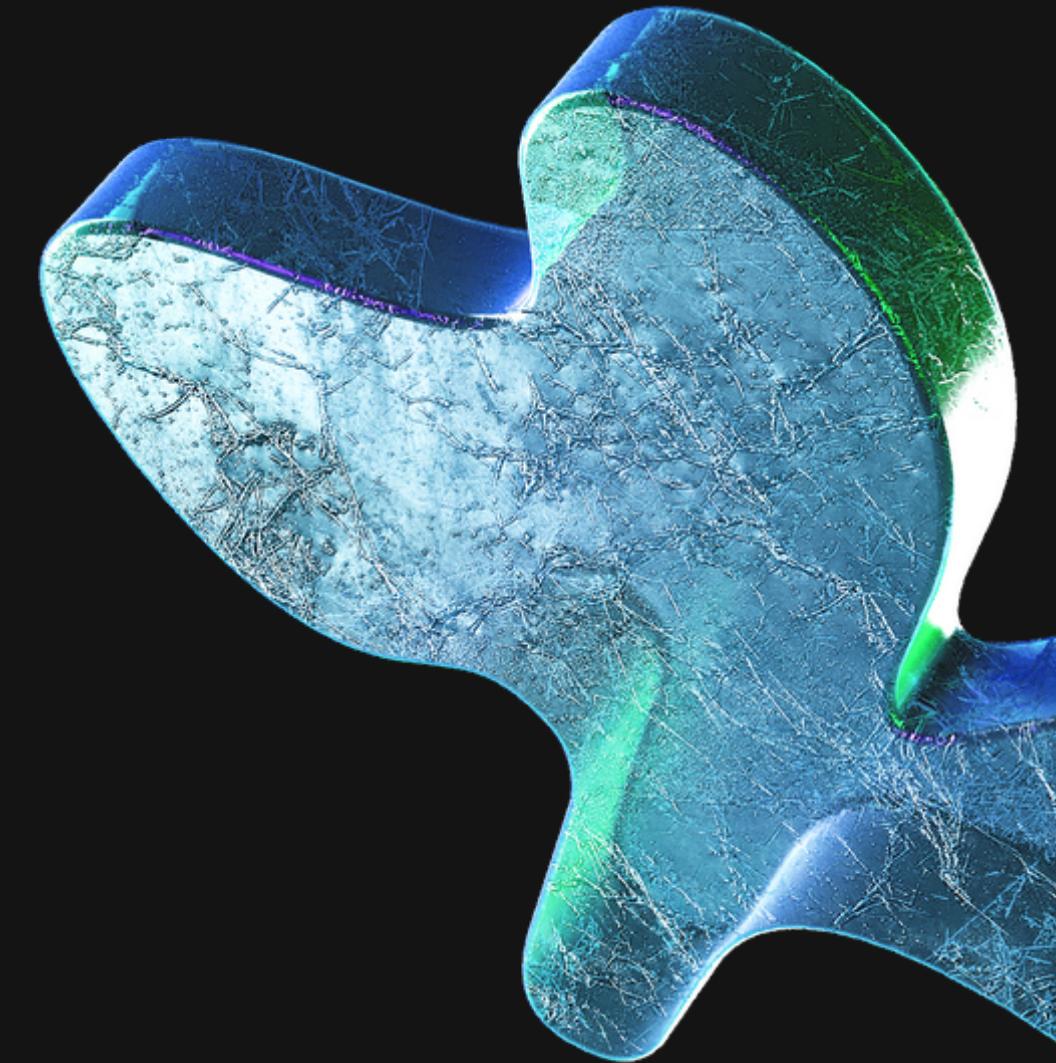


The mystery of HVGs

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Single-cell sequencing refers to the sequencing of a single-cell genome or transcriptome, so as to obtain genomic, transcriptome or other multi-omics information to reveal cell population differences and cellular evolutionary relationships



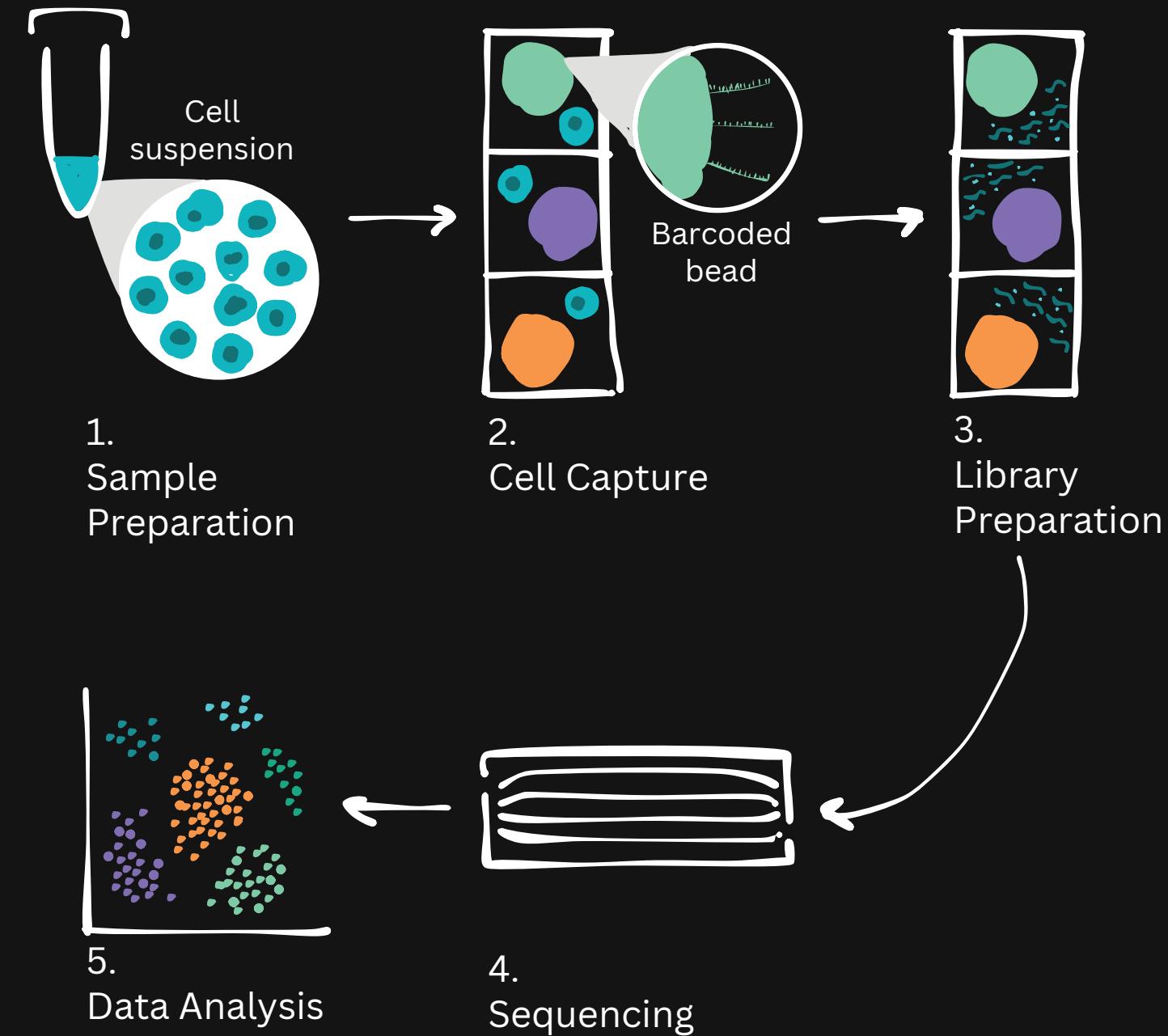
Bulk cell



Single-cell

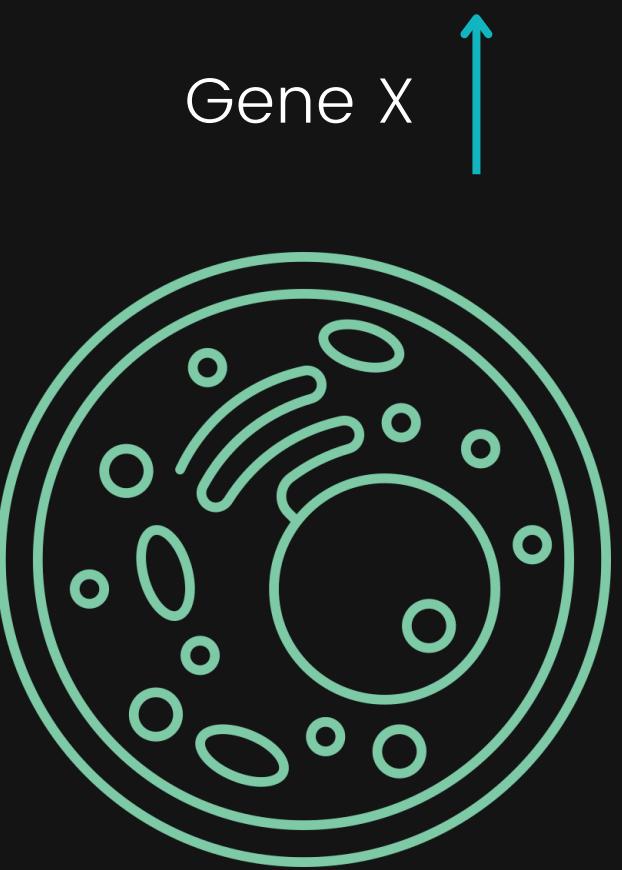


Spatial

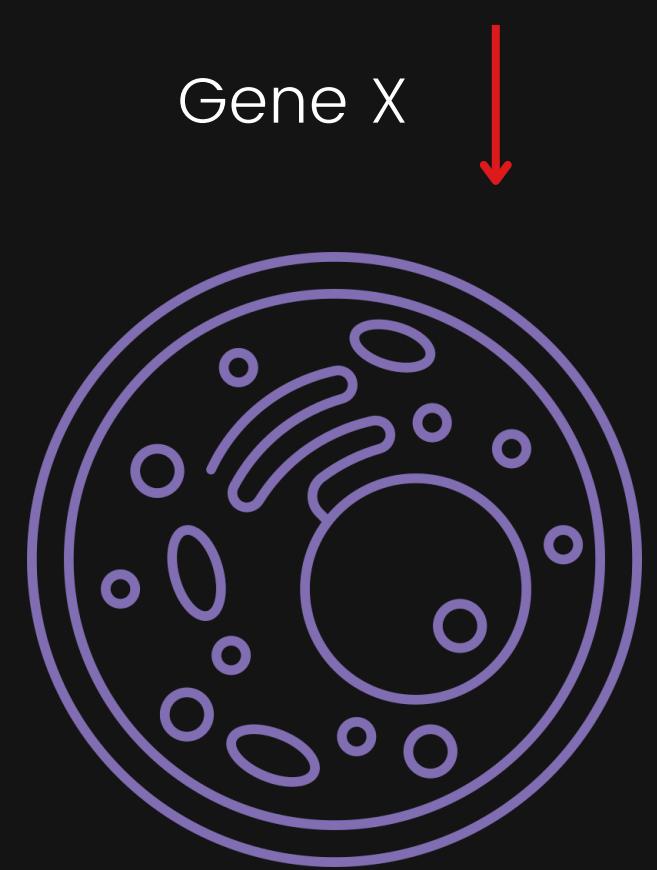


Highly variable genes

Genes that demonstrate substantial variation in their expression levels across different types of cells, providing valuable insights into biological processes and phenotypic diversity.

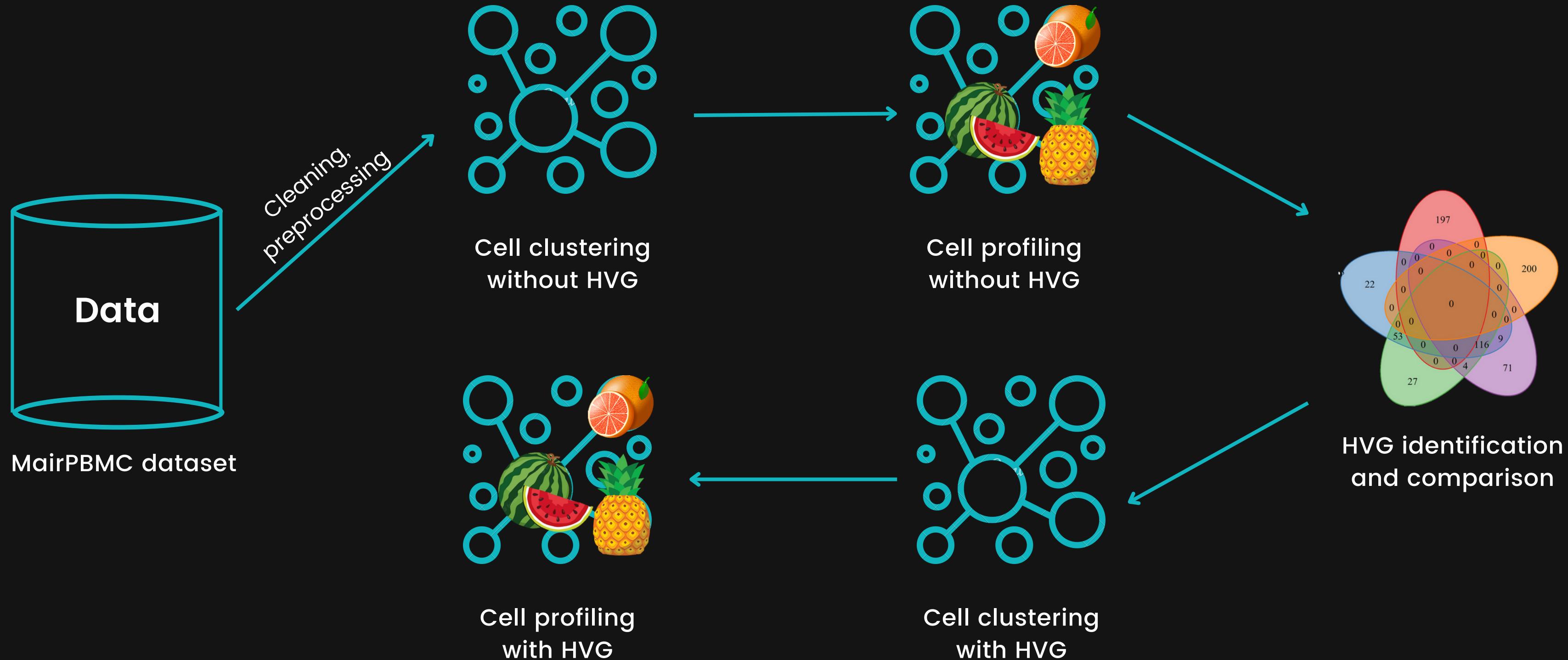


Cell A

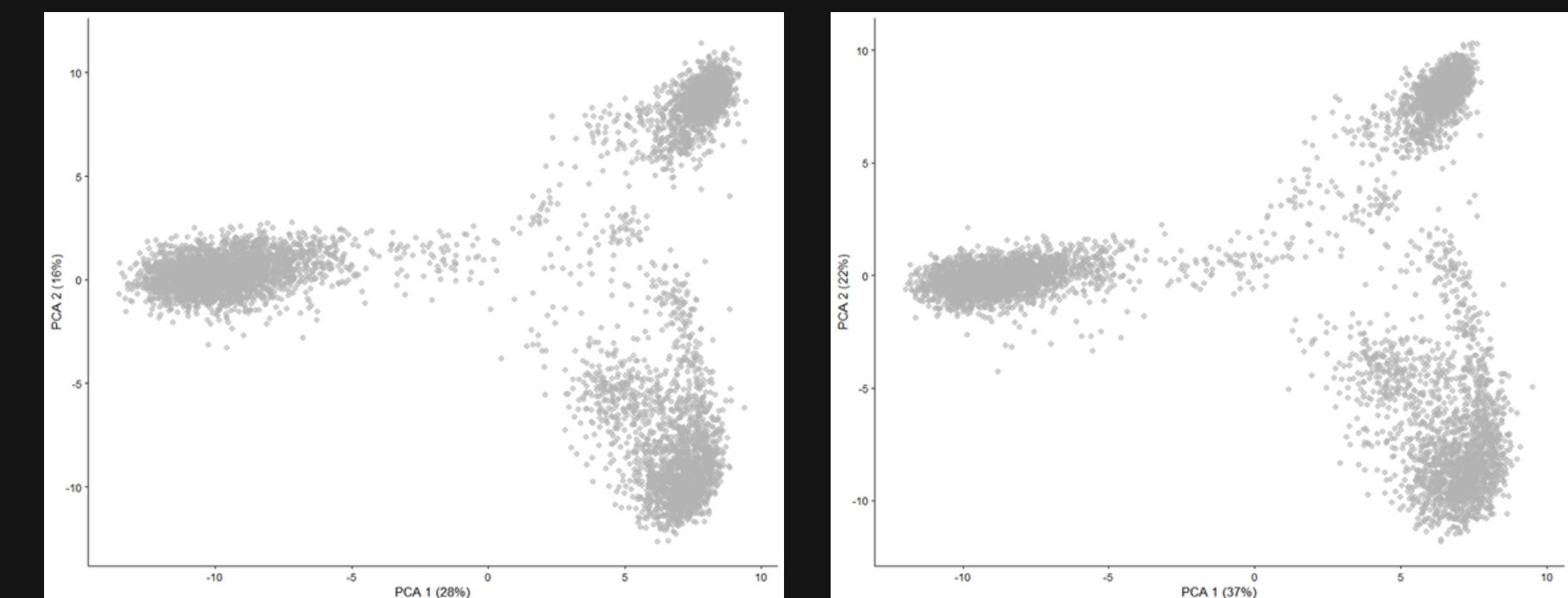
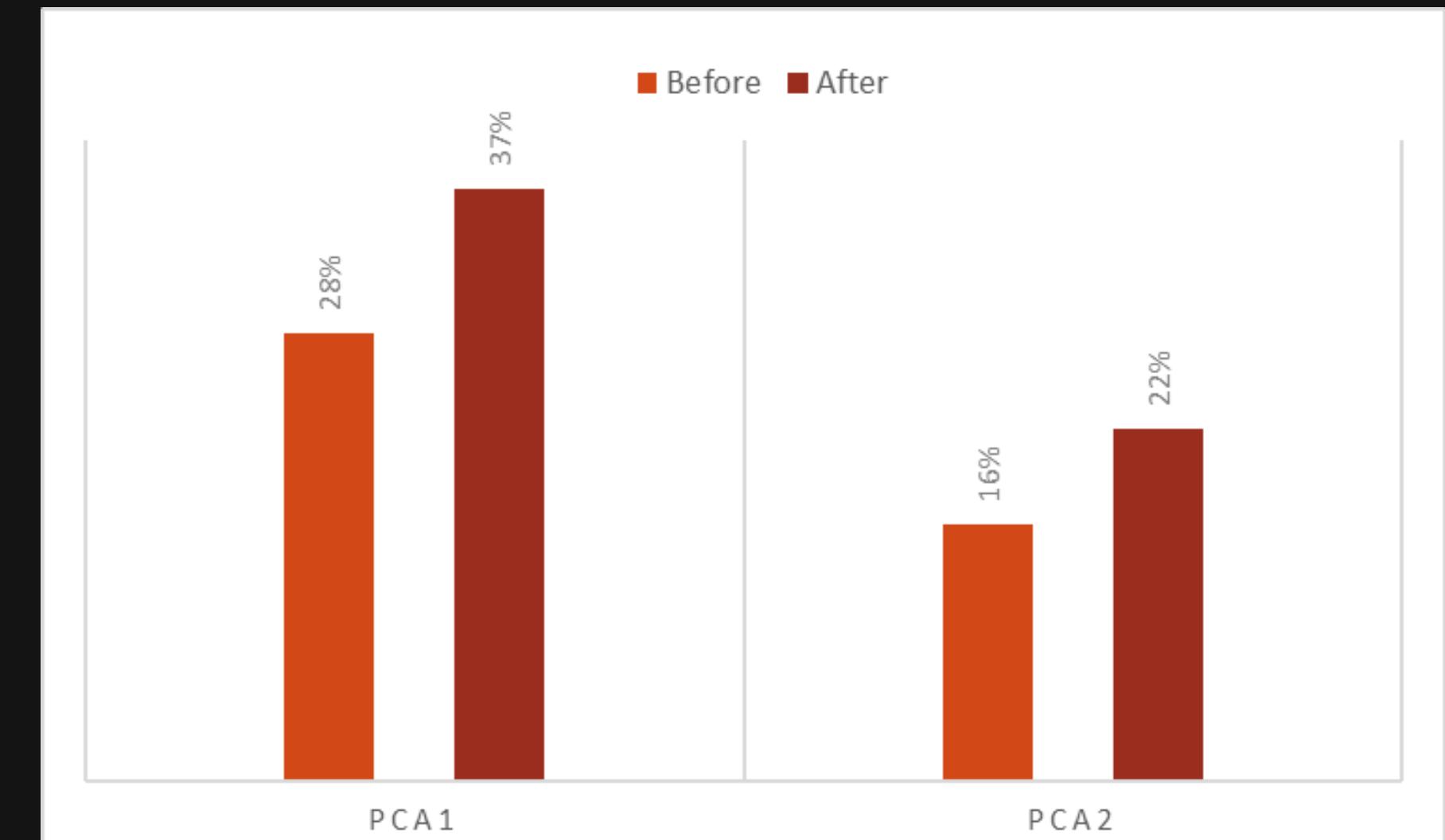
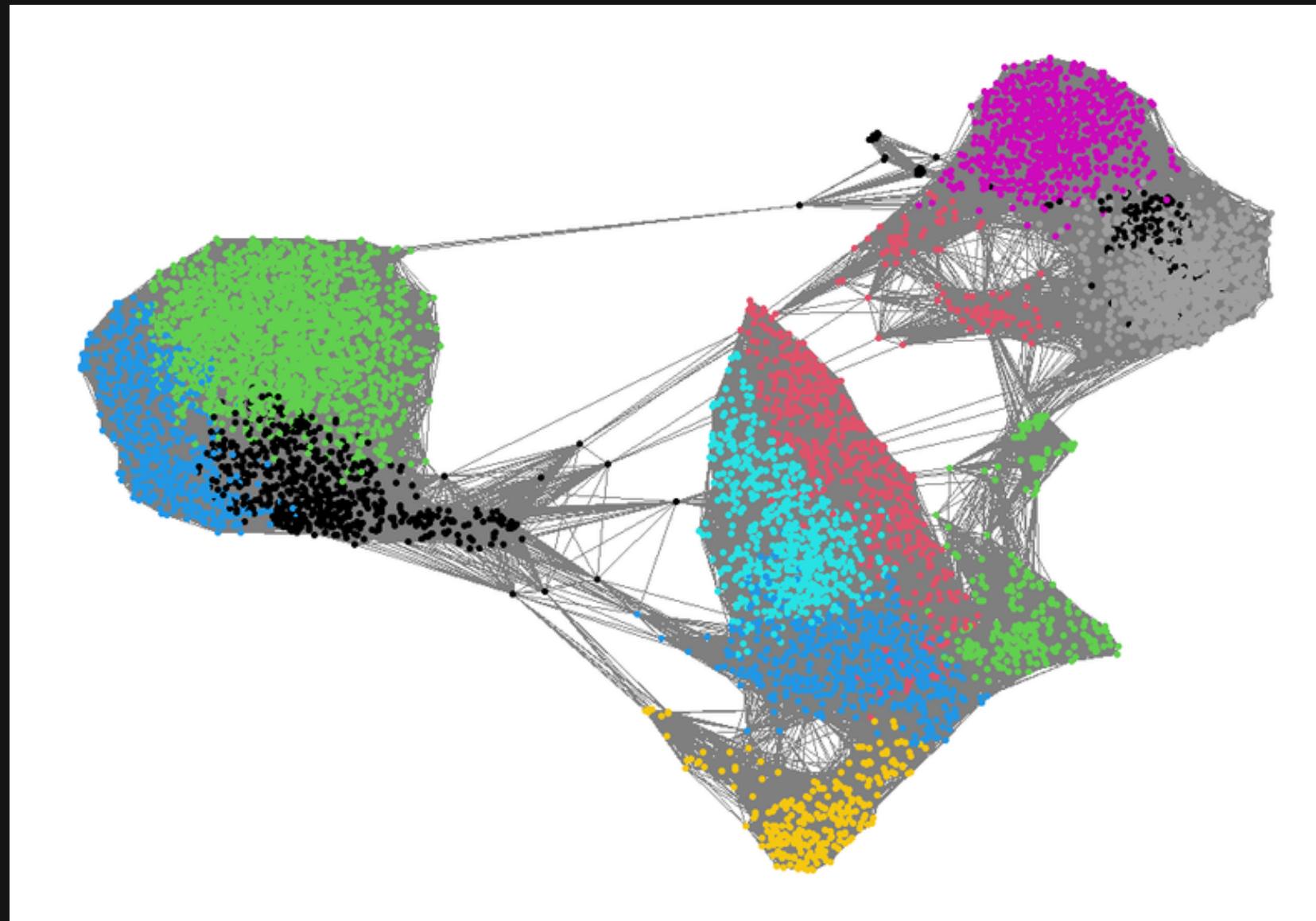


Cell B

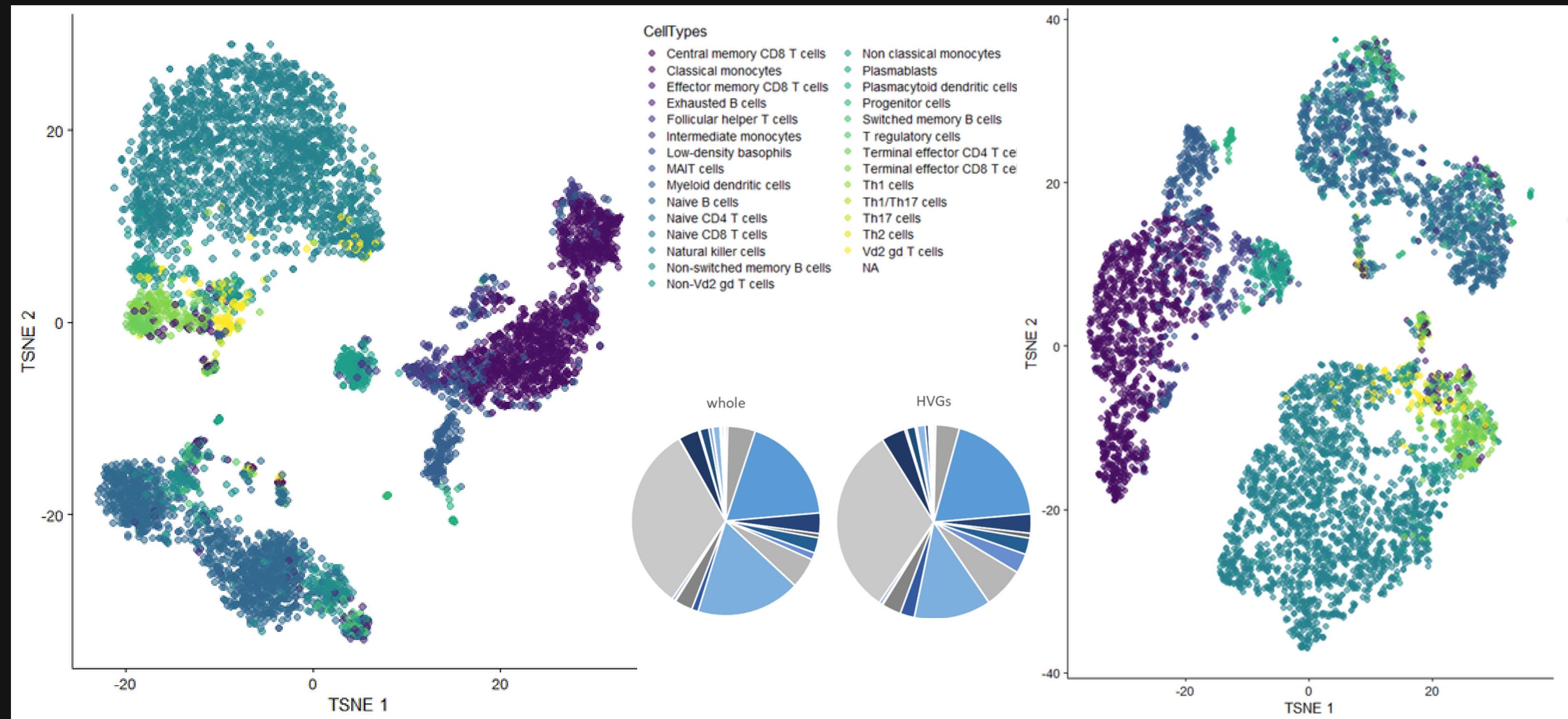
Check the **reproducibility** of common
methods used for HVG identification



HVGs improves clustering capabilities

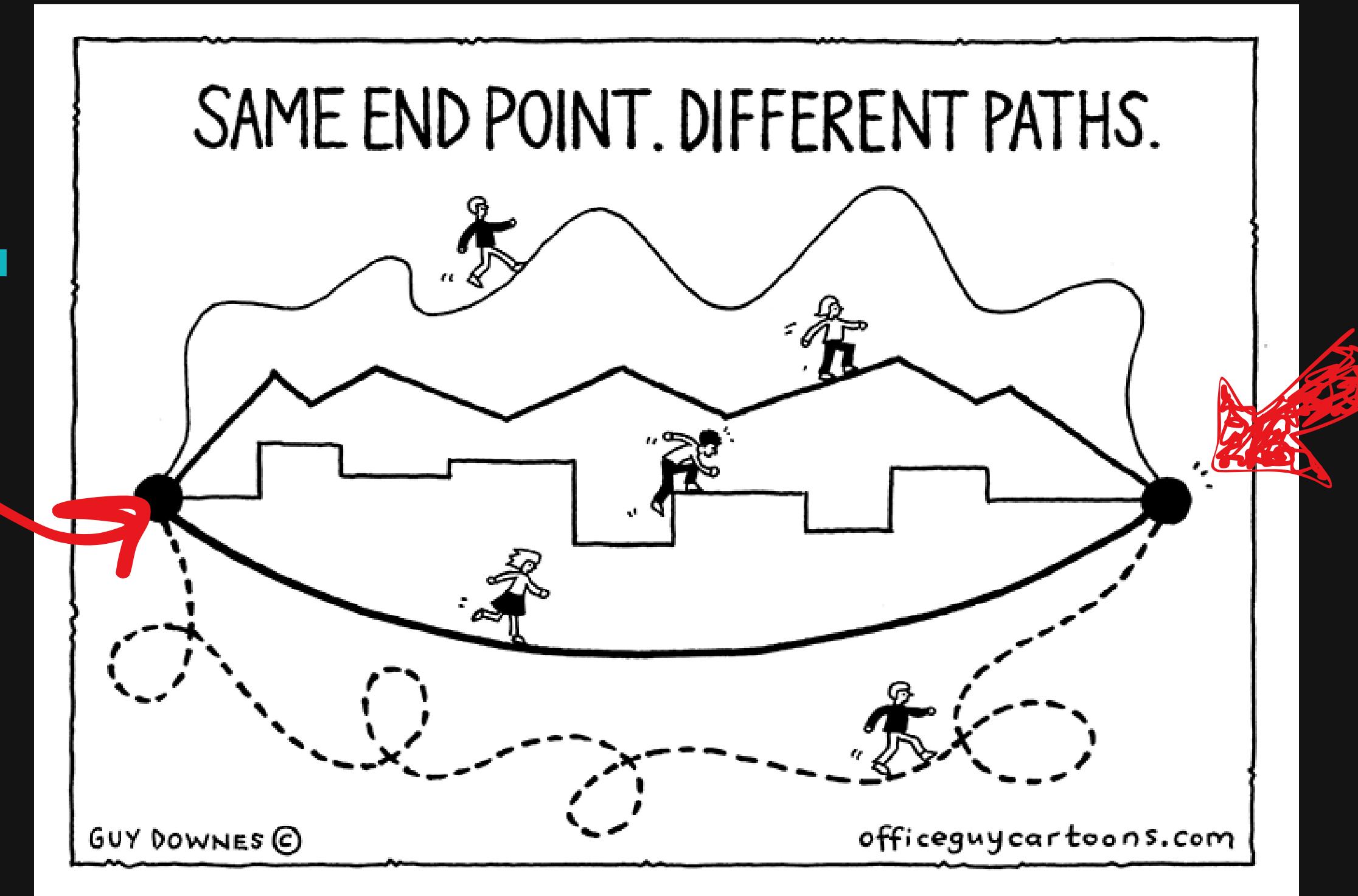


Profiling unveils data insights at scale



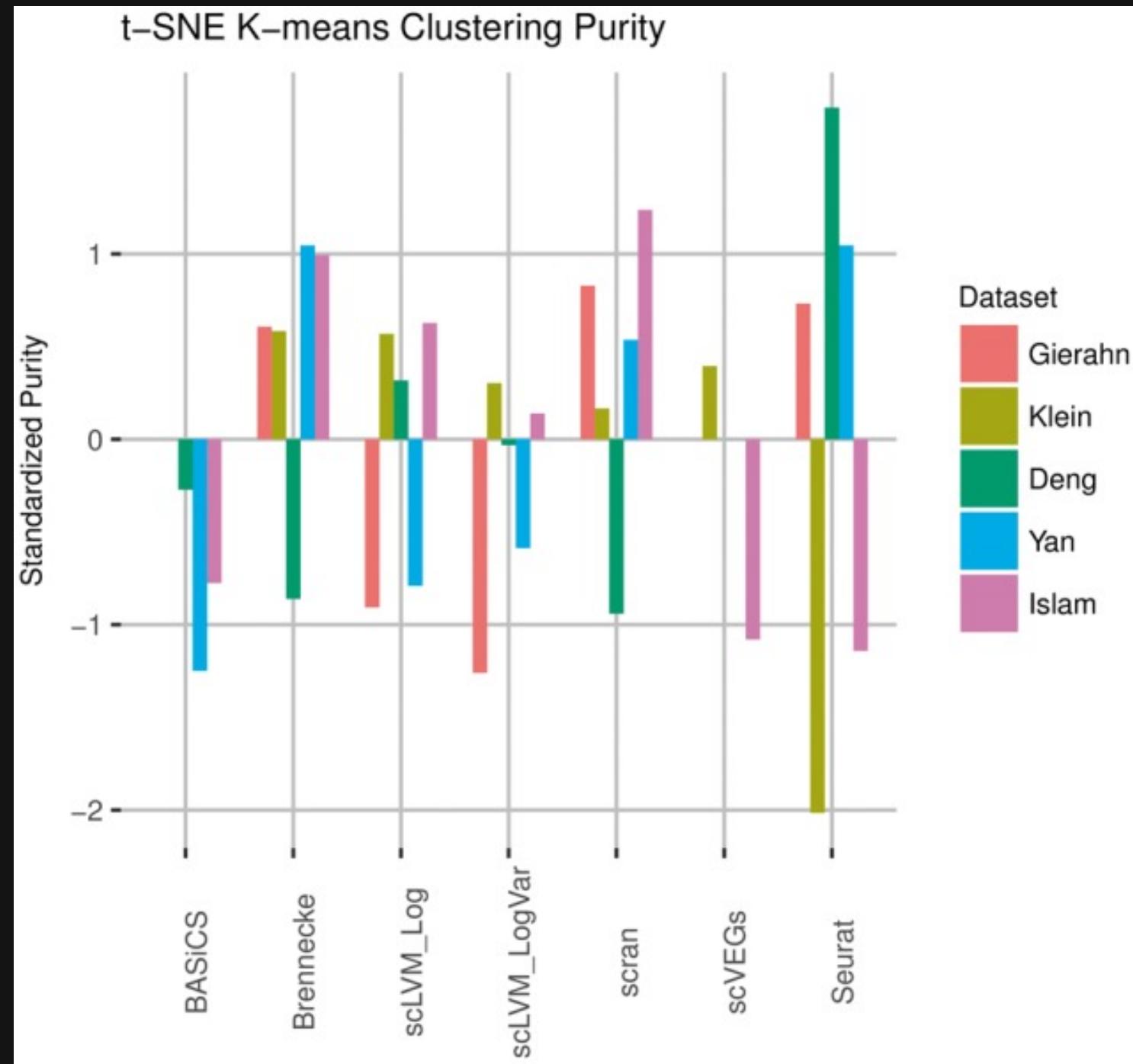
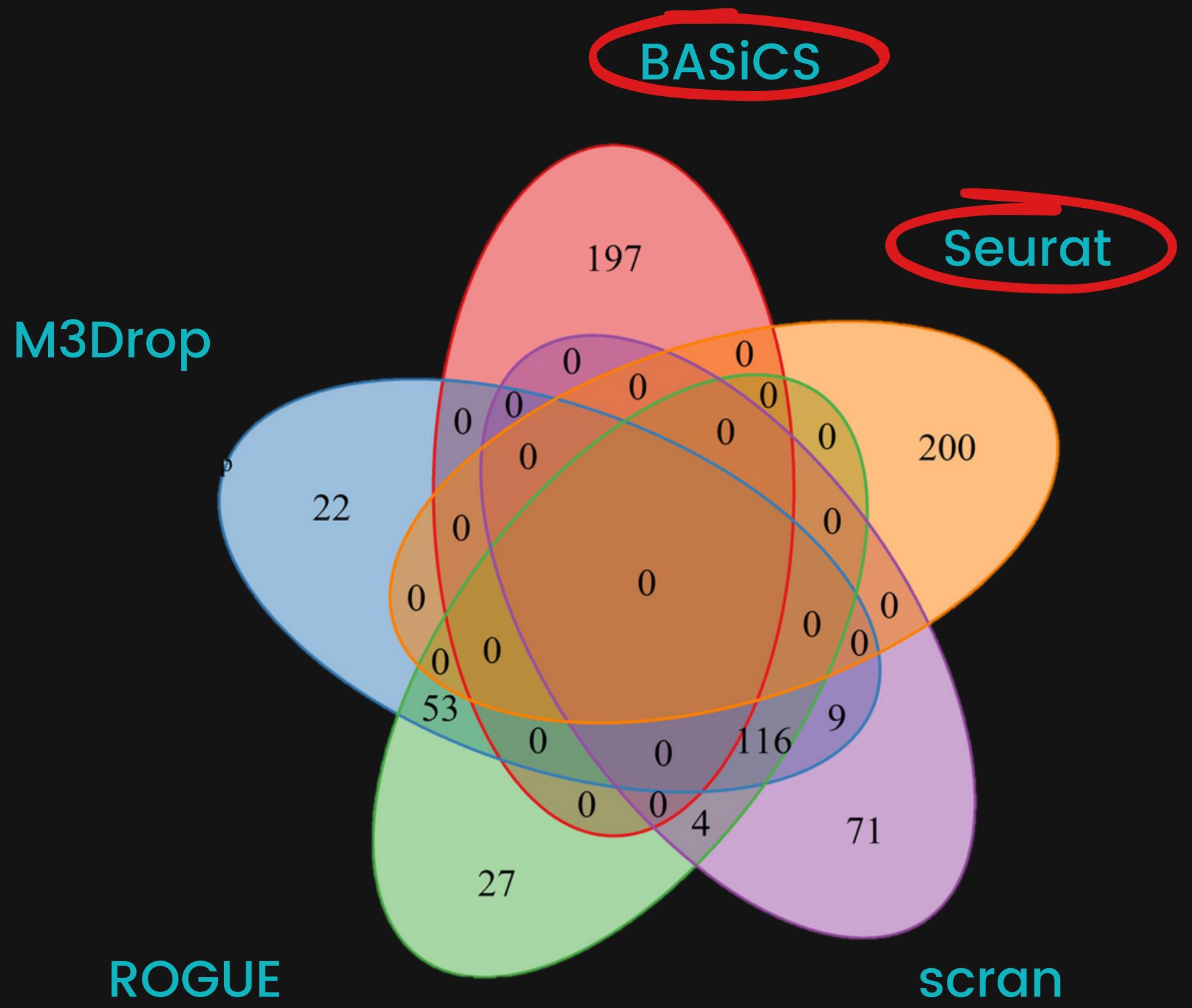
HVG identification

Our data



- Seurat
- BASiCS
- scran
- M3Drop
- ROGUE

HVG identification



10.1093/bib/bby011

Conclusions

Clustering and profiling are common approaches for scRNA-seq analysis

HVGs significantly increase the efficacy for the single cells clusterisation

Existing tools are not reproducible and rely too much on the type of data

Either the relatively universal method for HVGs investigation or the extensive documentation for existing ones should be developed

References

- Tang, X., Huang, Y., Lei, J. et al. The single-cell sequencing: new developments and medical applications. *Cell Biosci* 9, 53 (2019). <https://doi.org/10.1186/s13578-019-0314-y>
- Yip, S. H., Sham, P. C., & Wang, J. (2019). Evaluation of tools for highly variable gene discovery from single-cell RNA-seq data. *Briefings in bioinformatics*, 20(4), 1583–1589. <https://doi.org/10.1093/bib/bby011>
- Huber Group. (2023). Single Cell Analysis Methods and Applications. In Computational Statistics and Data Analysis for Genome Biology (csAMA) 2023. Retrieved from https://www.huber.embl.de/csama2023/csAMA/lab/2-tuesday/lab-04-singlecell/singlecell_CSAMA2023.html

Thank you for attention!

