NEXT GEM

Gene Expression and CRISPR-Mediated Perturbations at Scale

FEATURE BARCODING TECHNOLOGY FOR CRISPR SCREENS

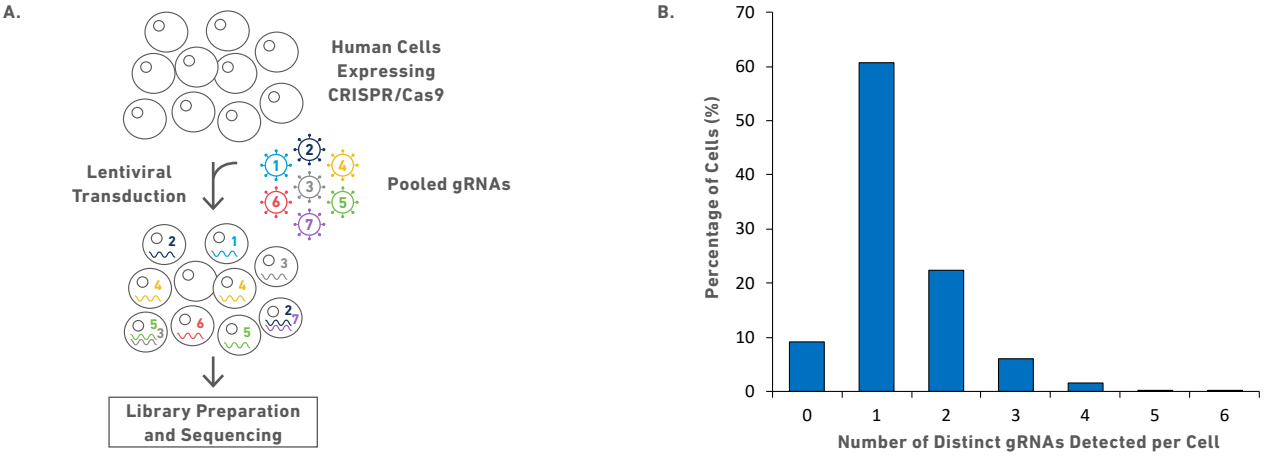
Pooled CRISPR screening is a powerful method for identifying genes involved in complex biological mechanisms such as cell proliferation, cell survival and drug/toxin resistance. Cells are transduced with a pooled lentiviral library containing guide RNAs (gRNAs) targeting tens to hundreds to thousands 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 (with Next GEM technology) 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 polyadentlyated 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
- Based on Next GEM technology

High-throughput Perturbation Studies Enabled via Feature Barcoding Technology



A. K562 cells expressing CRISPR/Cas9 were transduced with a pool of 18 gRNA's (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.

Learn More at
10xgenomics.com/single-cell

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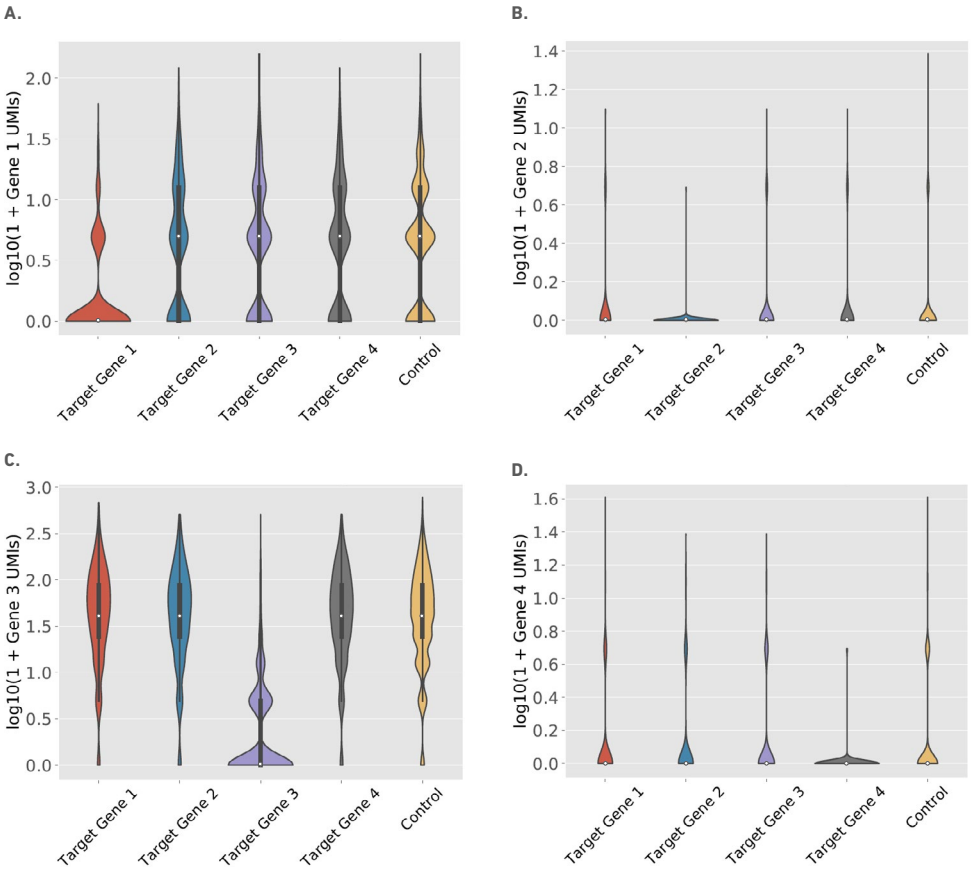
Feature Barcoding Technology Enables Determination of Knockdown Efficiency



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 100 – 80,000+ cells efficiently
- 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 0.9% in 1000 cells

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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	go.10xgenomics.com/scRNA-3/datasets
SEMINARS	go.10xgenomics.com/scRNA-3/seminars
APPLICATION NOTES	go.10xgenomics.com/scRNA-3/app-notes
TECHNICAL SUPPORT	go.10xgenomics.com/scRNA-3/support
PUBLICATIONS	go.10xgenomics.com/scRNA-3/pubs

PRODUCTS	PRODUCT CODE
Chromium Next GEM Single Cell 3' GEM, Library & Gel Bead Kit v3.1[1], 4 rxns	1000128
Chromium Next GEM Single Cell 3' GEM, Library & Gel Bead Kit v3.1[1], 16 rxns	1000121
Chromium Next GEM Chip G Single Cell Kit[1], 48 rxns	1000120
Chromium Next GEM Chip G Single Cell Kit[1], 16 rxns	1000127
Chromium Next GEM Single Cell 3' Library Construction Kit v3.1[1], 16 rxns	1000157
Chromium i7 Multiplex Kit, 96 rxns	120262
Chromium Single Cell 3' Feature Barcode Library Kit, 16 rxns	1000079
Chromium Controller & Next GEM Accessory Kit[1], 12 Mo. Warranty	1000202
Chromium Controller & Next GEM Accessory Kit[1], 24 Mo. Warranty	1000204
Cell Ranger	go.10xgenomics.com/scRNA-3/cell-ranger
Loupe Cell Browser	go.10xgenomics.com/scRNA-3/loupe-cell

Reference

[1] Next GEM reagents are specific to Next GEM products and should not be used interchangeably with non-Next GEM reagents.

LIT000041 *Rev C Chromium Single Cell Gene Expression CRISPR v3.1 Product Sheet*

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