



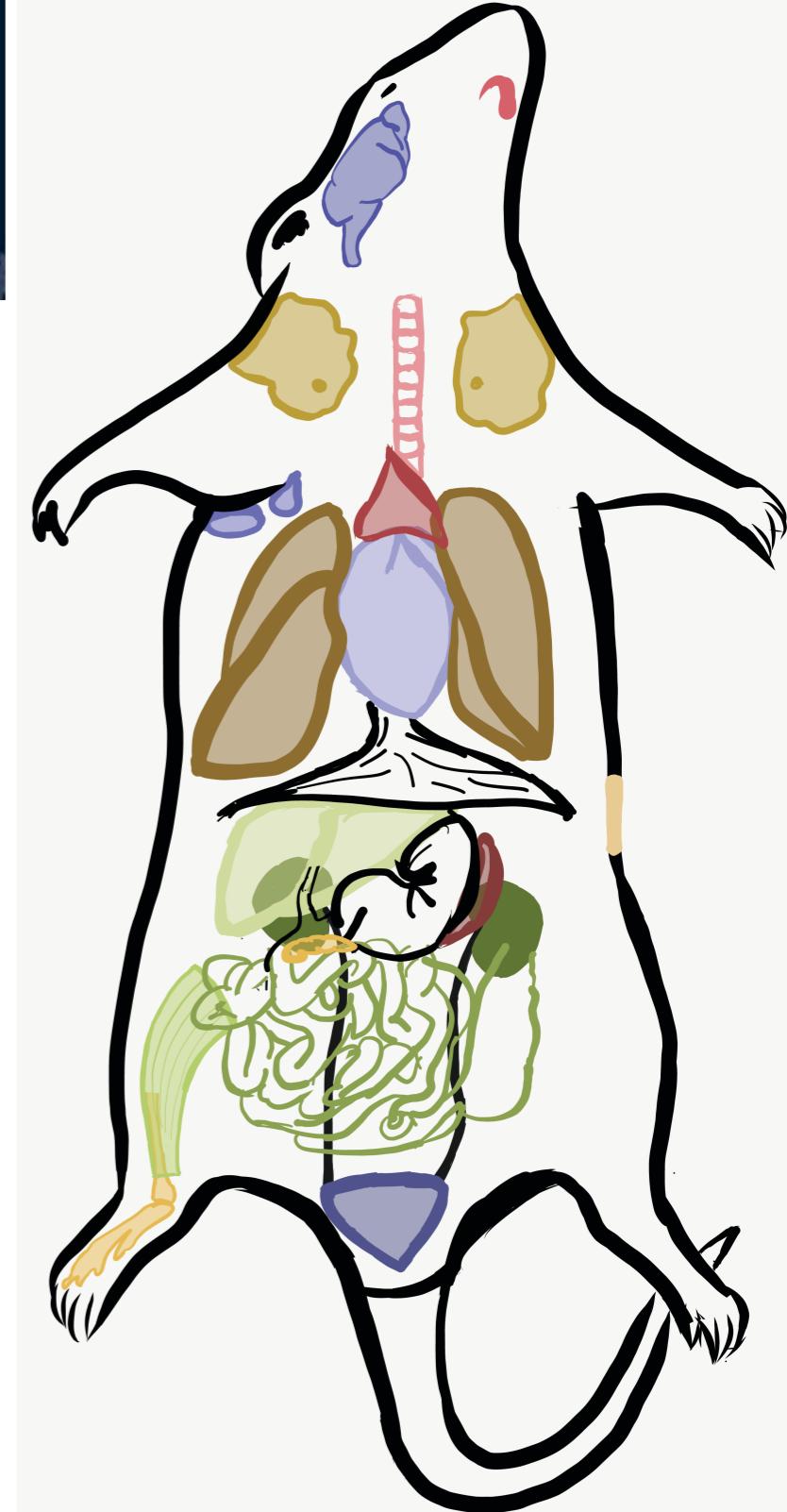
CHAN ZUCKERBERG
BIOHUB



The mouse aging cell atlas

aka

Cell biology meets Python



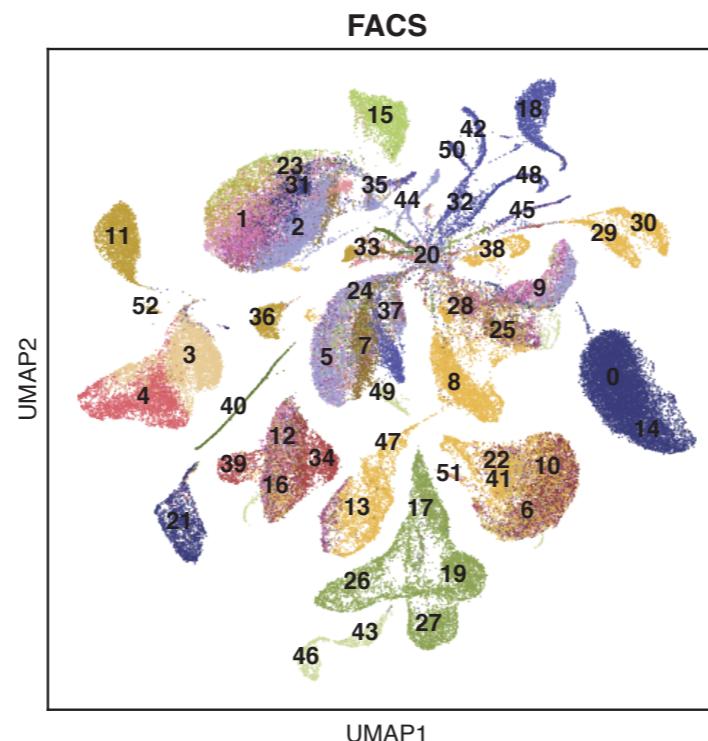
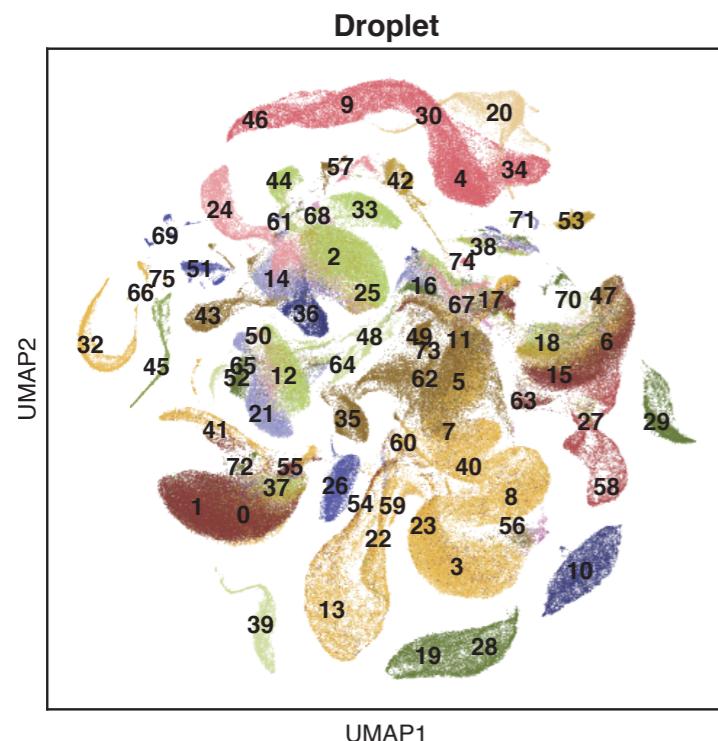
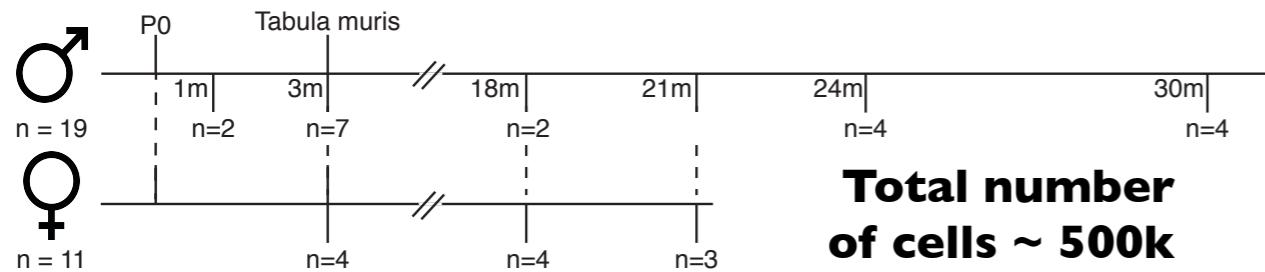
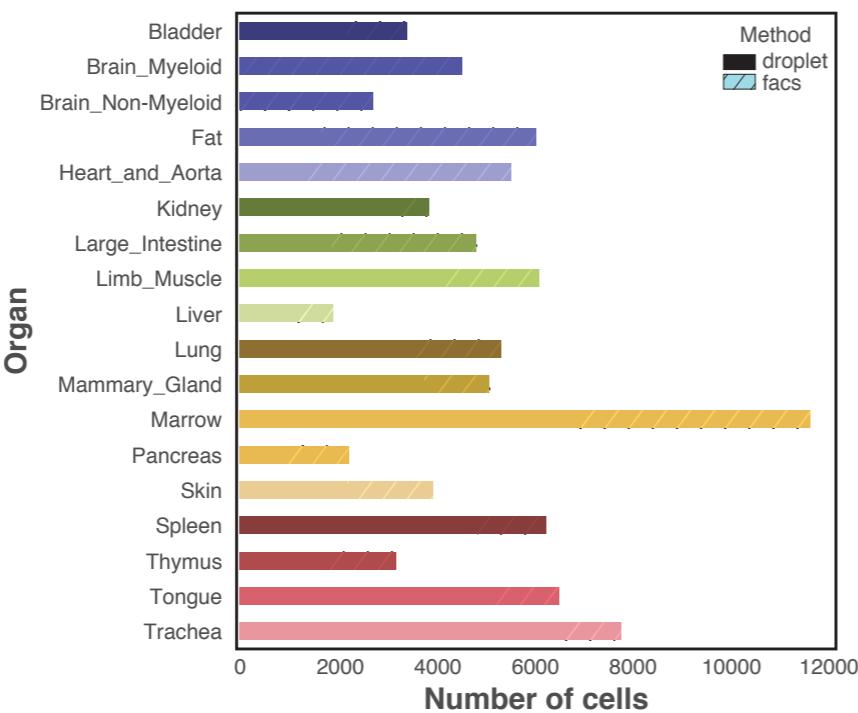
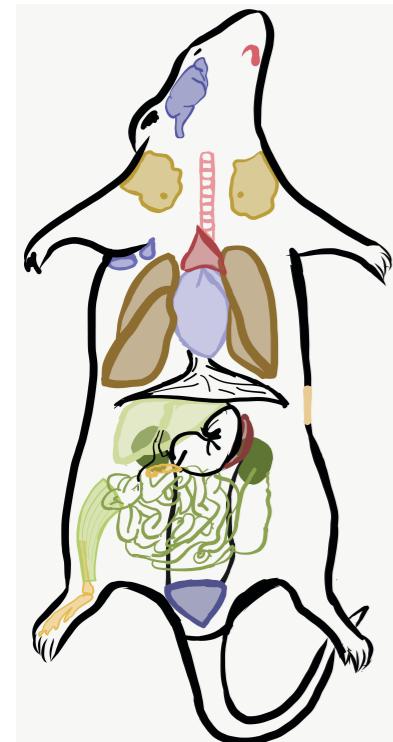
Angela Oliveira Pisco

angela.pisco@czbiohub.org

[@drAOPisco](https://twitter.com/drAOPisco)

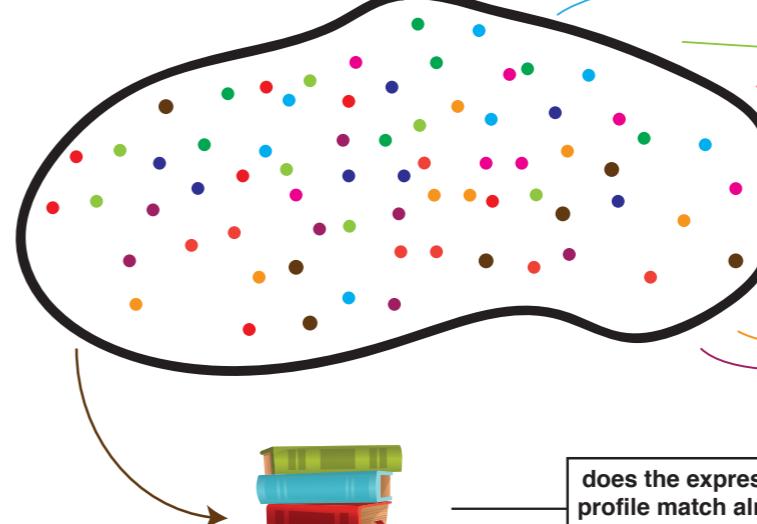
[@aopisco](https://github.com/aopisco)

Tabula Muris Senis - overview



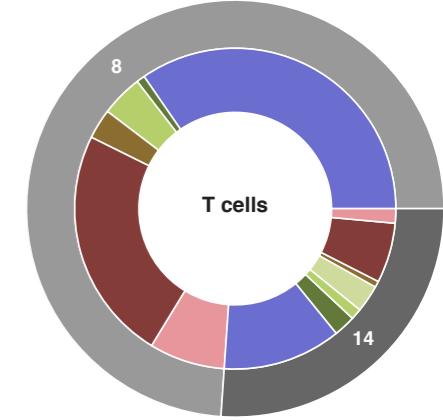
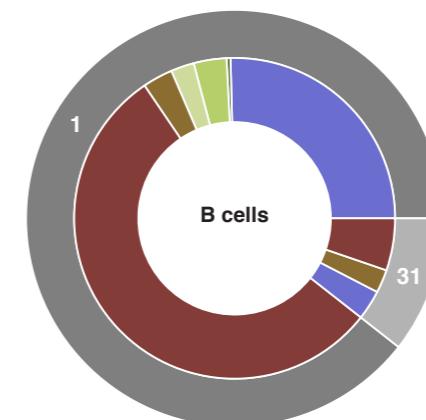
How to annotate the new dataset?

Unclassified dataset



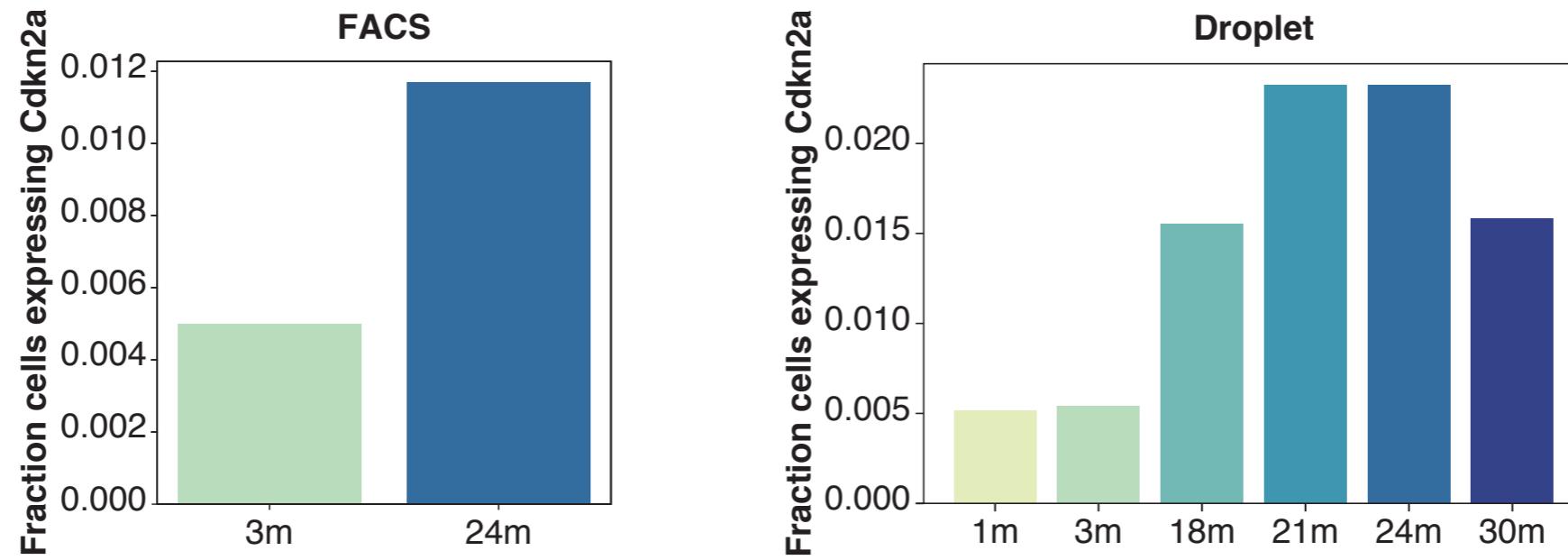
Tabula Muris
3m time point

Shared cell types cluster together at the global level (e.g. FACS)

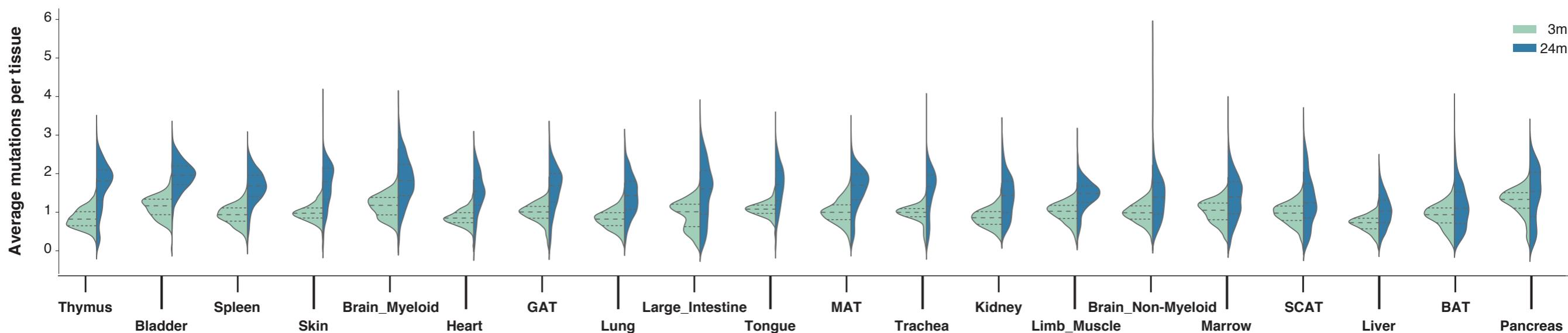


Tabula Muris Senis - aging hallmarks

Cellular senescence: the fraction of cells expressing p16 increases with age

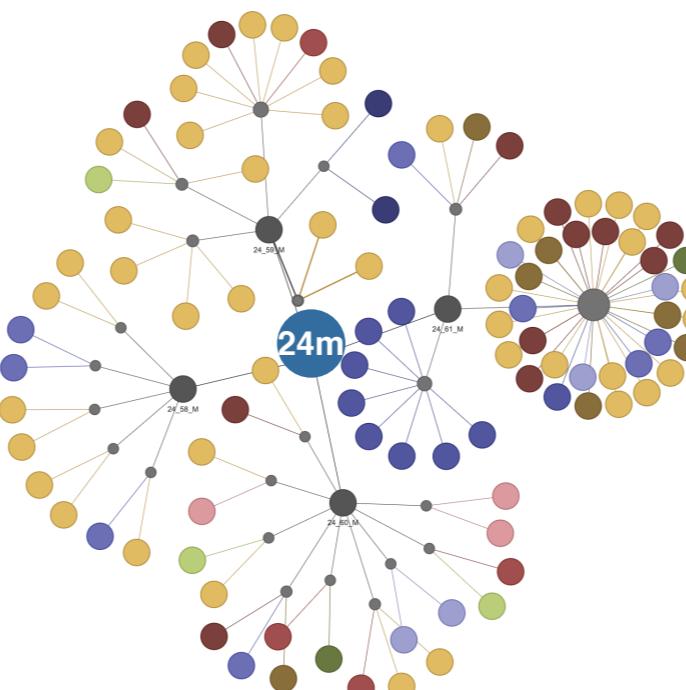
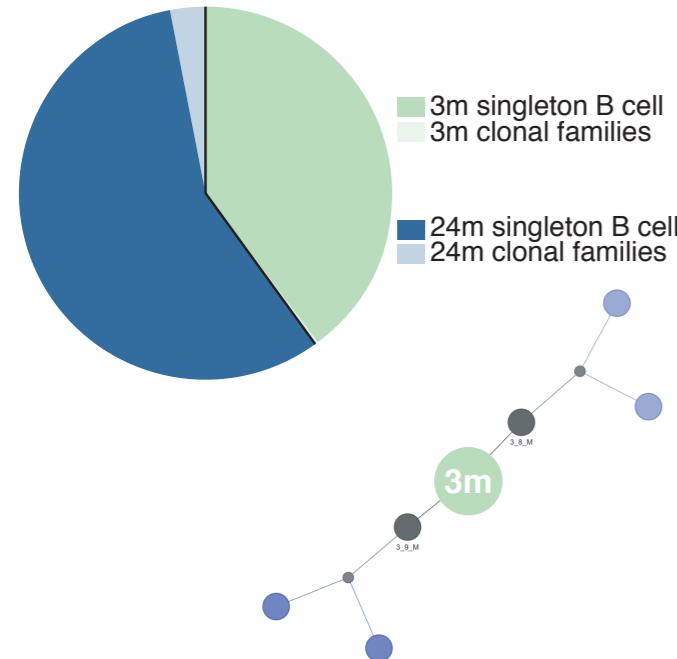


Genomic instability: the number of somatic mutations increases for the majority of tissues



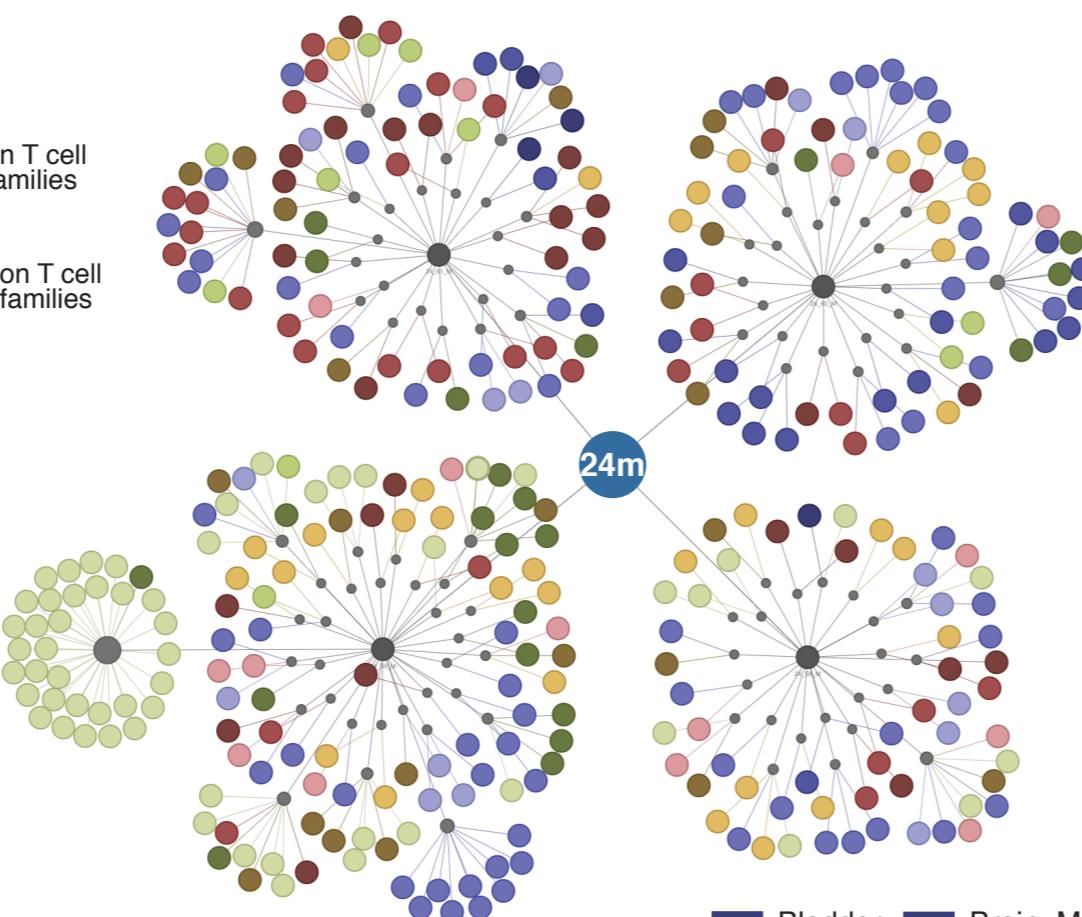
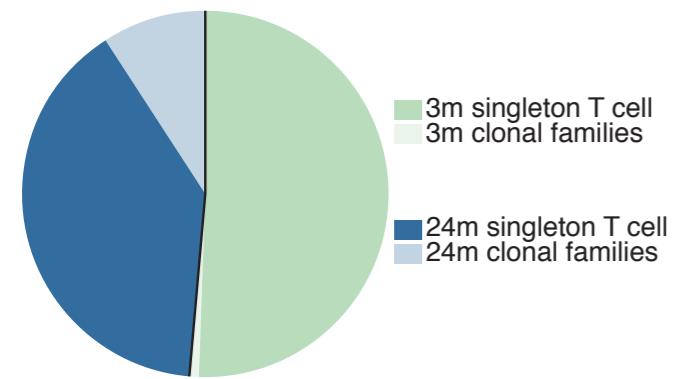
Tabula Muris Senis - immune changes

3450 cells with assembled BCR



There is a significant increase in the number of B and T cells clones

3675 cells with assembled TCR



The immune repertoire becomes less diverse with age, leading to reduce capability of fighting new infections

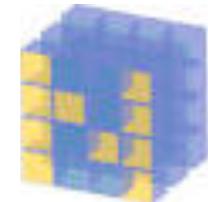
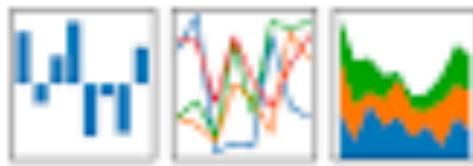
Legend for tissue types:
Bladder, Brain_Myeloid, Brain_Non-Myeloid, Fat, Heart_and_Aorta, Kidney,
Limb_Muscle, Liver, Lung, Marrow, Spleen, Thymus, Trachea



cellxgene

An interactive explorer for single-cell transcriptomics data

pandas
 $y_t = \beta y_{t-1} + \mu_t + \epsilon_t$

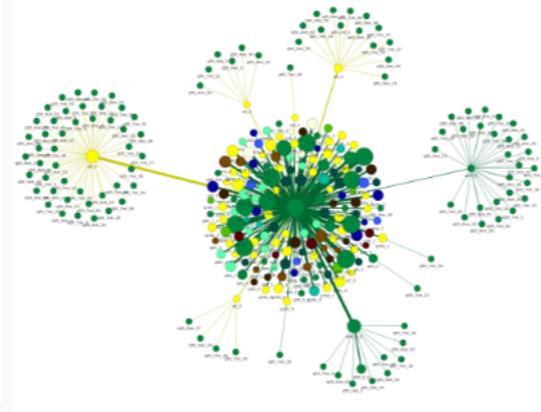
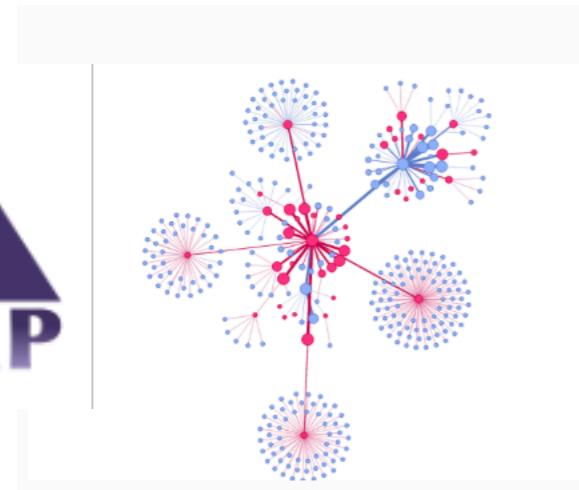
 NumPy
The NumPy logo features a 3D cube composed of blue and yellow squares. To the right of the cube is the word "NumPy" in a blue serif font.

matplotlib

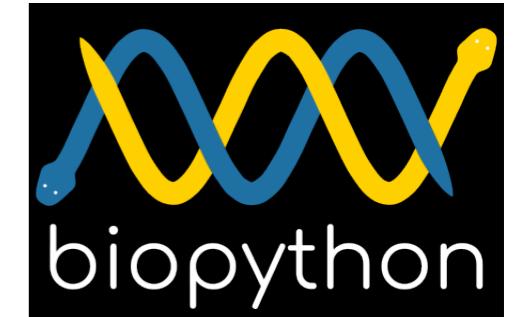


seaborn: statistical data visualization

UMAP

 scikit
learn
The scikit-learn logo features two overlapping circles: one light blue and one orange. The word "scikit" is in a small blue sans-serif font above "learn", which is in a larger black cursive font.

MulticoreTSNE 0.1

 biopython
The biopython logo consists of two wavy lines, one blue and one yellow, against a black background. Below the lines is the word "biopython" in a white sans-serif font.

intervaltree 3.0.2

leidenalg 0.7.0

louvain 0.6.1




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Posted June 08, 2019.

A Single Cell Transcriptomic Atlas Characterizes Aging Tissues in the Mouse

The Tabula Muris consortium, Angela Oliveira Pisco, Nicholas Schaum, Aaron McGeever, Jim Karkanias, Norma F. Neff, Spyros Darmanis, Tony Wyss-Coray, Stephen R. Quake

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