



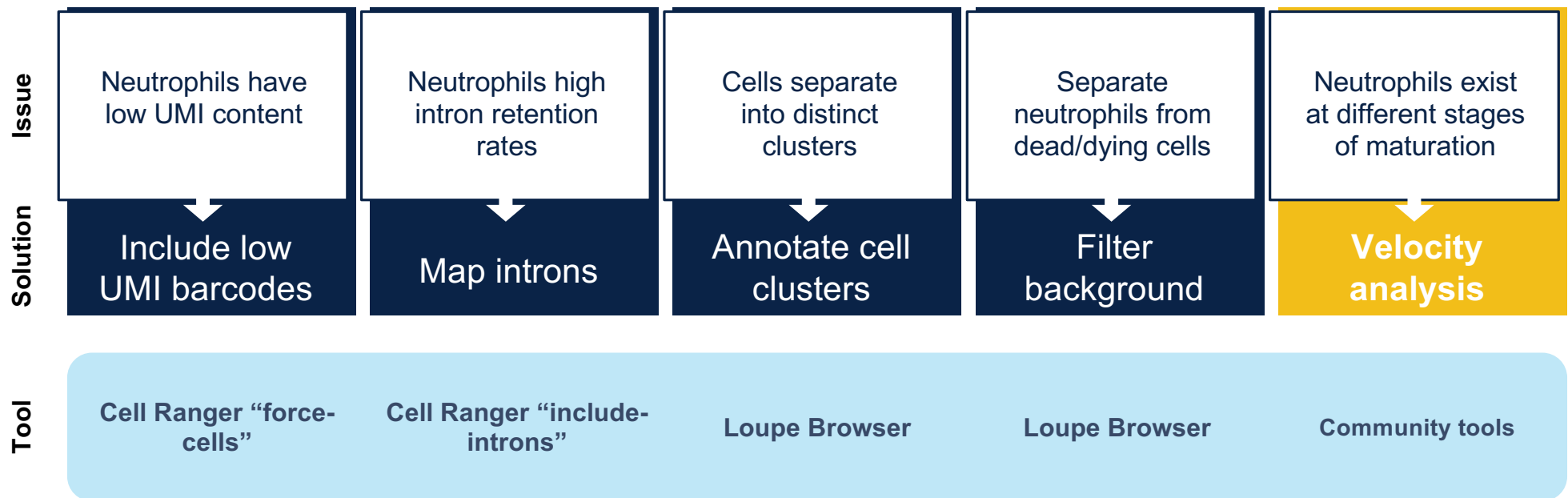
# Introduction to RNA Velocity Analysis

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Hands on tour of the single cell analysis journey

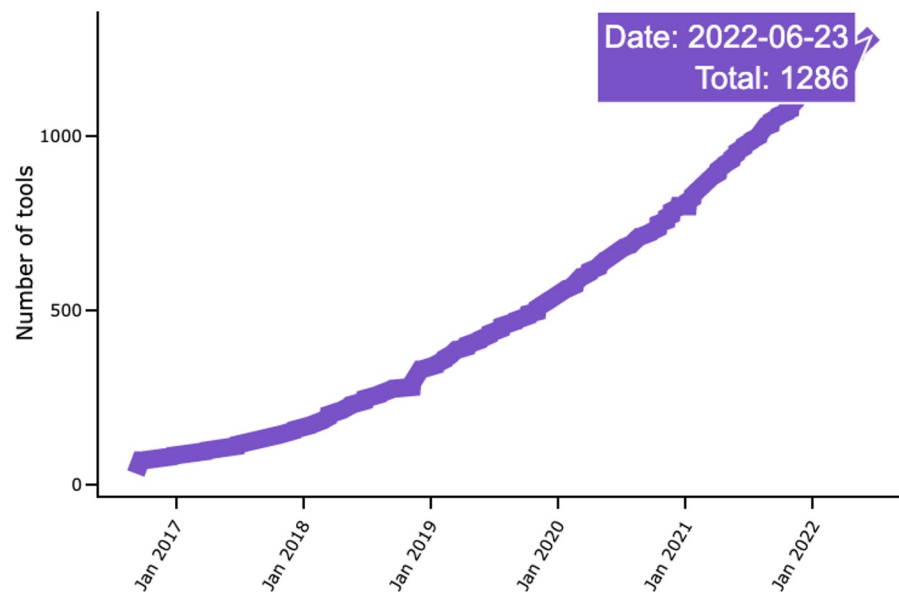
# Recap: Neutrophil analysis plan

Our journey through analysis



# Approaching the Analysis Ecosystem

More than 1,000 tools!



<https://www.scrna-tools.org/>

- How do you choose?
  - Leverage your research question
  - Look to the literature
    - Citations
    - Reviews
  - Look at GitHub sites
    - Check for regular updates
    - Check for issues and responses
- 10x Analysis Guides
  - Introductions
  - Tutorials
  - Informatics blogs

# RNA Velocity

Single-cell RNA-seq provides only static snapshots of cellular states at the moment of the measurement.

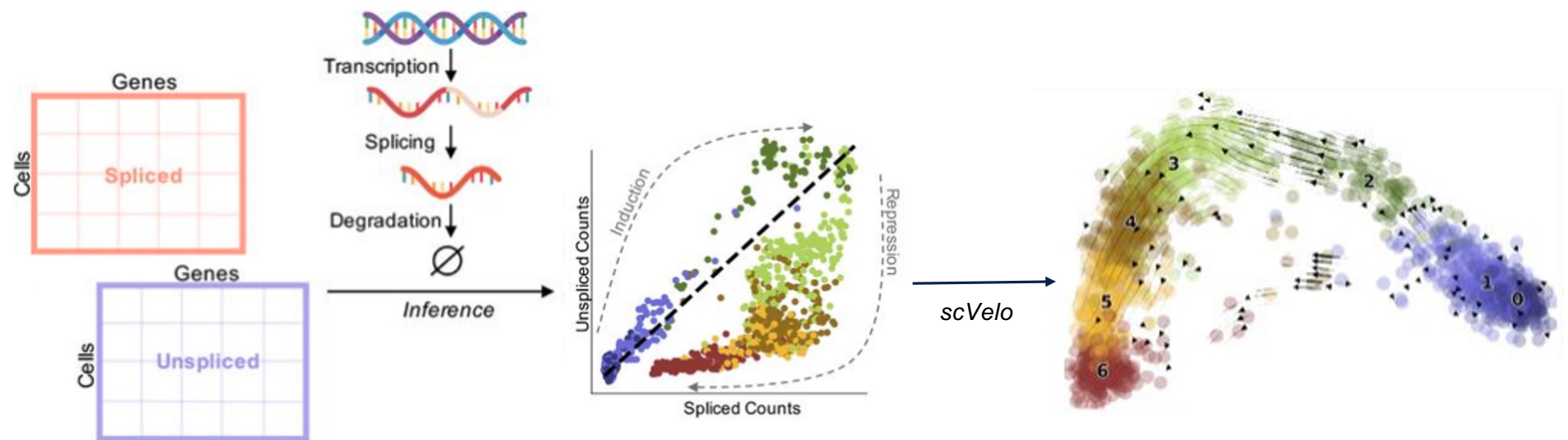
RNA velocity ([La Manno et al, 2018](#); [Bergen et al. 2020](#)) can predict the direction and speed of movement of cells in transcriptome space.

Application: analysis of cell dynamics → developmental biology, tissue regeneration, disease progression



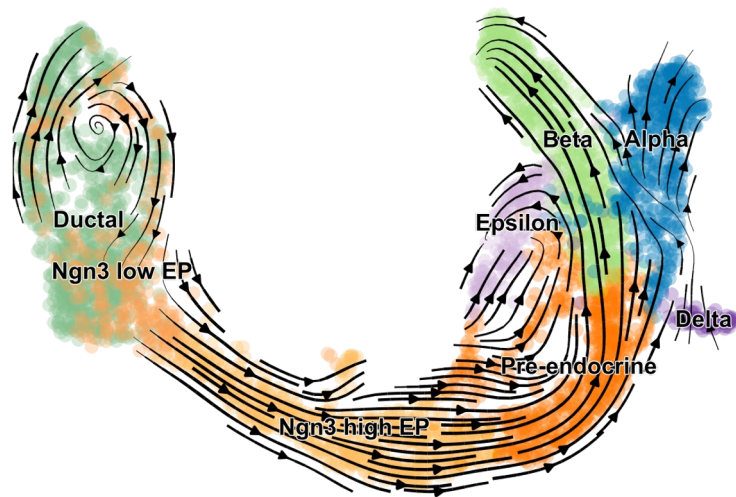
# How does RNA velocity work?

Estimation basis: the relative abundance of nascent (**unspliced**) and mature (**spliced**) mRNA → rate of RNA splicing and degradation

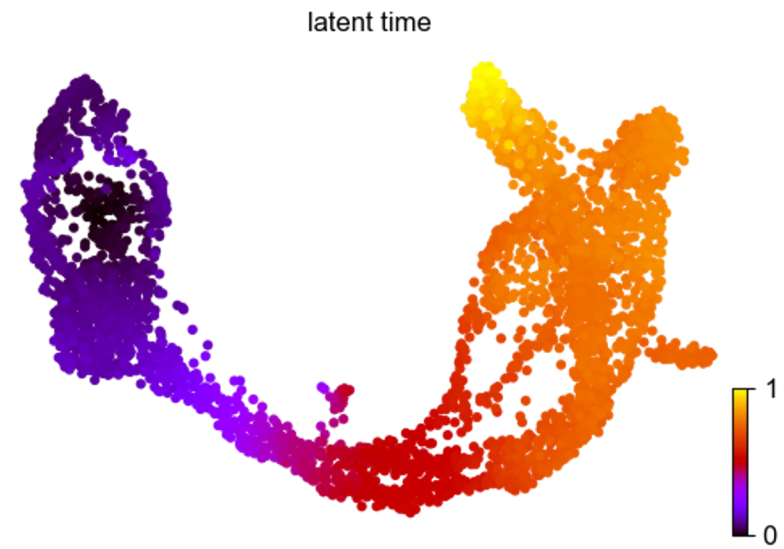


<https://doi.org/10.1101/2022.02.12.480214>

## Example of scVelo results

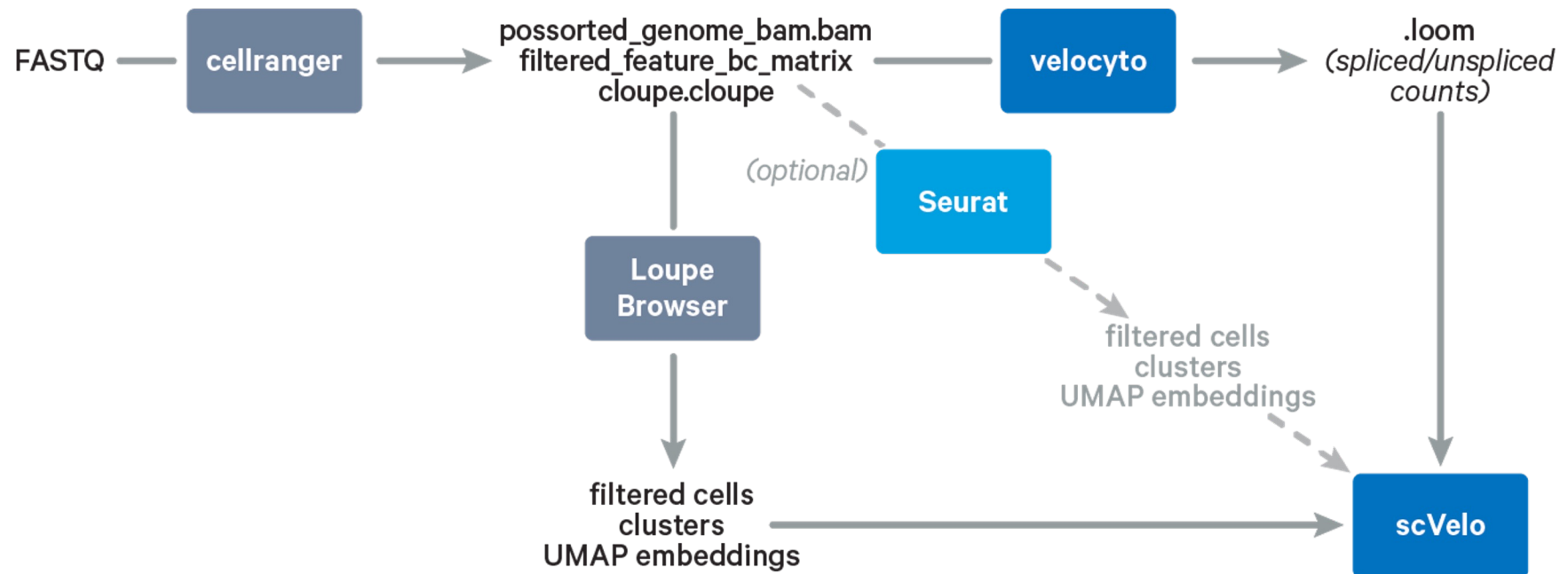


Endocrine development in the pancreas with lineage commitment to four major fates:  $\alpha$ ,  $\beta$ ,  $\delta$  and  $\epsilon$ -cells.



The **latent time** represents the **cell's internal clock** and approximates the real time experienced by cells as they differentiate, based only on its transcriptional dynamics.

# Velocity analysis using 10x data



<https://www.10xgenomics.com/resources/analysis-guides/trajectory-analysis-using-10x-Genomics-single-cell-gene-expression-data>