

# Gene Expression and CRISPR-Mediated Perturbations at Scale

## FEATURE BARCODING TECHNOLOGY FOR CRISPR SCREENS

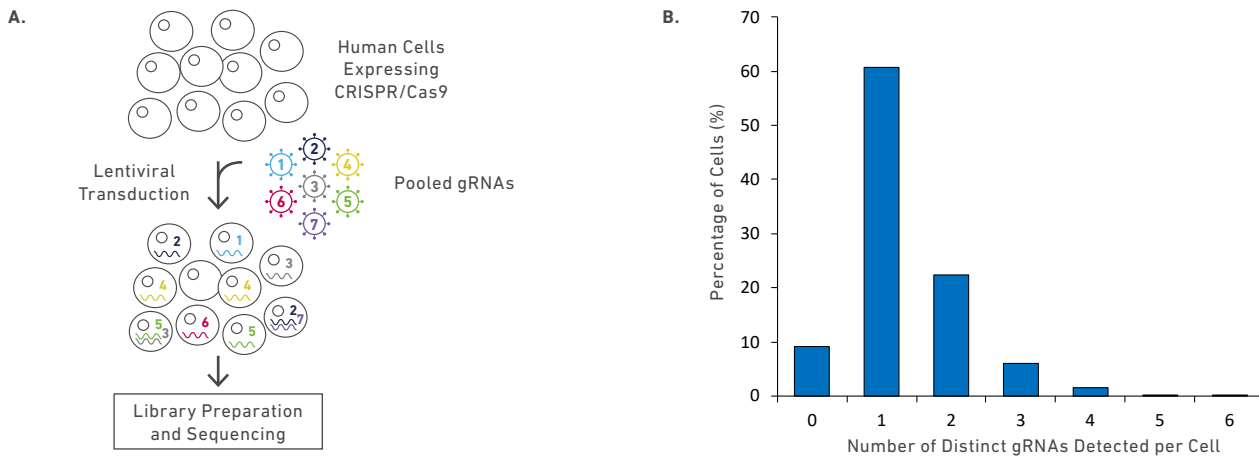
Pooled CRISPR screening is a powerful method for identifying genes involved in complex biological mechanisms such as cell proliferation, cell survival and drug/toxin resistance. Cells are transduced with a pooled lentiviral library containing guide RNAs (gRNAs) targeting tens to hundreds to thousands of genes in a given genome. These libraries can be designed for common CRISPR applications including genetic knockout, activation, cutting, and repression.

The Chromium Single Cell Gene Expression Solution combined with Feature Barcoding technology provides a high-throughput and scalable approach to assess the effects of perturbations on gene expression via direct capture of gRNAs and polyadenylated mRNAs from the same single cell. This powerful solution lets you analyze regulatory gene networks and pathways involved in development and disease, resolve complex biological pathways and dissect cellular regulation at an unprecedented scale with single cell resolution.

## HIGHLIGHTS

- Simultaneously assess perturbation phenotypes and gene expression from the same cell
- Enable high throughput and high resolution functional genetic screens in hundreds to tens of thousands of cells simultaneously
- Determine comprehensive gene expression phenotypes for individual perturbations
- Customize your CRISPR pools with dozens, to hundreds, to thousands of gRNAs
- Implement an improved and novel methodology over published methods by directly capturing and sequencing gRNAs, eliminating the need for a proxy barcode

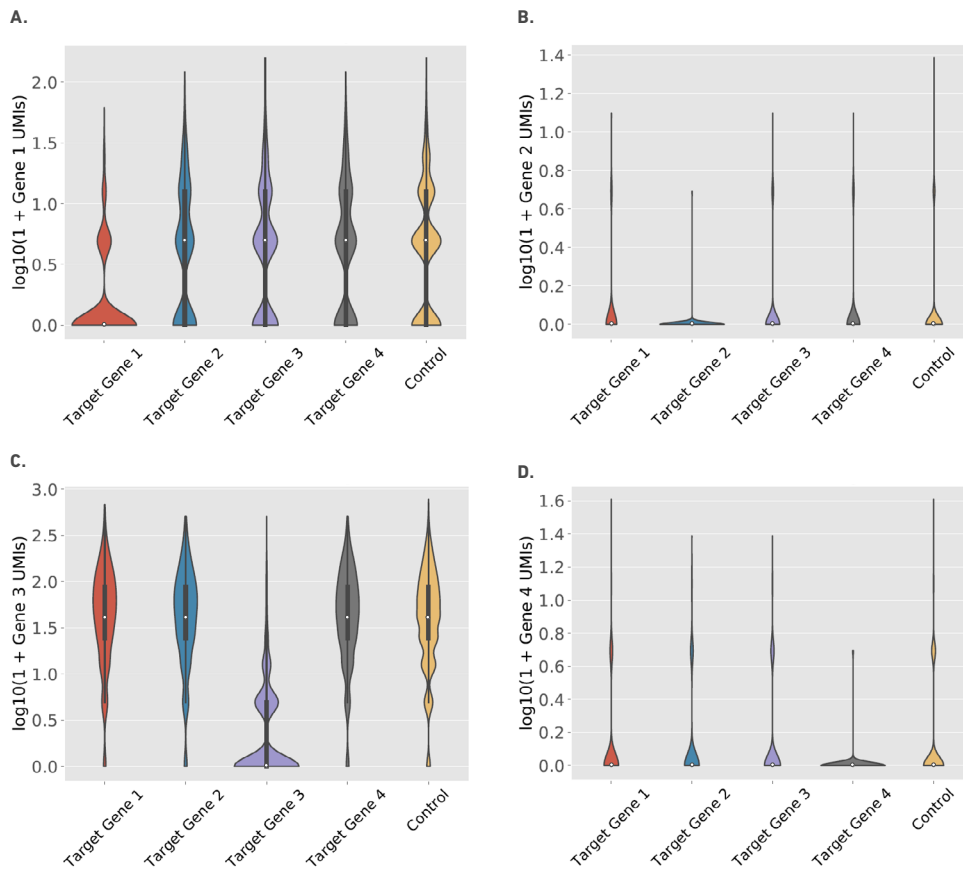
### High-throughput Perturbation Studies Enabled via Feature Barcoding Technology



A. K562 cells expressing CRISPR/Cas9 were transduced with a pool of 18 gRNAs (8 targeting: 4 genes, 2 targets per gene and 10 non-targeting guides) before 10260 cells were profiled with the Chromium Single Cell Gene Expression Solution. B. 60% of the cells profiled were found to contain a single gRNA, 30% of cells were found to contain 2 - 6 gRNAs and the remaining 10% of cells did not contain a gRNA.

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## Feature Barcoding Technology Enables Determination of Knockdown Efficiency



Violin plots illustrating the differences in UMI counts and knockdown efficiency per Target Gene relative to the control (cells containing the non-targeting guides). The white dots represent the median. A. Target Gene 1, B. Target Gene 2, C. Target Gene 3 and D. Target Gene 4.

### SOLUTION FEATURES

- Ready-to-use, robust protocols including applications using Feature Barcoding technology
- Compatible partners for gRNA components and support
- Documentation for custom gRNA design for use with the Feature Barcoding technology
- Easy-to-use and convenient software with Cell Ranger Analysis Pipelines and Loupe Cell Browser visualization tool

### SYSTEM FEATURES

- Partition 500 – 80000+ cells in under 9 minutes
- Scalable; run up to 8 samples in parallel
- Superior sensitivity
- Simple workflow
- Cell size flexibility, no lower limits
- High cell capture rates of up to 65%
- Low doublet rates of under 0.8% in 1000 cells

Learn More at  
[10xgenomics.com/single-cell](https://10xgenomics.com/single-cell)

## APPLICATIONS

- Functional Genetic Screens
- Drug Screens
- Biomarker Discovery
- Target Validation from Large-scale Screens
- Resolution of Complex Gene Regulatory Networks
- Gene Signature Identification
- Cell State & Lineage Tracing
- Clonal Expansions During Disease Development

## RESEARCH AREAS

- Basic & Translational Research
- Cancer Research
- Infectious Disease
- Immuno-oncology
- Metabolic Disorders
- Developmental Biology

## ADDITIONAL RESOURCES

DATASETS	<a href="https://go.10xgenomics.com/scRNA-3/datasets">go.10xgenomics.com/scRNA-3/datasets</a>
SEMINARS	<a href="https://go.10xgenomics.com/scRNA-3/seminars">go.10xgenomics.com/scRNA-3/seminars</a>
APPLICATION NOTES	<a href="https://go.10xgenomics.com/scRNA-3/app-notes">go.10xgenomics.com/scRNA-3/app-notes</a>
TECHNICAL SUPPORT	<a href="https://go.10xgenomics.com/scRNA-3/support">go.10xgenomics.com/scRNA-3/support</a>
PUBLICATIONS	<a href="https://go.10xgenomics.com/scRNA-3/pubs">go.10xgenomics.com/scRNA-3/pubs</a>

PRODUCTS	PRODUCT CODE
Chromium Single Cell 3' Library & Gel Bead Kit v3, 4 rxns <sup>1</sup>	1000092
Chromium Single Cell 3' Library & Gel Bead Kit v3, 16 rxns <sup>1</sup>	1000075
Chromium Chip B Single Cell Kit, 48 rxns <sup>1</sup>	1000073
Chromium Chip B Single Cell Kit, 16 rxns <sup>1</sup>	1000074
Chromium i7 Multiplex Kit, 96 rxns	120262
Chromium Single Cell 3' Feature Barcode Library Kit, 16 rxns	1000079
Chromium Controller & Accessory Kit, 12 Mo. Warranty	120223
Chromium Controller & Accessory Kit, 24 Mo. Warranty	120246
Cell Ranger	<a href="https://go.10xgenomics.com/scRNA-3/cell-ranger">go.10xgenomics.com/scRNA-3/cell-ranger</a>
Loupe Cell Browser	<a href="https://go.10xgenomics.com/scRNA-3/loupe-cell">go.10xgenomics.com/scRNA-3/loupe-cell</a>

<sup>1</sup> Available for use only with the indicated Chromium Controller (PN-120223;120246) or Chromium Single Cell Controller (PN-120263;120212).

# Linking Data, Developers and Discovery

We are dedicated to helping you get the most out of your 10x Genomics system by offering multiple helpful resources:



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## 10x University

Immerse yourself in 10x University, a comprehensive step-by-step learning and training environment containing video tutorials and trainings.



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## CONTACT US

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