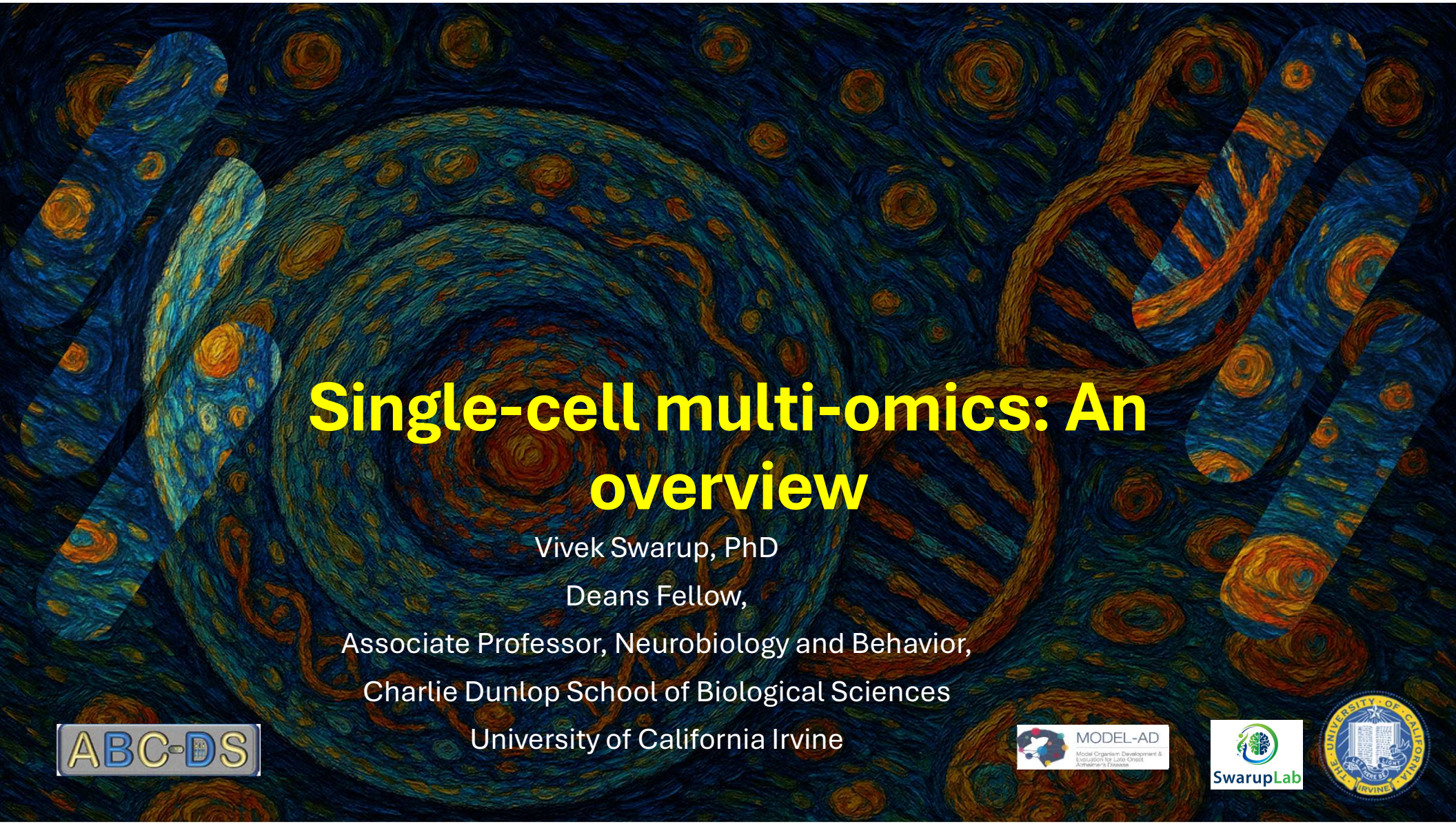

Single-cell multi-omics: An overview

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University of California Irvine

ABC-DS

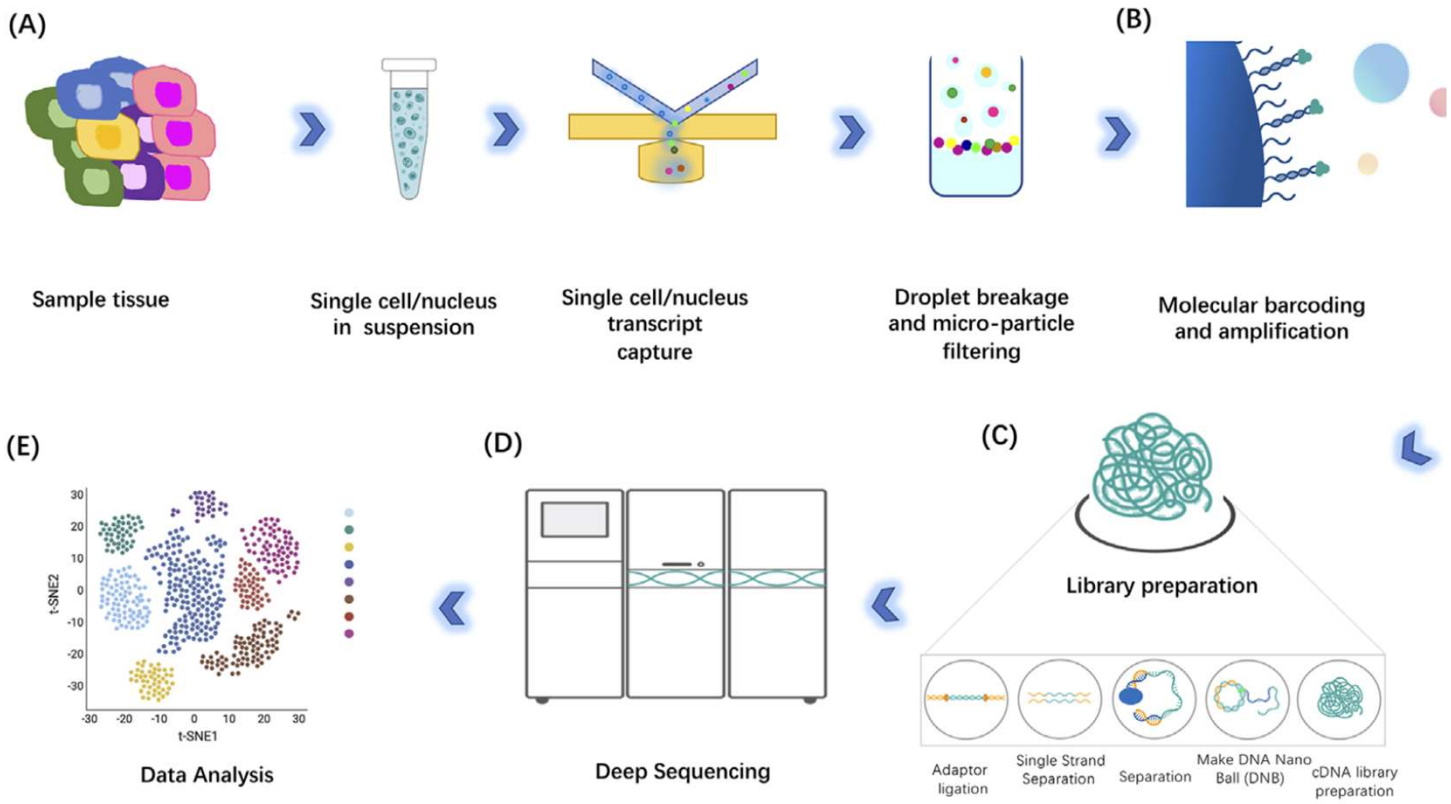
MODEL-AD

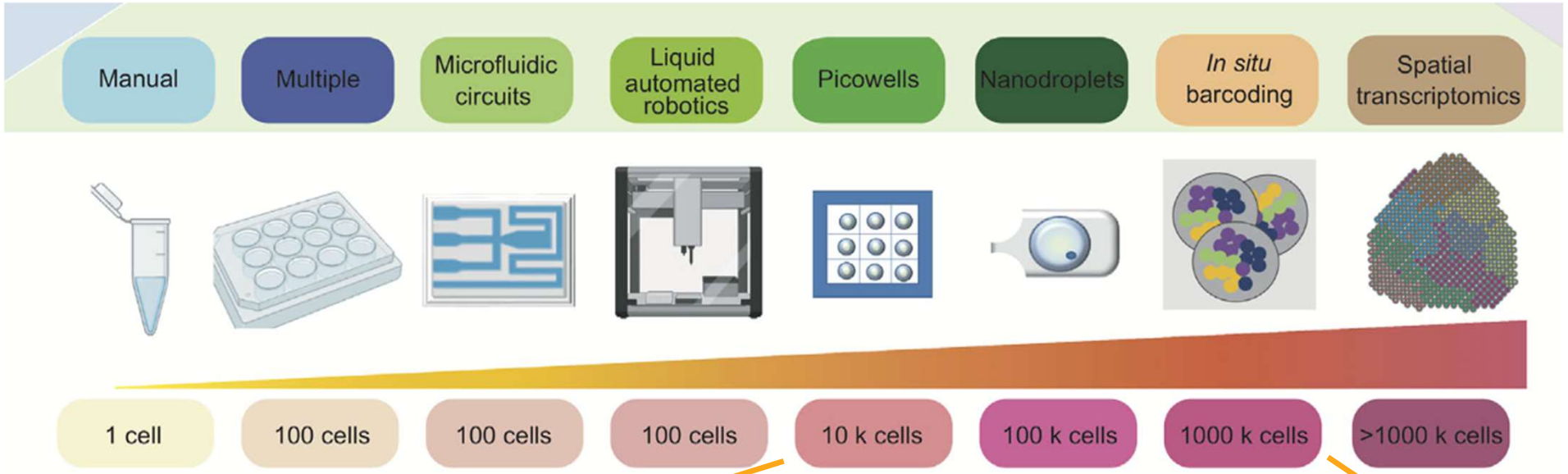
Model Organism Development & Evaluation for Late Onset Alzheimer's Disease

SwarupLab

THE UNIVERSITY OF CALIFORNIA IRVINE

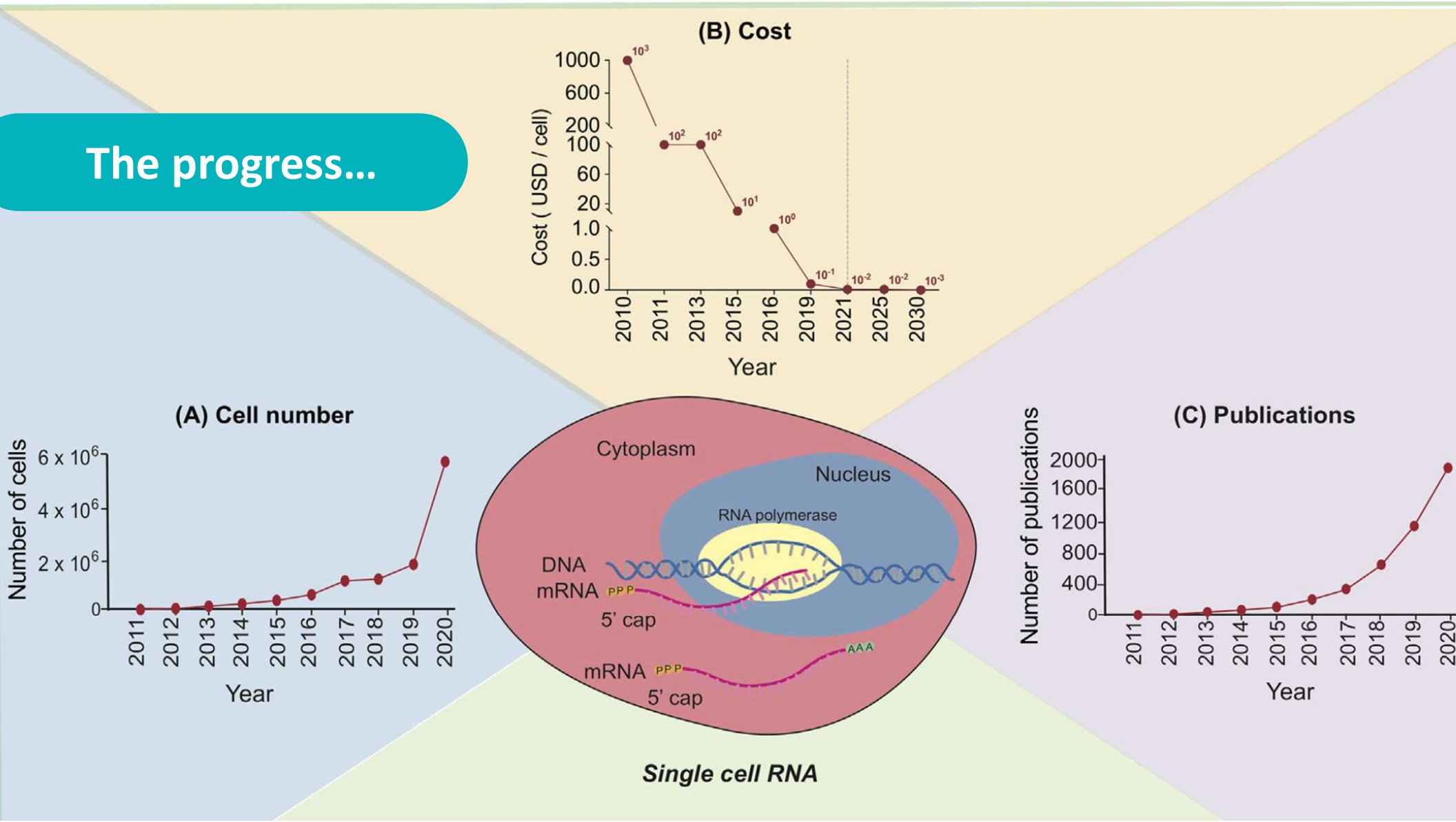
Overview of sc/snRNA-seq



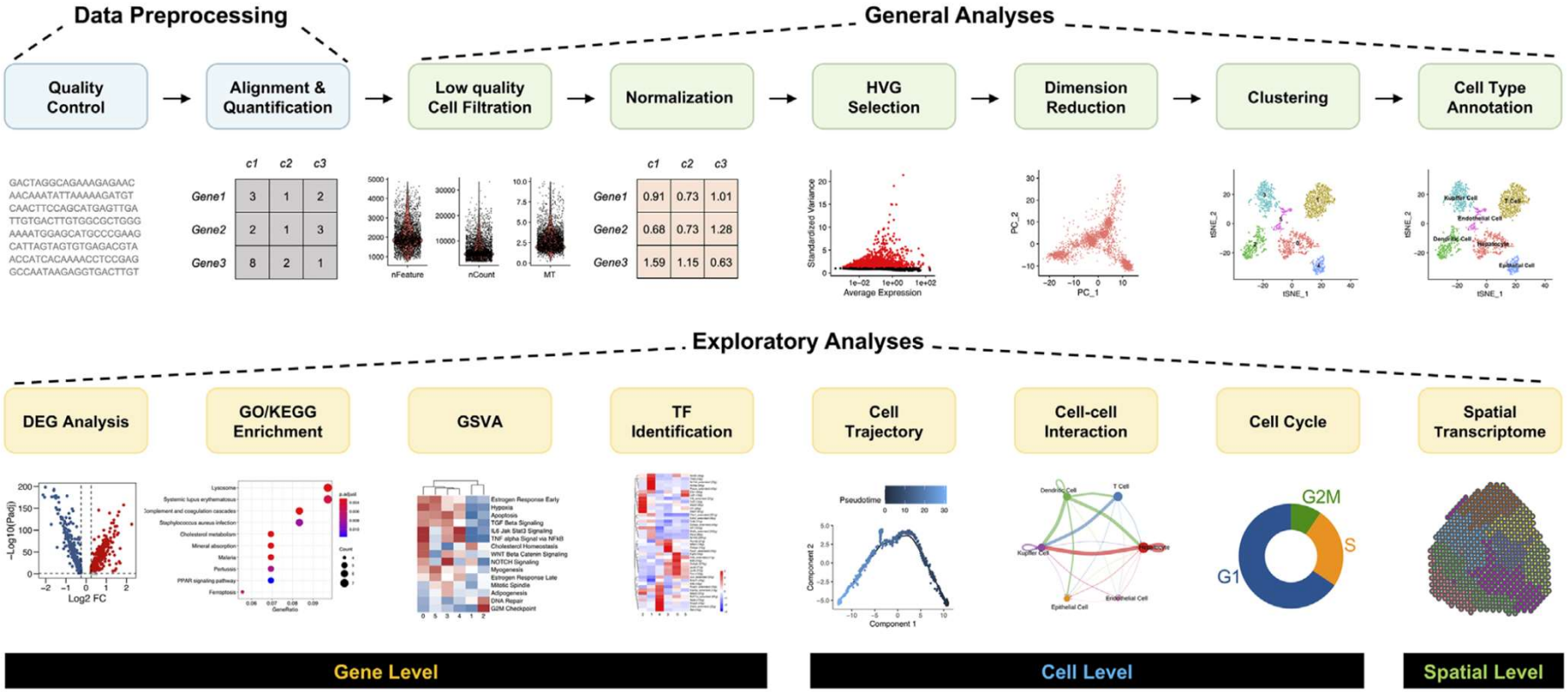


Single-cell Genomics

The progress…



Data Analysis Overview



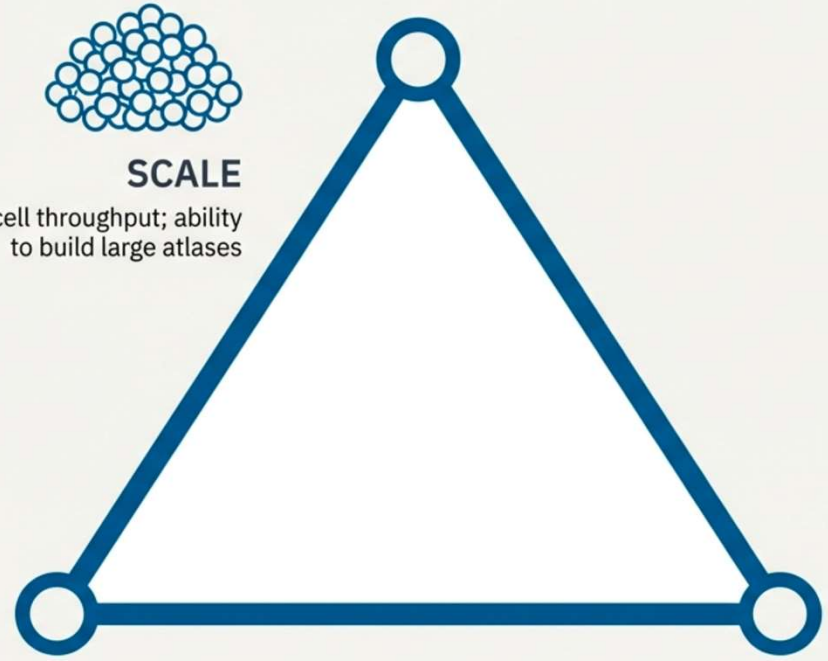
Lost in the triad

Every Single-Cell Experiment is a Balance of Three Key Priorities

The commercial landscape for single-cell genomics is crowded and rapidly evolving. Choosing the right platform is not about finding the "best" technology, but the *optimal* one for your specific research question, budget, and sample type. The fundamental decision always involves a trade-off between three factors.

SCALE

Max cell throughput; ability to build large atlases



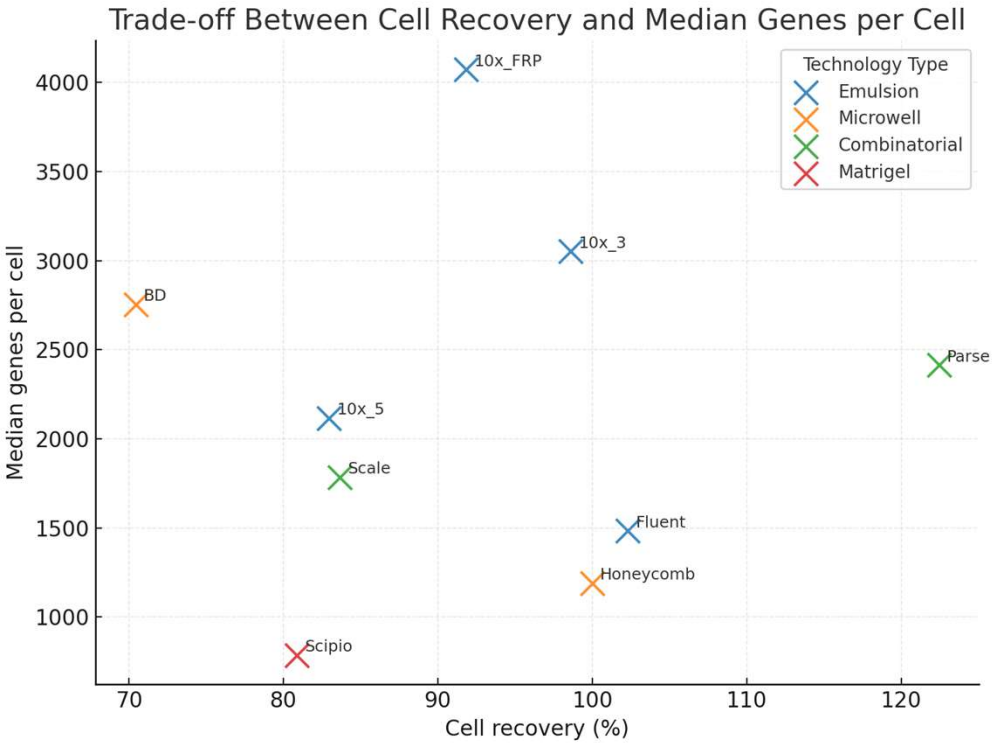
DEPTH

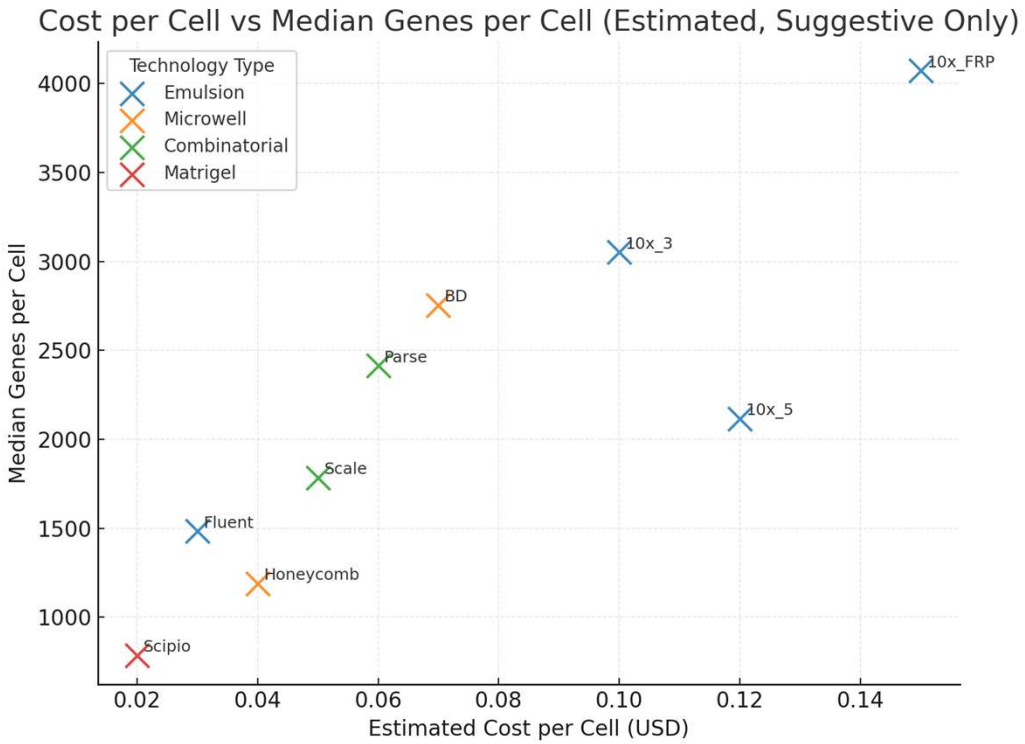
Multi-omic capability; richness of data per cell

COST & EFFORT

Relative cost per cell; workflow difficulty

The Trade-offs





A Researcher's Guide to

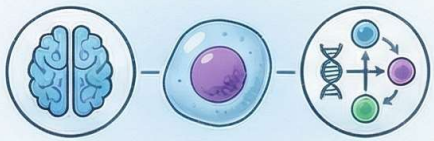
Single-Cell RNA-Seq Platforms

The landscape of single-cell RNA sequencing (scRNA-seq) offers many commercial platforms. These technologies vary significantly in cell throughput, cost, and their ability to measure multiple data types (multi-omics) from the same cell. This guide highlights the key trade-offs to inform your experimental design.

Platform Trade-Offs at a Glance

	10x Chromium	BD Rhapsody	Parse Biosciences	SMART-Seq3
Max Cells per Assay	~160,000	Tens of Thousands	Up to 5,000,000	~2,000
Relative Cost	$	$$	$	$$$
Multi-Ome Strength	Strong (RNA + Protein)	Strong (RNA + Protein + DNA) RNA Protein DNA	Growing (RNA + TCR/CRISPR) RNA TCR/CRISPR	No (RNA only)

4 Steps to a Successful Experiment



1. Design the Experiment

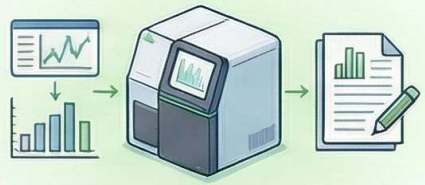
Decide your approach: single-cell (scRNA), single-nucleus (snRNA), or multi-omics.

2. Choose Your Platform

Consult with genomics cores, other labs, and vendor representatives.

3. Perform a Pilot Study

Nail down conditions, measure actual cell recovery, and assess variability first.



4. Run the Full-Scale Experiment

Proceed with the full library preparation and data analysis.

The Multi-Omics Frontier: Matching Platforms to Data Modalities

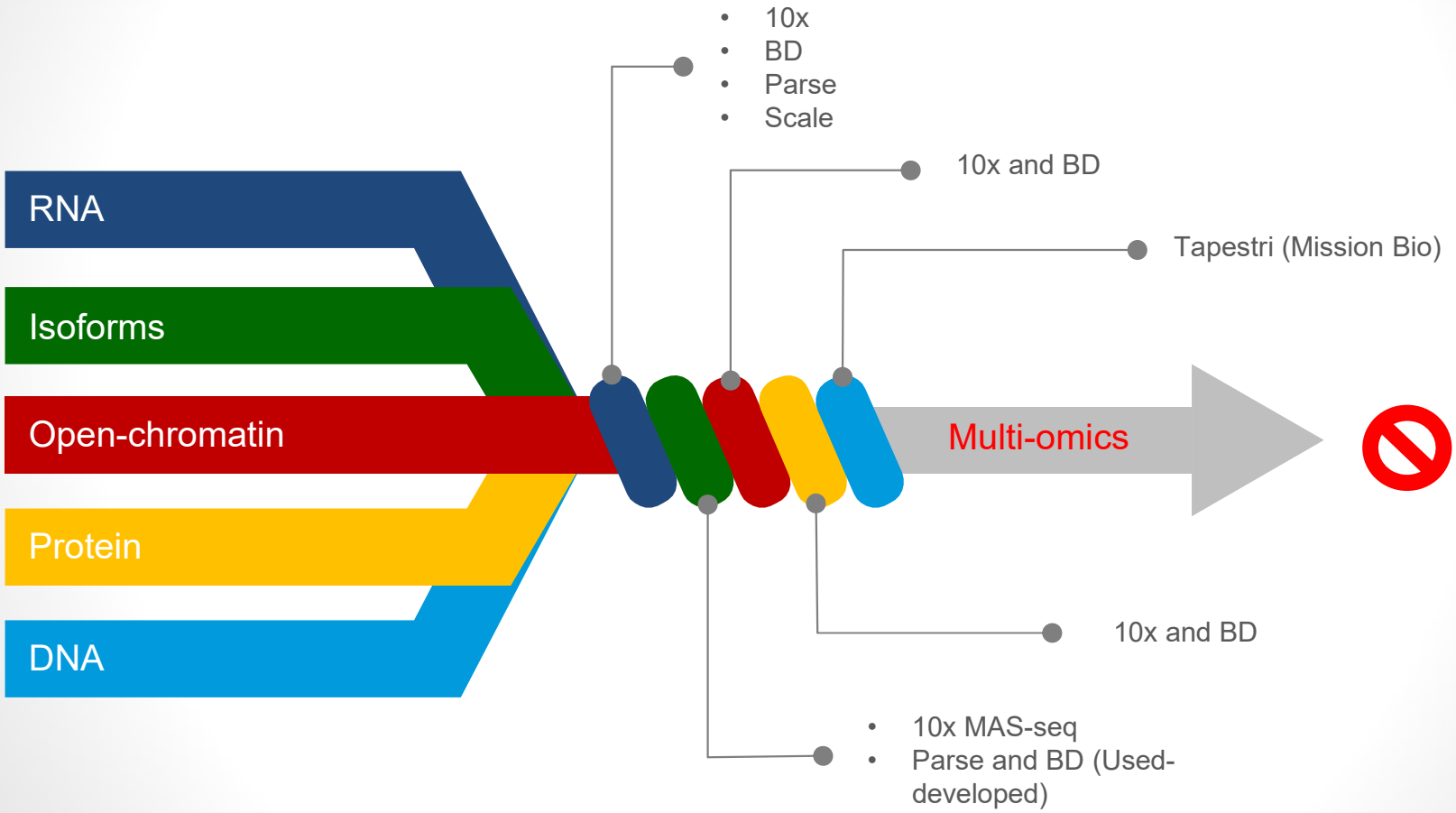
	10x Genomics	BD	Parse	Mission Bio
RNA Expression	●	●	●	●
Open Chromatin (ATAC)	●	●	■	▲
Surface Protein	●	●	▲	▲
DNA (SNV/CNV)	▲	■	▲	●
Isoforms/TCR	●	●	■	▲

● Turnkey: Fully supported, commercial kit

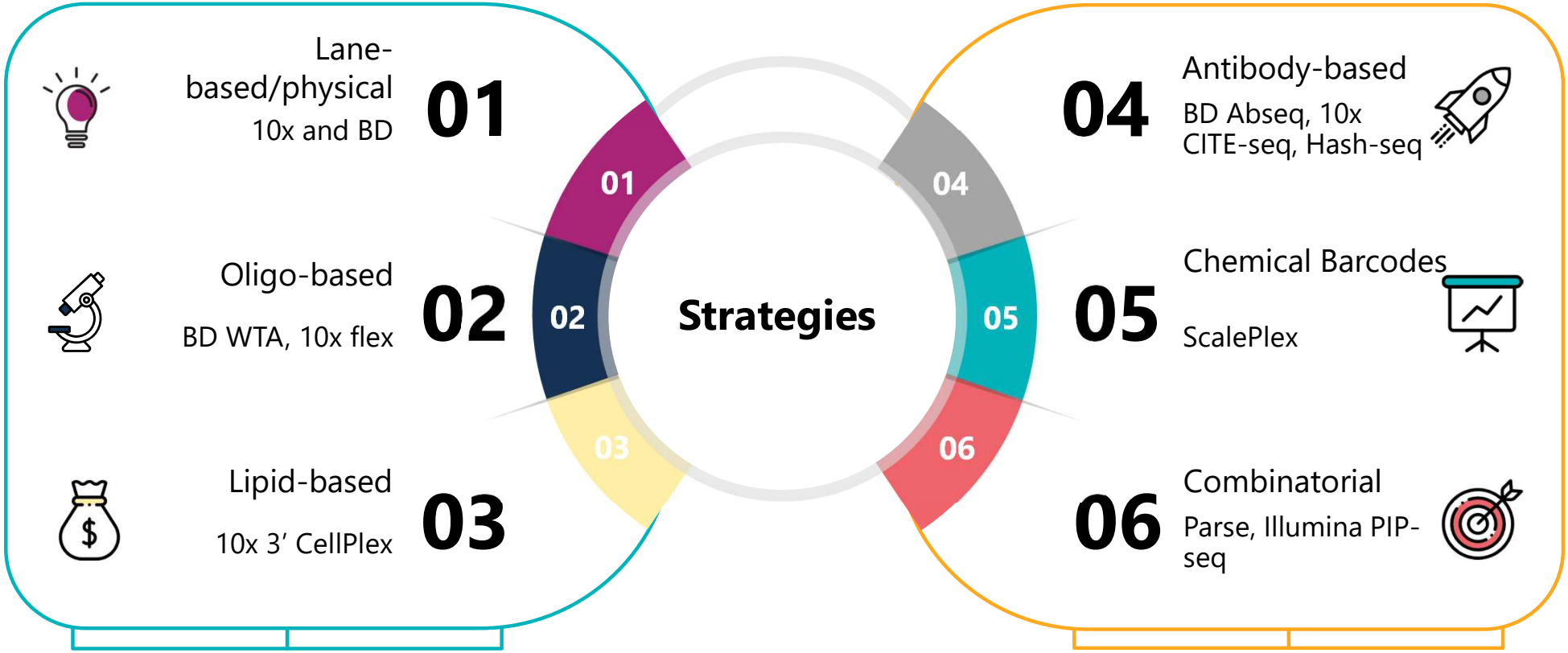
■ Ecosystem: Available as separate kits or protocols

▲ Limited/Custom: Requires user-developed protocols

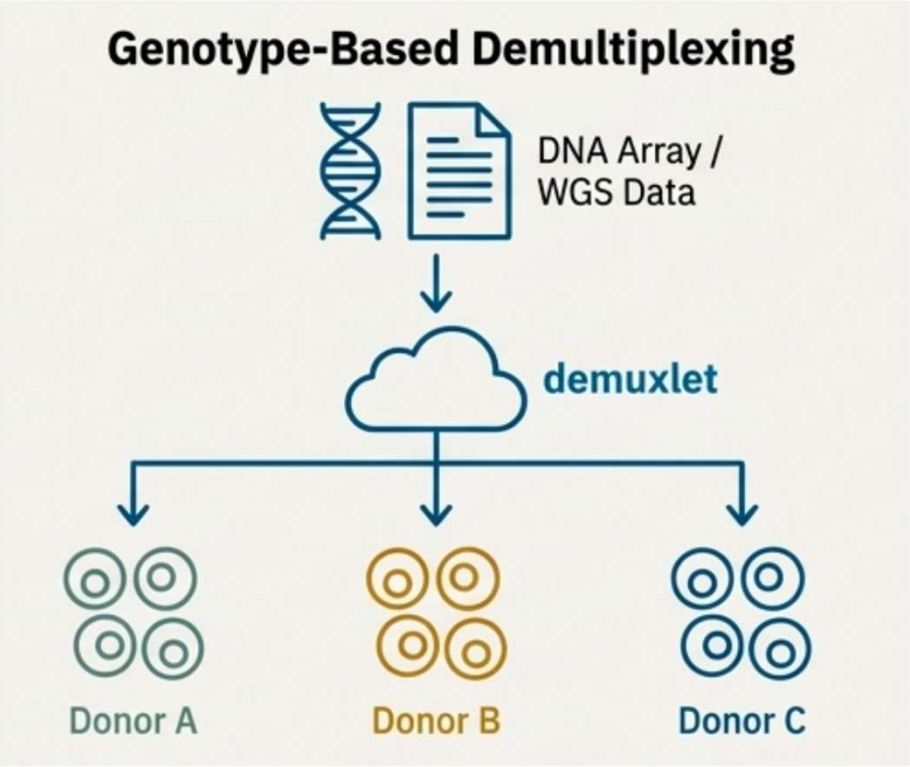
Multi-omics Overview

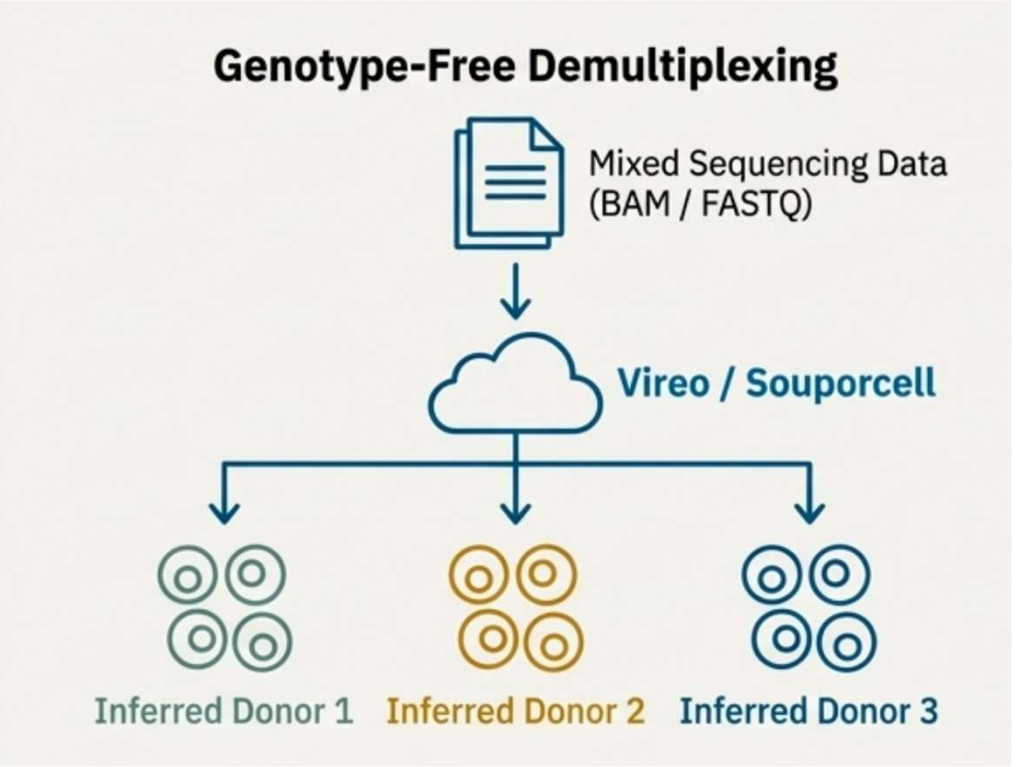


Strategies to sample Pooling



Multiplex strategy for human samples





Realistic workflow

Stage 1

Step: 1

Choose your experimental design – scRNA or snRNA or multi-ome

Stage 2

Step: 2

Choose your platform, talk to labs/genomics core/rep

Stage 3

Step: 3

Perform a pilot and nail conditions, figure out actual cell-recovery and variablity

Stage 4

Step: 4

Run full-scale library and data-analysis