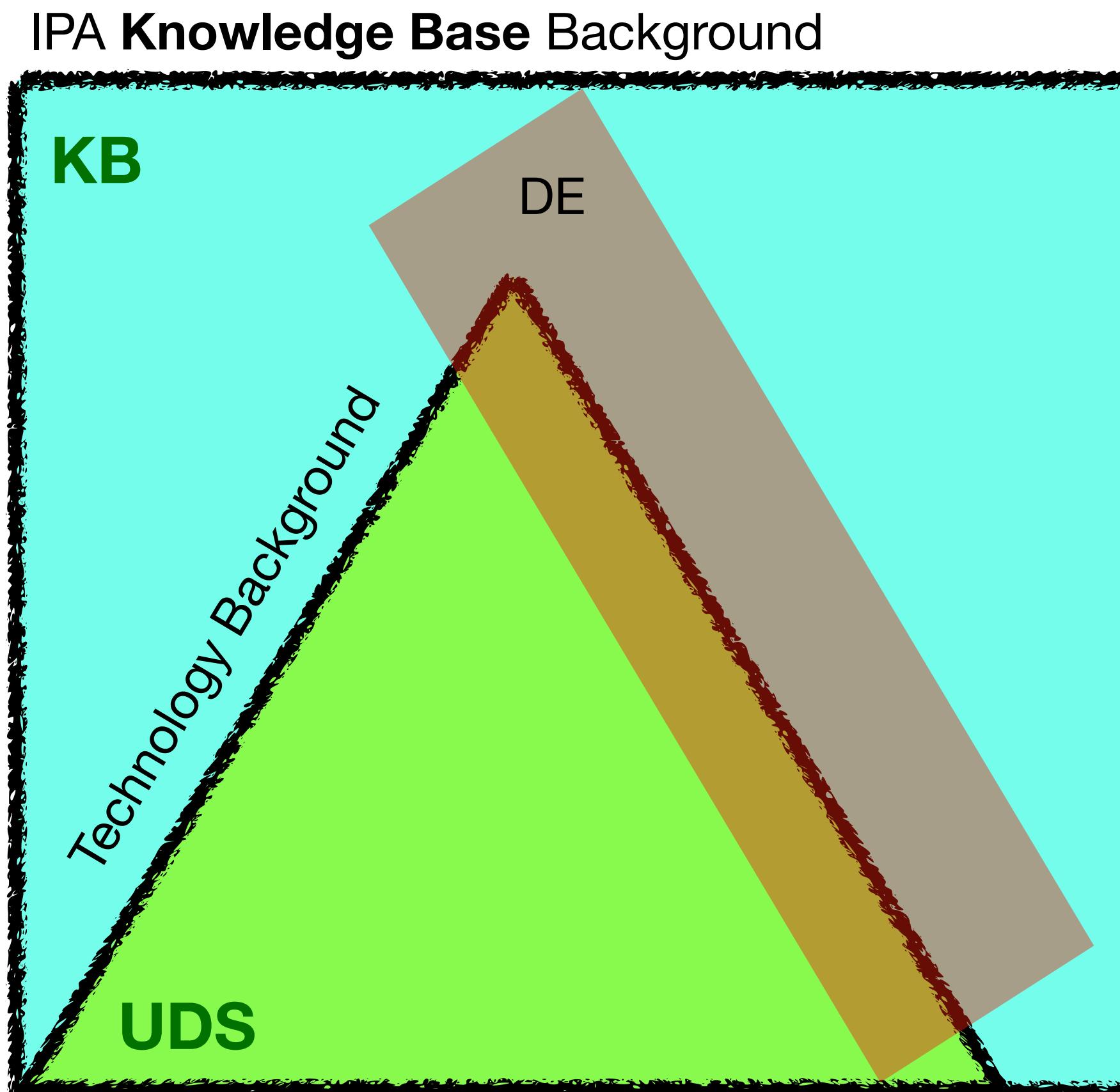
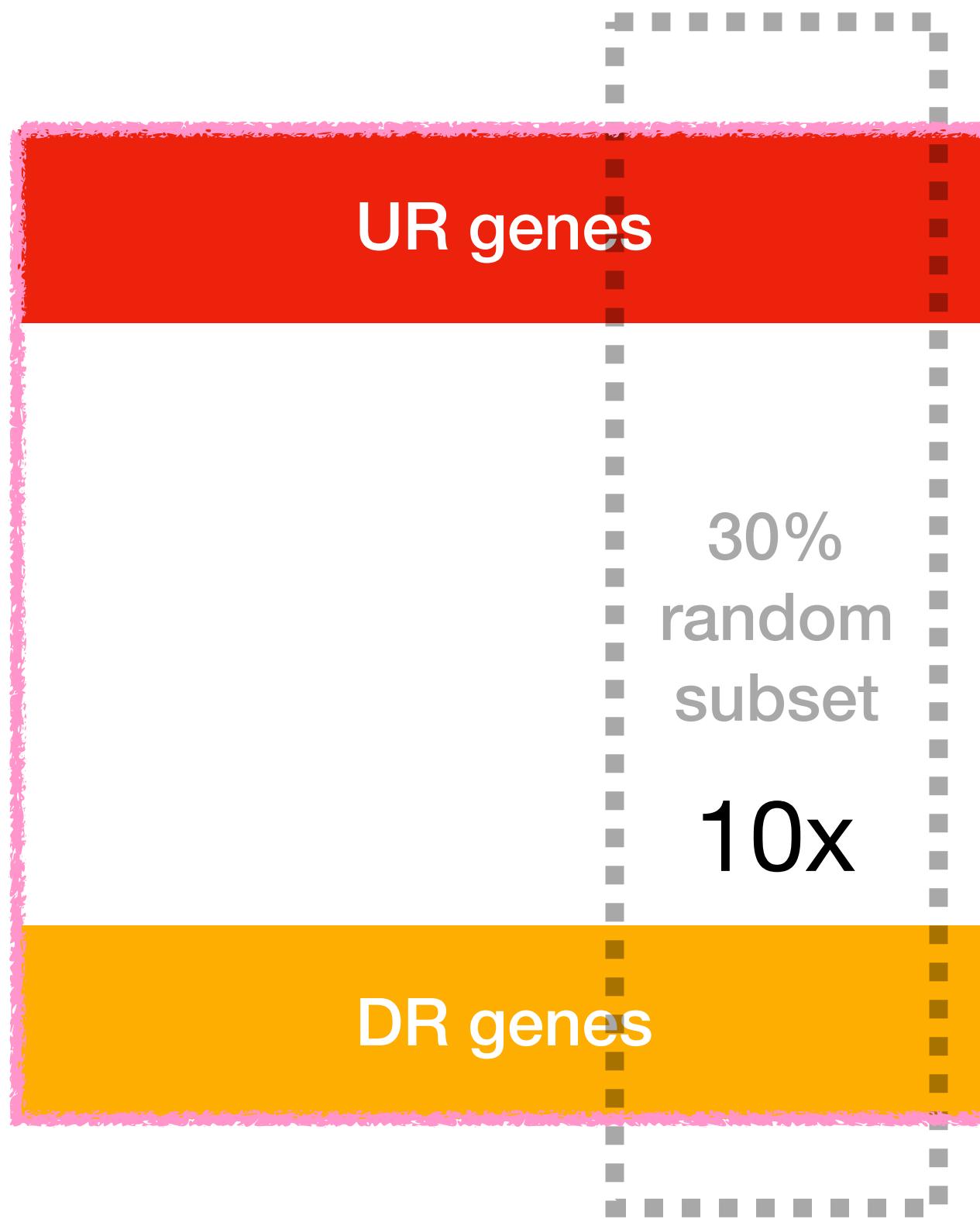
Genome Background



DE%

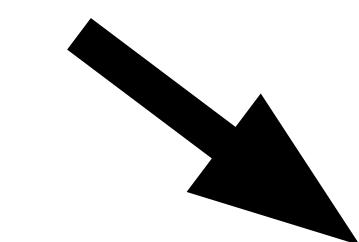
	UDS	KB	Effect
L1	50%	50%	=
L2	50%	75%	<i>underestimate</i>
L3	50%	20%	<i>overestimate</i>

Sampling x Background effect

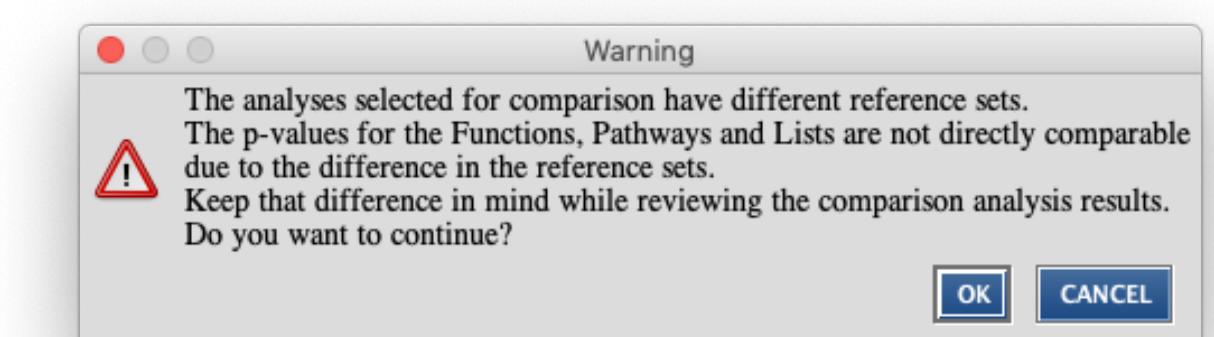


2x 10x core analysis
different backgrounds

$|logR| > 1$ & $adjp < 0.001$

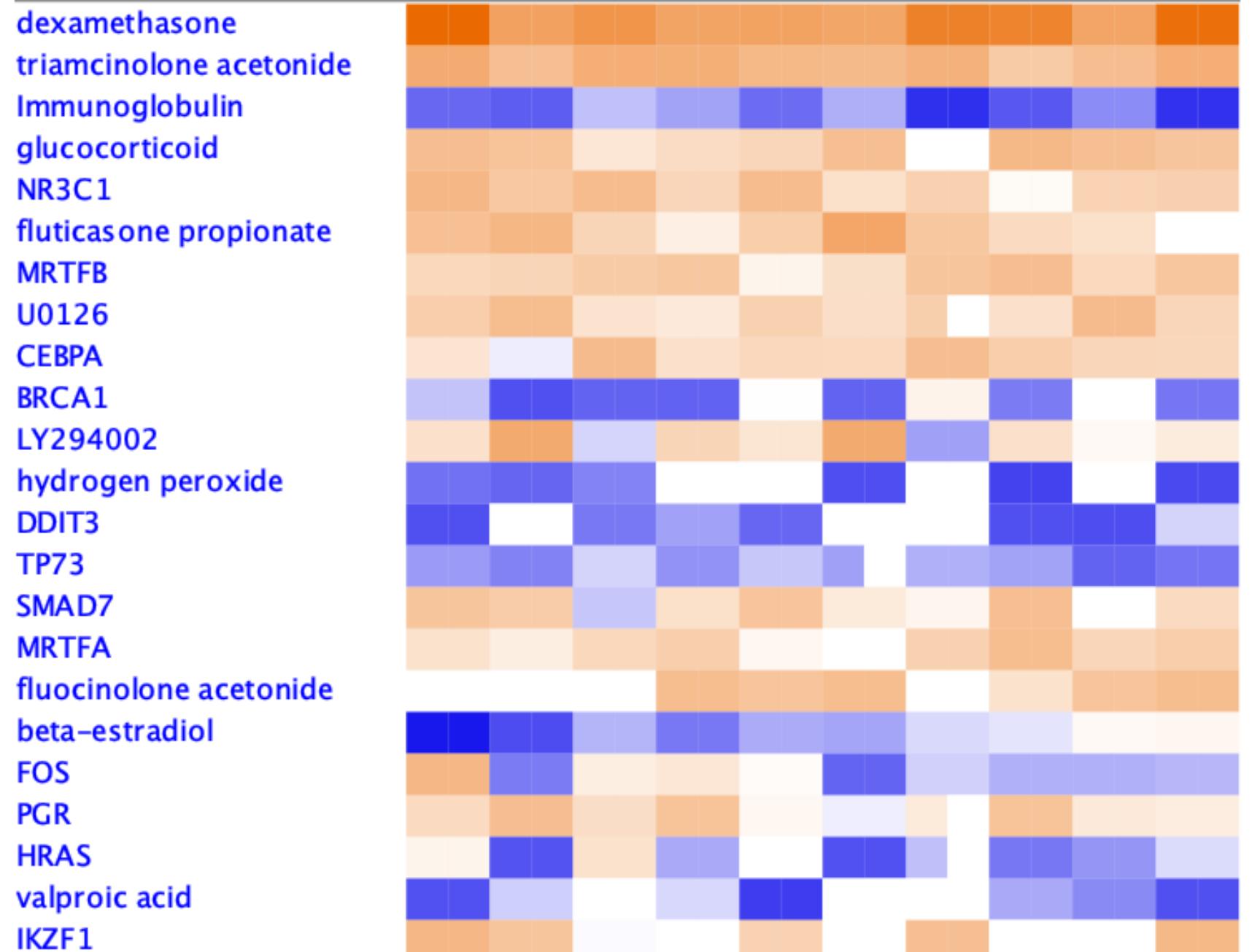


Compare

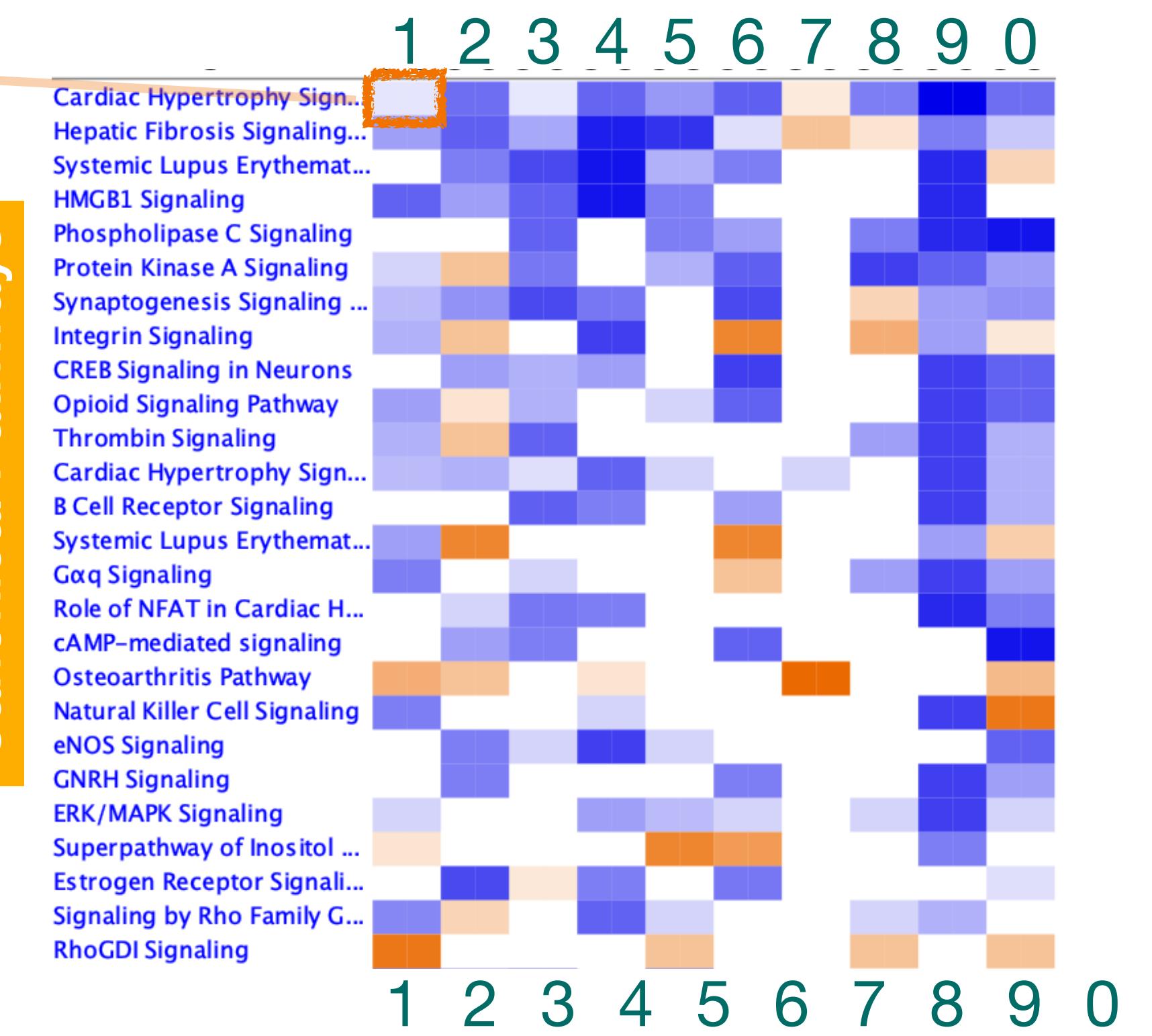


KB UDS

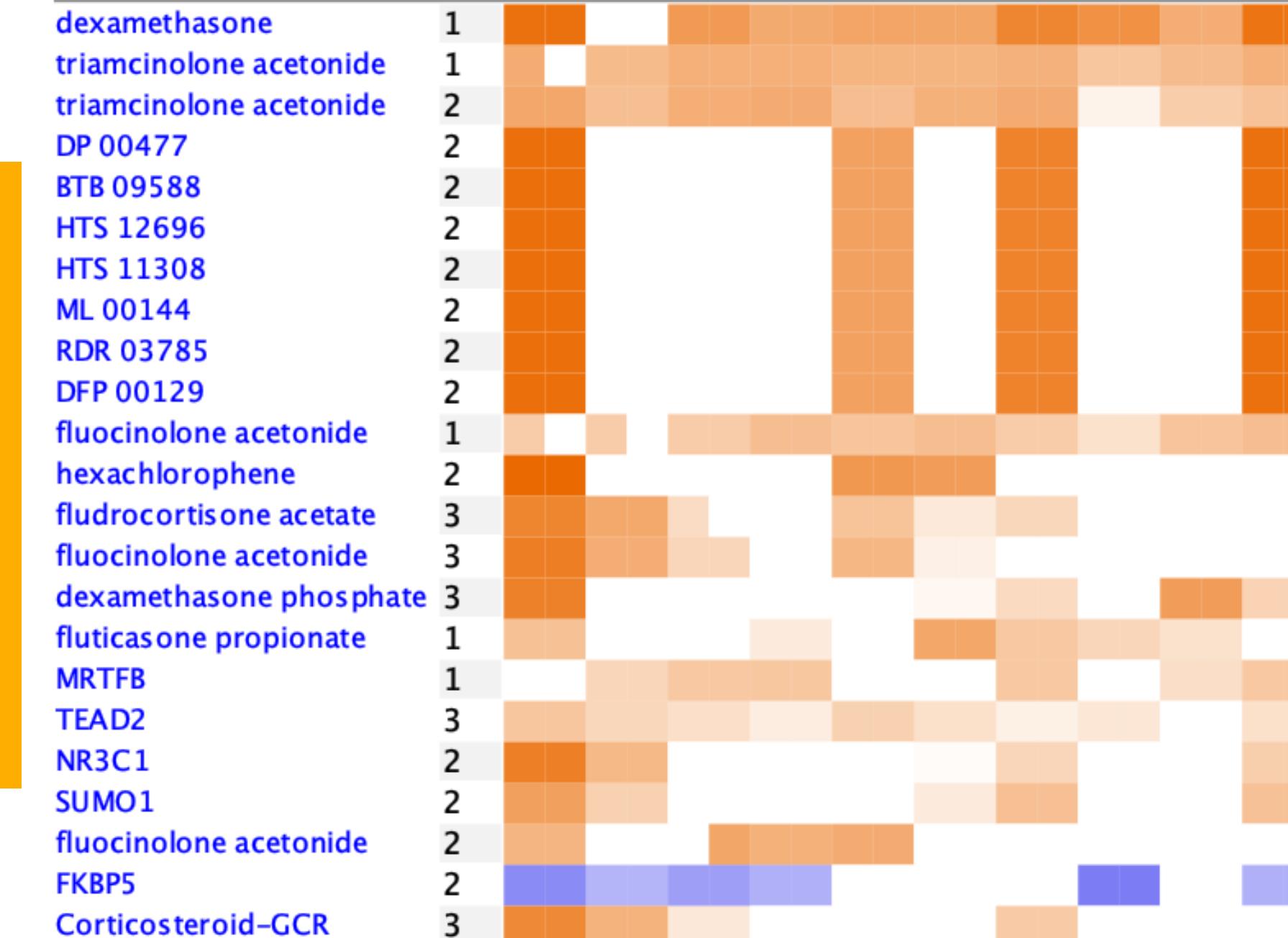
Upstream regulators



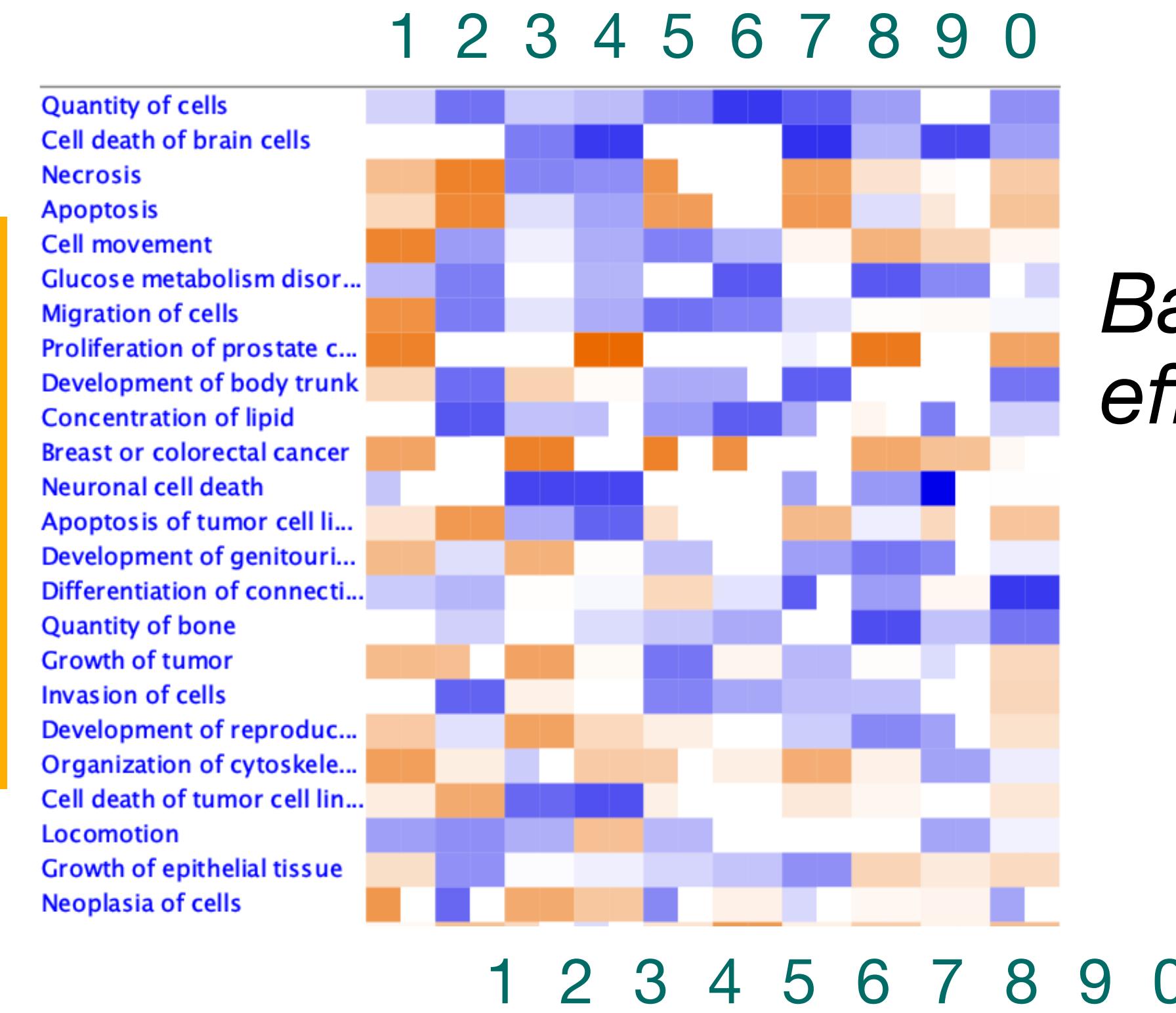
Canonical Pathways



Causal Networks



Diseases & Functions



Background effect

!

IPA

<https://www.bits.vib.be/software-overview/ingenuity-pathways-analysis>

bits.vib.be/software-overview/ingenuity-pathways-analysis

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IPA news

Read the latest release notes ([here](#)).
Read the archived release notes ([here](#)).

Online Tutorials

Recorded IPA webinars and tutorial videos (in particular the 3-part series covering most of IPA)

Software Support

Overview

- > CLC Main Workbench
- > Tibco Spotfire
- > CLC Genomics Workbench
- > ELN
- > Genevestigator
- > GraphPad Prism
- > IPA
- > MATLAB
- > OpenRefine
- > qbase+
- > SnapGene
- > Galaxy
- > Developed@VIB
- > FlowJo

Software News