Single Cell Genomics @ NGI

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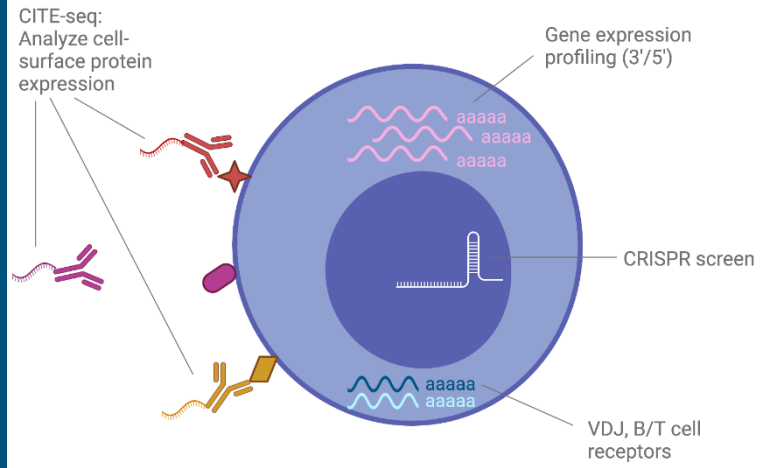


NATIONAL GENOMICS INFRASTRUCTURE

SciLifeLab

Our Services

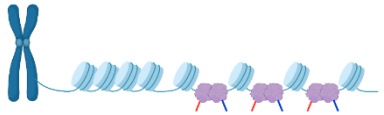
Gene Expression



10x Genomics
- *3'/5' GEX*
- *CITE-seq*
- *Cell hashing*
- *VDJ*
- *FLEX*

Split&pool methods (Parse & scale)
- *GE*
- *VDJ*
- *CITE-seq*
- *CRISPr*

Epigenetics



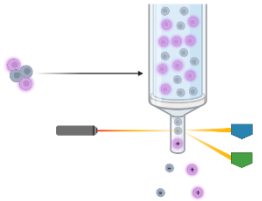
10x Genomics
- scATAC-seq
- scATAC + GEX

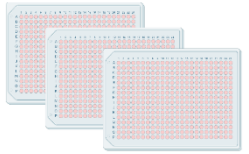


scWBGS (SPLAT)
- Raine et al, 2022

Split&pool scWGBS (Scale)

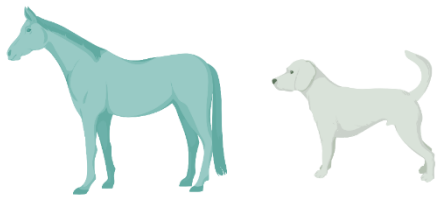
DNA-sequencing

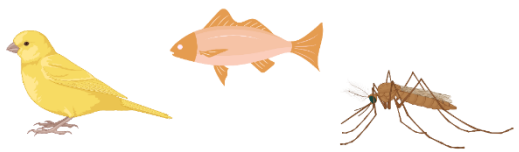


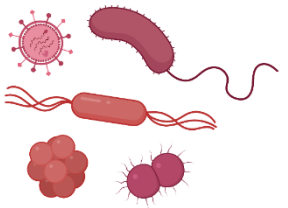


FACS sorting combined with cell lysis and genome amplification (MDA)



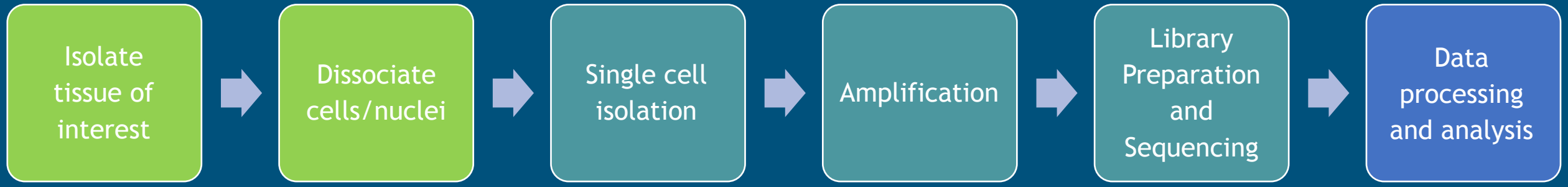






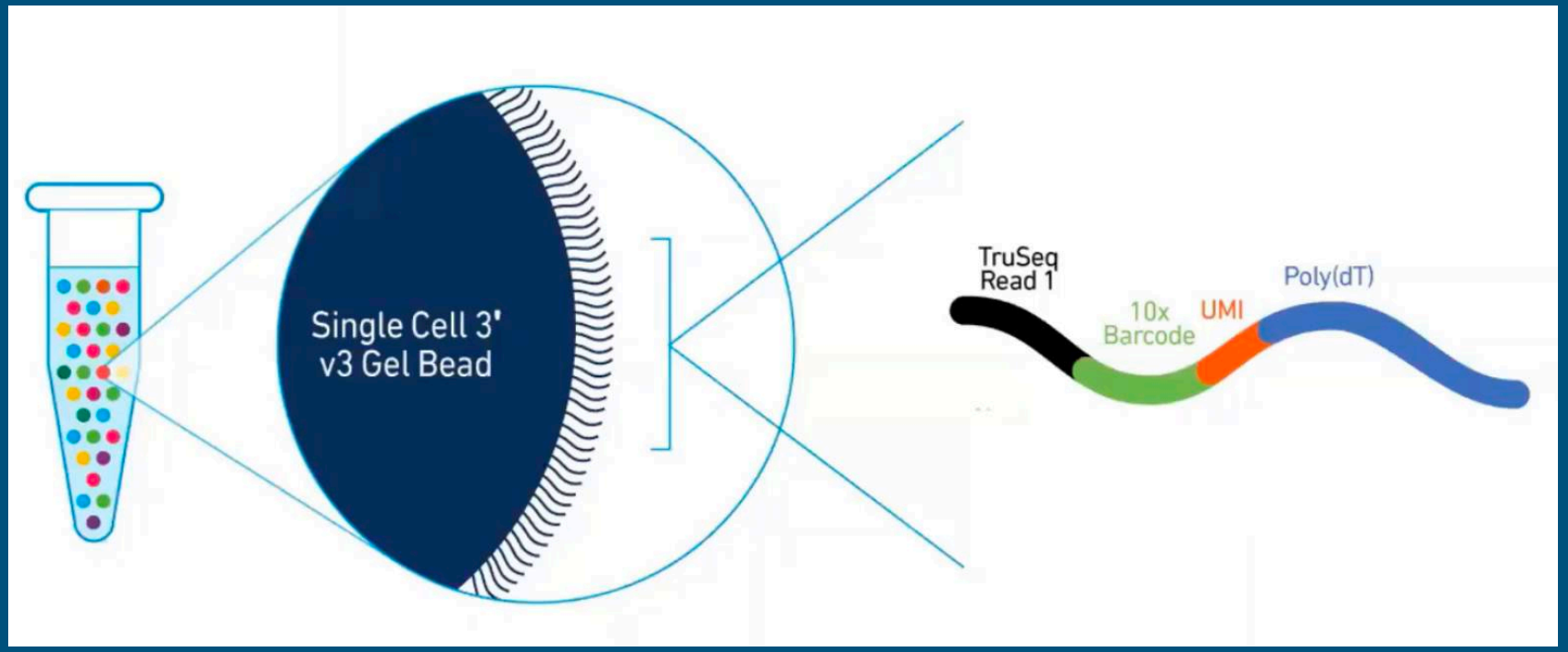


Single cell sequencing workflow



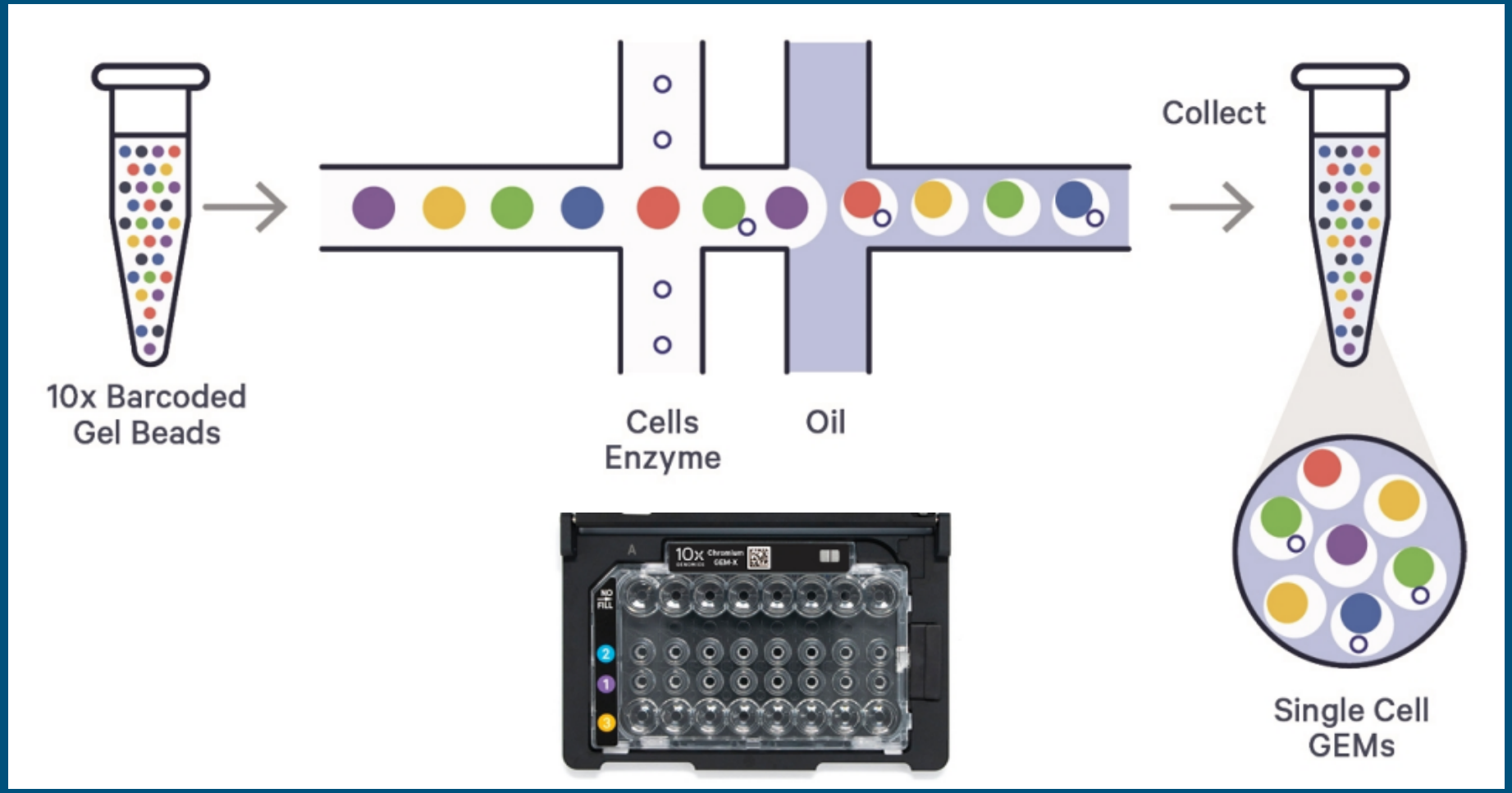
- User Consultations
  - Experimental design
- Quality control of single-cell preparations prior to the experiment
  - Sample submission guidelines for samples/cells/nuclei for different applications
- Initial bioinformatics

10X Chromium single cell sequencing



Adapted from https://cdn.10xgenomics.com

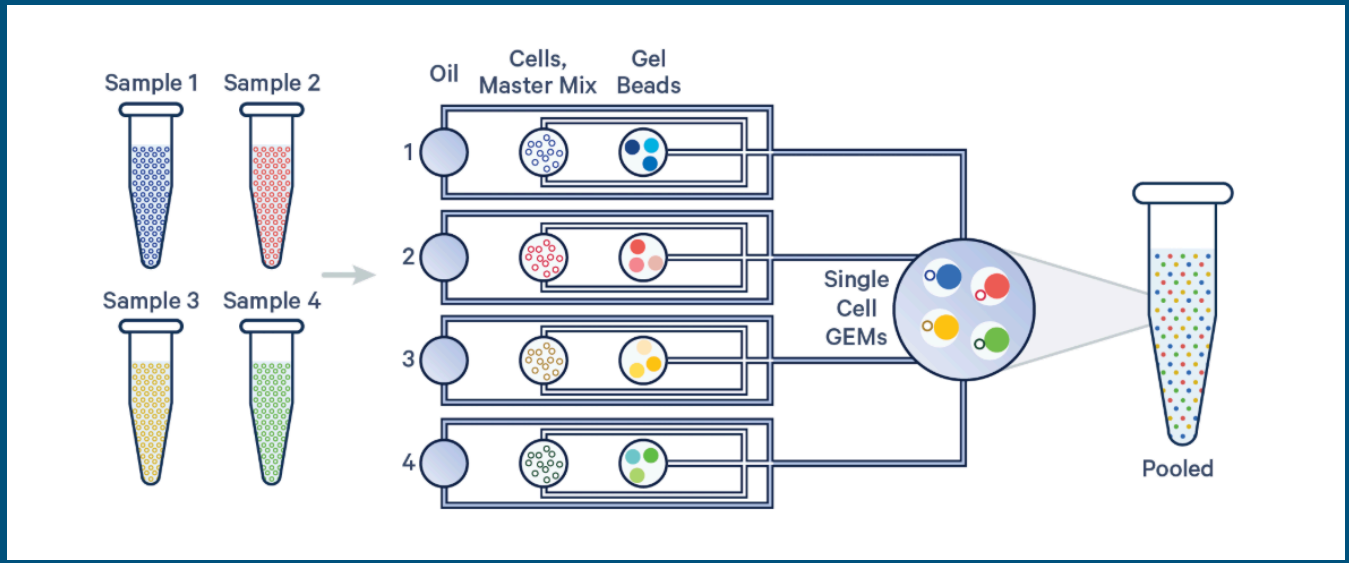
10X Genomics 3’ GE



Adapted from https://cdn.10xgenomics.com

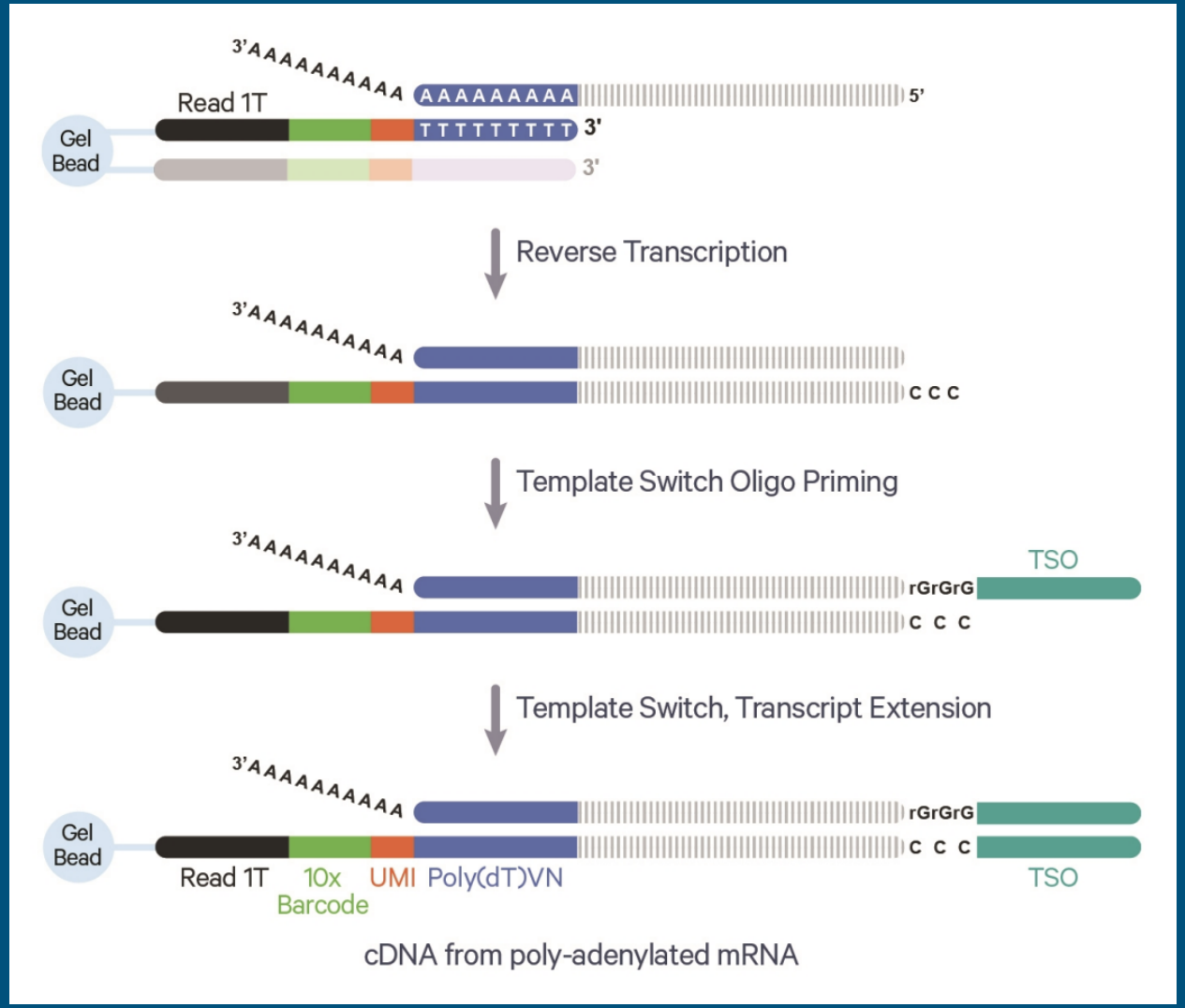
Easy multiplexing with OCM for 3’ and 5’ workflows

OCM: On Chip Multiplexing
- Combine up to 4 samples per reaction
- Up to 5000 cells per sample
- Cost efficient



Adapted from https://cdn.10xgenomics.com

10X Chromium single cell sequencing



Adapted from https://cdn.10xgenomics.com

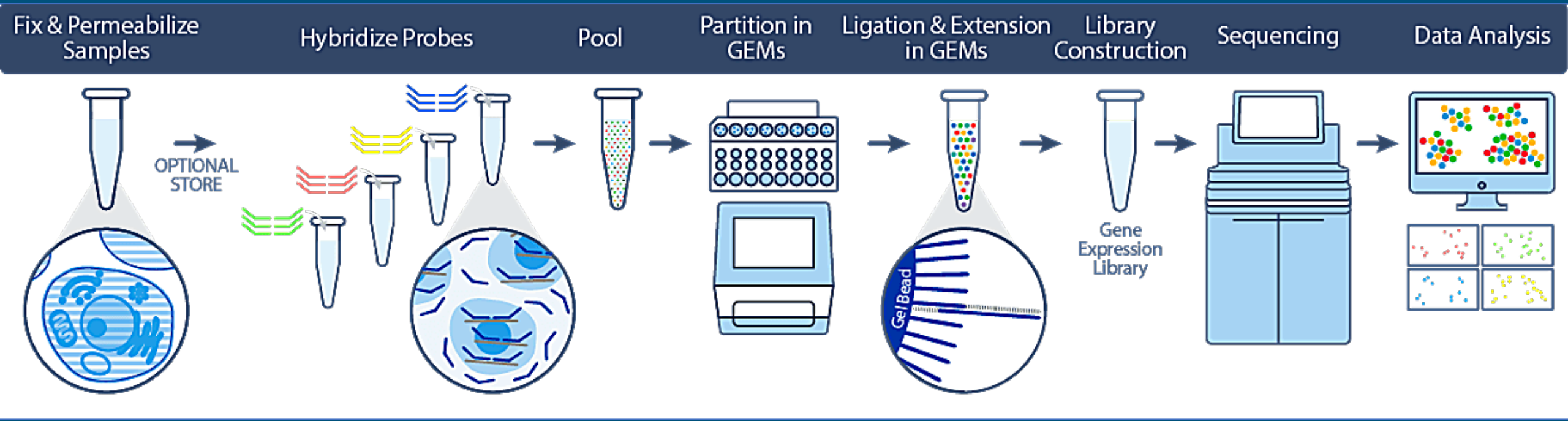
Long-read sequencing for full-length information



OR



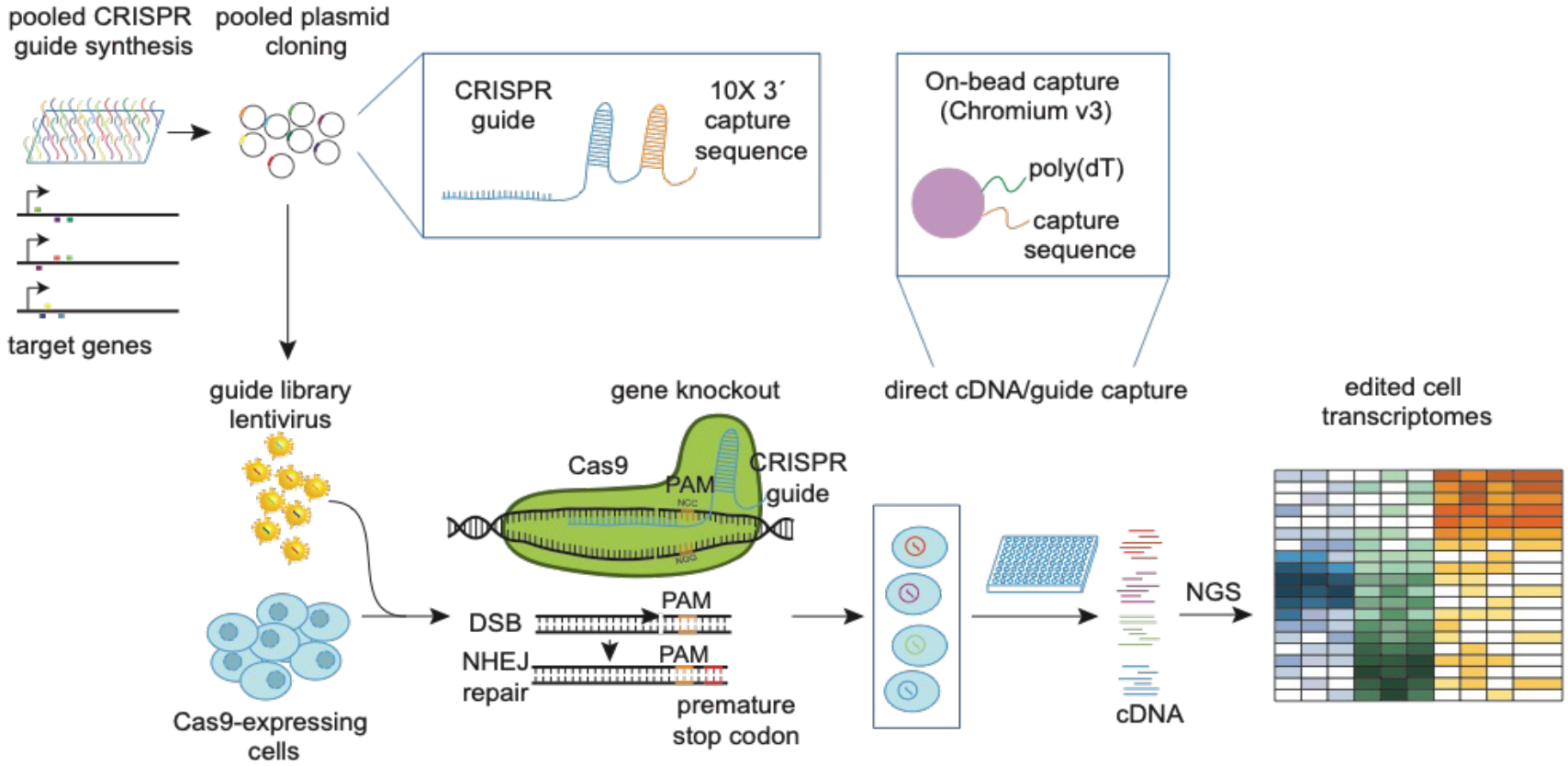
Fixed Single Cell Analysis - 10X Chromium



Adapted from https://cdn.10xgenomics.com

Pooled CRISPR screens with single-cell readout

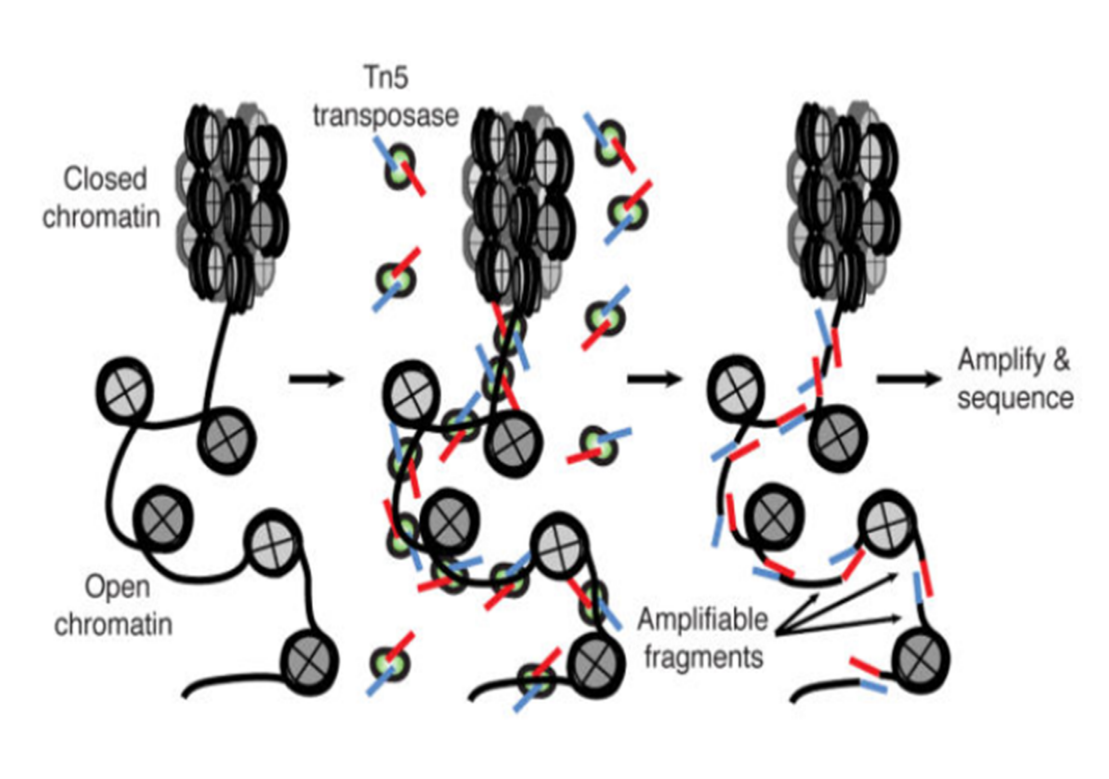
- Small, custom libraries (currently 100's of guides, number is limited by scRNA-Seq cost)
- Guide libraries include a capture sequence compatible with 10xGenomics kits
- Enables, simultaneous capture of mRNA and guide RNA from single cells
- Compatible with CRISPR-KO, CRISPR-activation, CRISPR-inhibition



CRISPR Functional Genomics Unit

Eukaryotic Single Cell Genomics Unit

Single-cell ATAC-sequencing



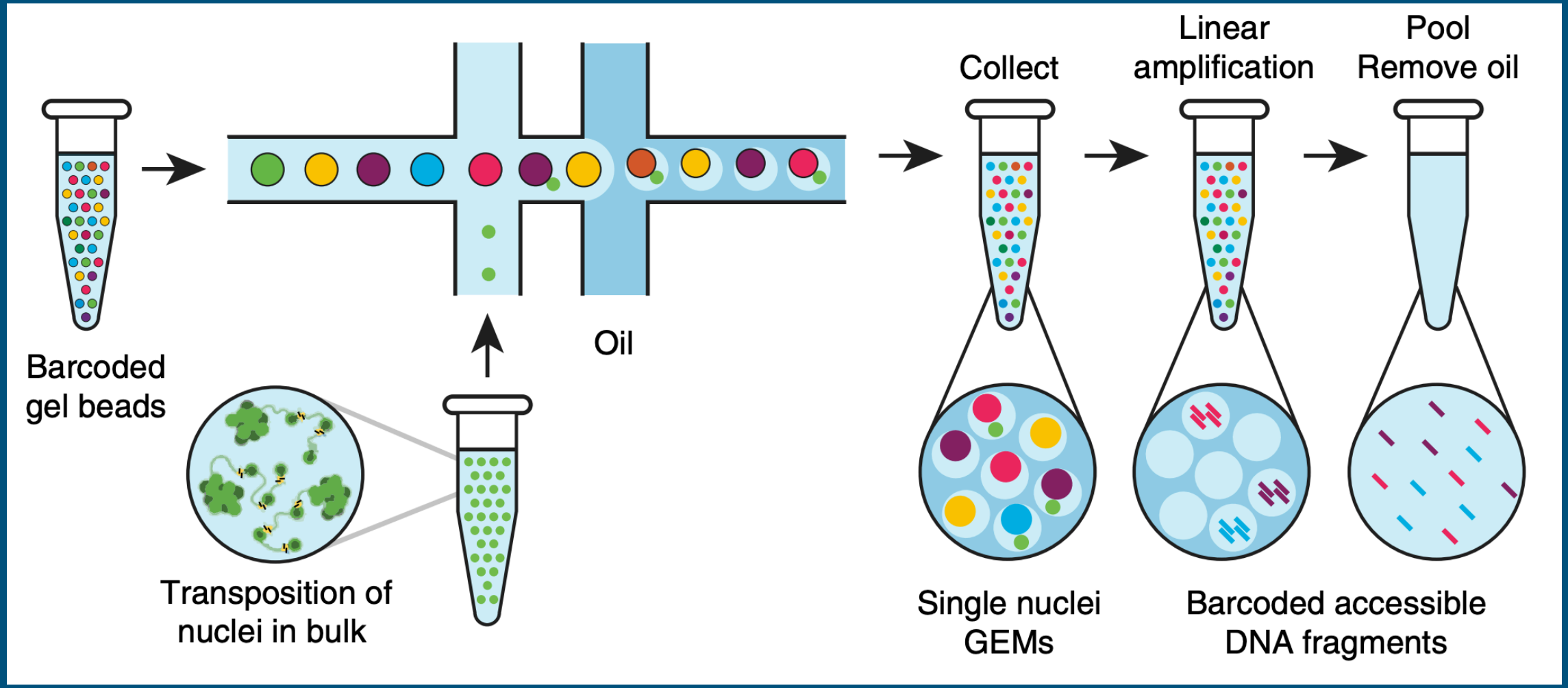
- Subpopulations with different chromatin accessibility profiles

→ Increased understanding of gene regulatory networks upstream on gene expression

Multiome available: 3’ GE + ATAC from the same cell

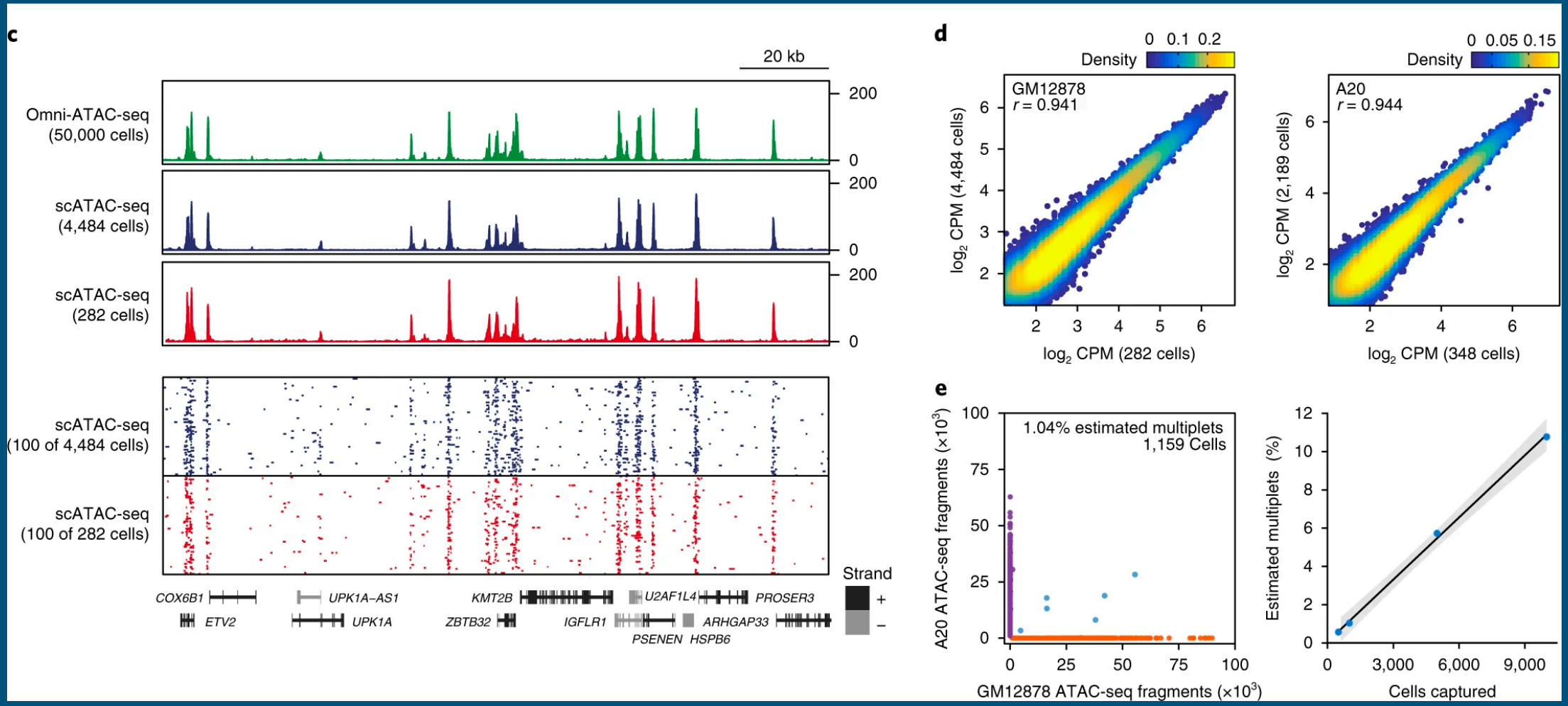
(Buenrostro et al, Nature Methods, 2013

Single-cell ATAC-sequencing



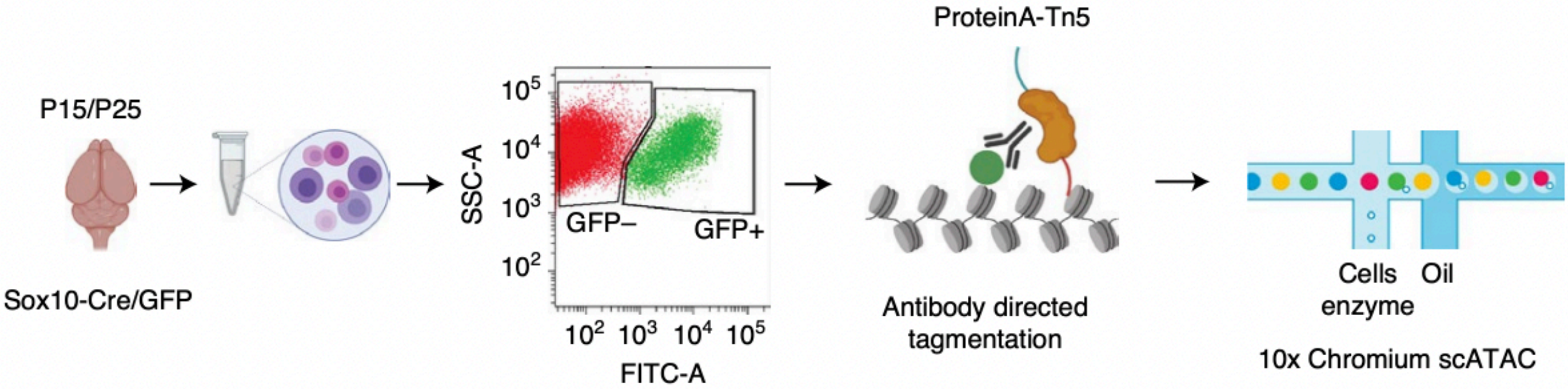
Satpathy et al, Nature Biotech, 2019

Single-cell ATAC-sequencing



Satpathy et al, Nature Biotech, 2019

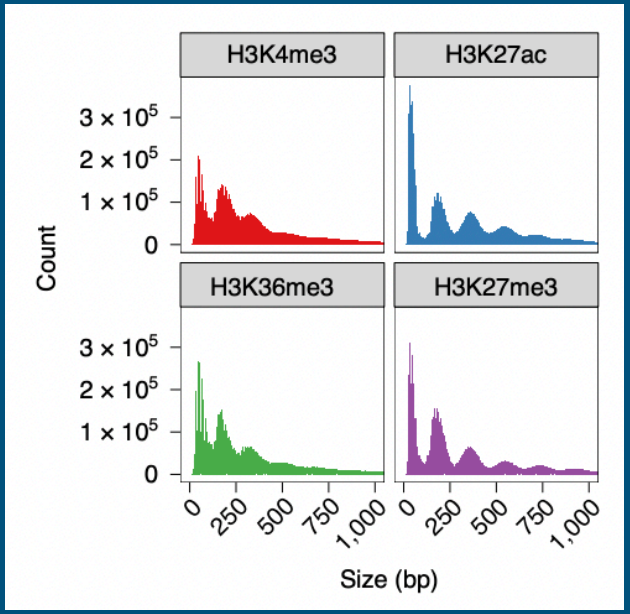
scCUT&Tag

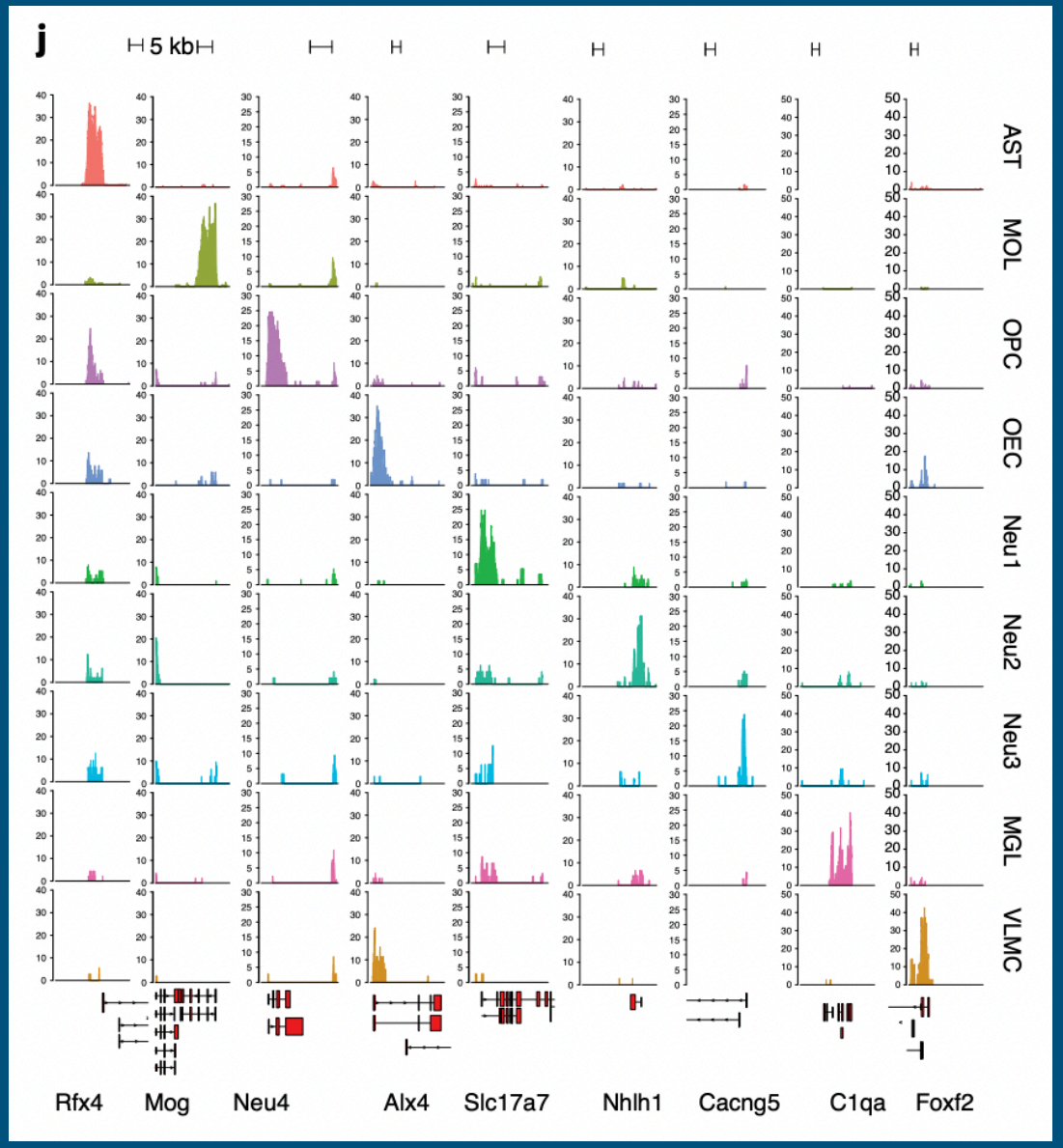

P15/P25
Sox10-Cre/GFP
SSC-A
10^5
10^4
10^3
10^2
GFP–
GFP+
10^2 10^3 10^4 10^5
FITC-A
ProteinA-Tn5
Antibody directed tagmentation
Cells
Oil
enzyme
10x Chromium scATAC

scCUT&Tag

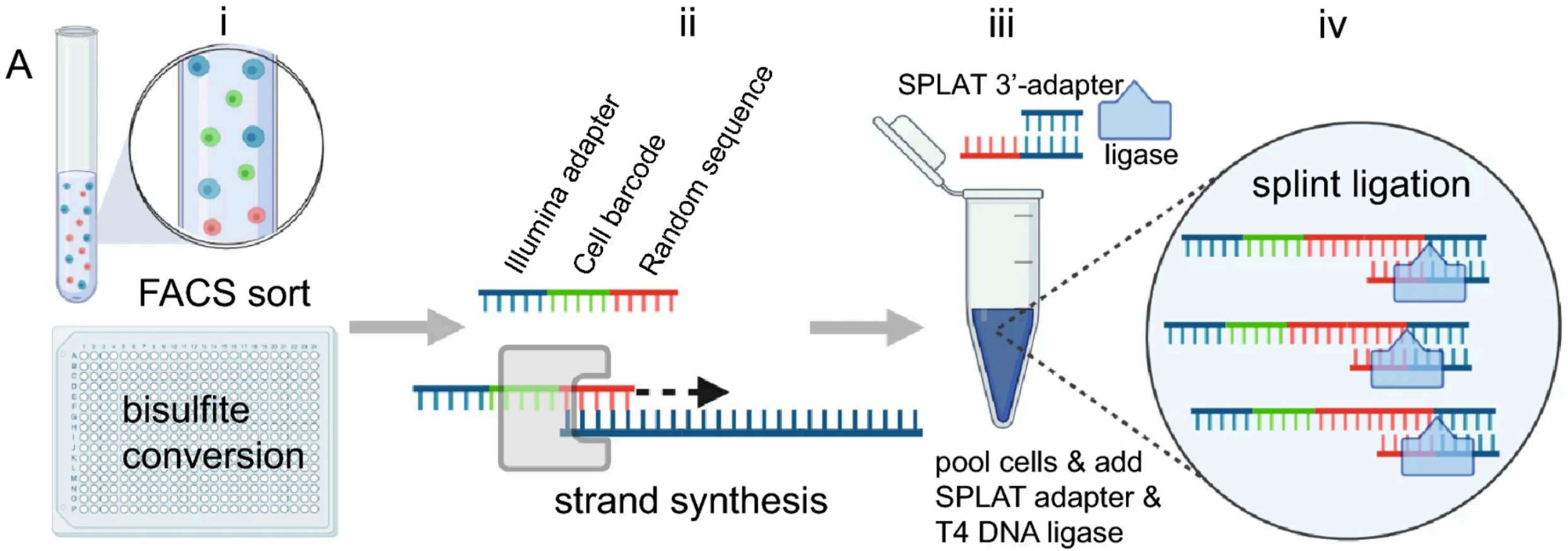
Tn5-H3K4me3

—> Mapping active promoters



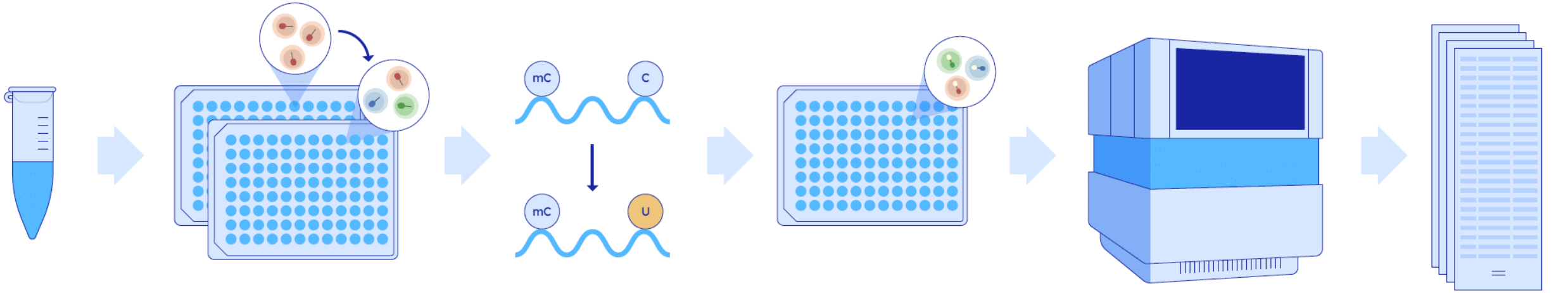


sc Splinted Ligation Adapter Tagging for WGBS



(Raine et al, Scientific Reports, 2022)

Scale Biosciences - Single cell methylation



10X Genomics workflow at NGI

Provided by the user:

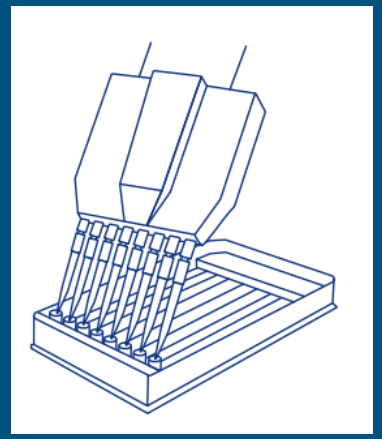
- Single cell suspension
  - High viability (preferably above 90%)/intact nuclei
  - Free of debris
  - Counted
  - Ab staining (if desired)

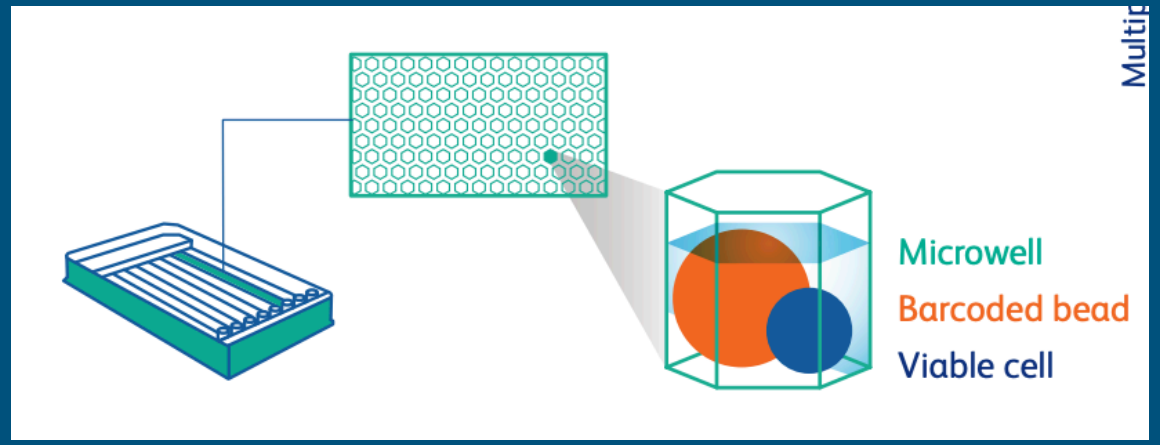
Done at NGI:

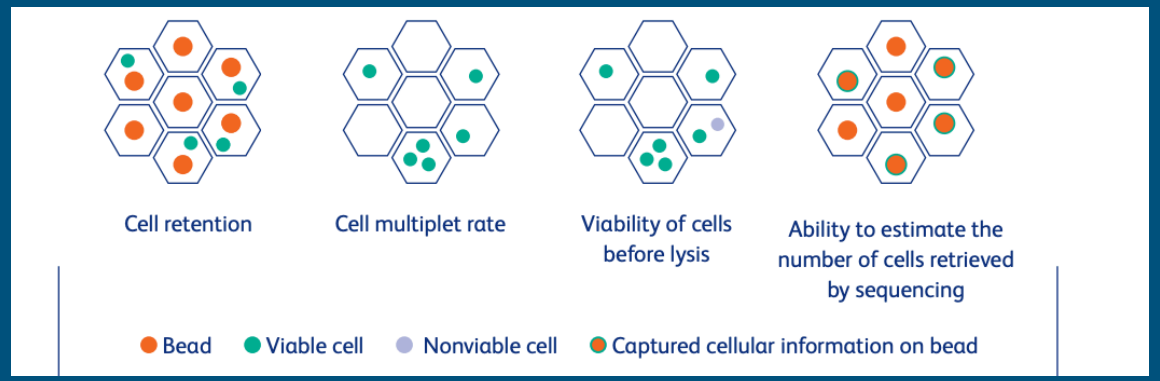
- QC of provided samples
- GEM generation & Library generation
- Sequencing & upstream data analysis

BD Rhapsody HT Express - Pilot phase









GE (WT or targeted)
ATAC
Multiome (GE+ATAC)
Ab-staining
BCR/TCR

How to get in touch?

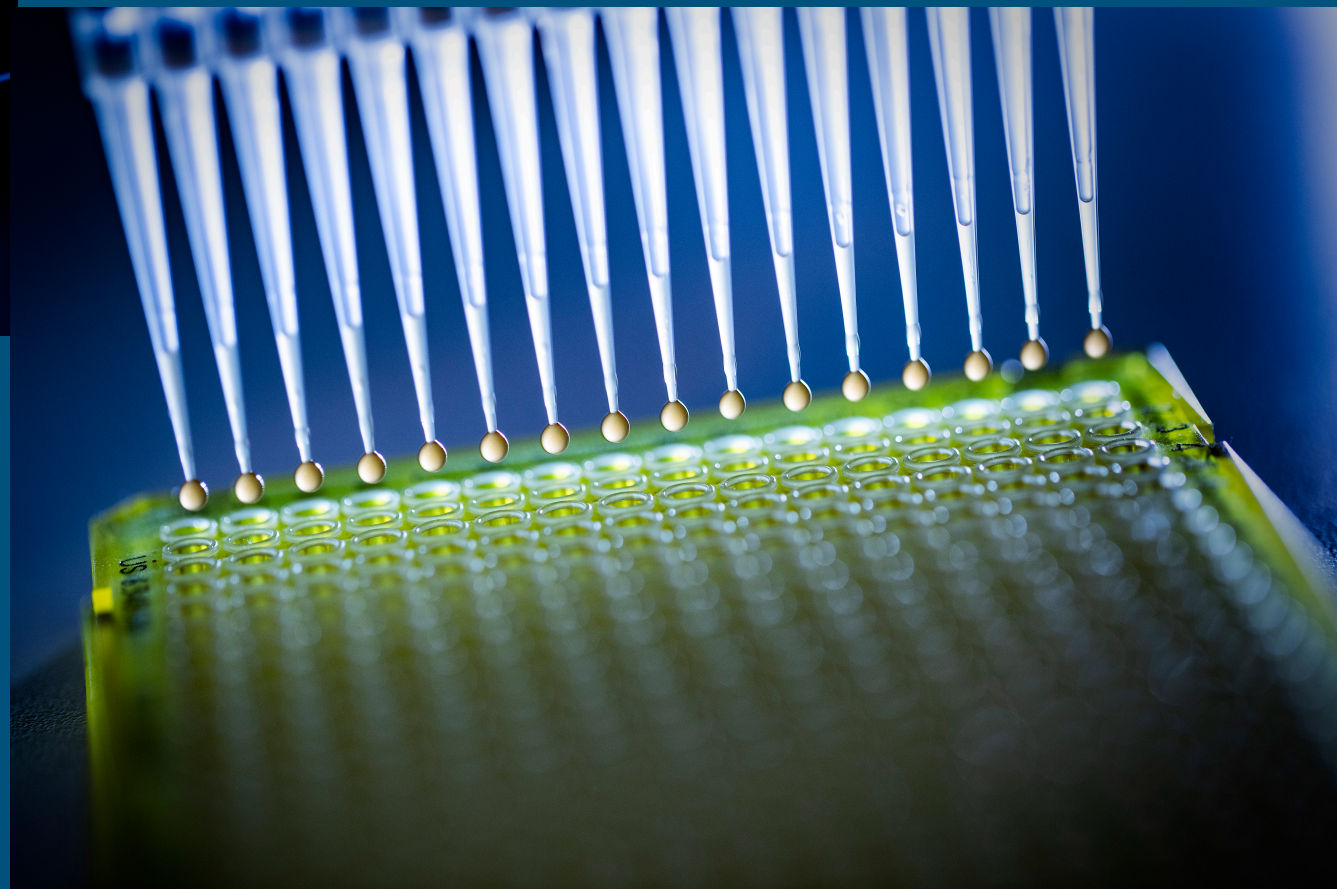
- Contact us at support@ngisweden.se
- Visit ngisweden.scilifelab.se
- Place an order





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Thanks!



Questions?

Contact: support@ngisweden.se