Gain deeper insights by scaling your single cell studies with sample multiplexing

**Single Cell Gene Expression with 3’ CellPlex**

Increase your understanding of biological complexity by implementing Single Cell Gene Expression studies at scale with 3’ CellPlex, an optimized end-to-end sample multiplexing solution. Combine up to 12 samples and maximize cell throughput to more deeply profile heterogeneity across development and disease, identify and characterize rare cell subtypes and states, and validate novel biomarkers. Utilizing species-agnostic tags compatible with cells or nuclei, 3’ CellPlex reduces the cost per sample to make large-scale single cell studies more accessible.

**Figure 1.** Scale experimental throughput and reduce cost per sample with sample multiplexing. 3’ CellPlex lets you combine up to 12 samples in a single channel and maximize cell throughput. Enabled by Feature Barcode technology and demonstrated across protein and CRISPR applications, 3’ CellPlex enables single cell transcriptional profiling, multiomic analysis, and CRISPR screening at scale.

**Highlights**

- Streamline your workflow for large-scale studies by increasing sample and cell throughput.
- Reduce your experimental and sequencing costs per sample by combining sample multiplexing with Targeted Gene Expression for translational studies with large patient cohorts.
- Get started easily with sample multiplexing using whole cells or nuclei and ready-to-use species-agnostic tags.
Product features

• Multiplex up to 12 samples per channel to enable increased sample throughput for larger single cell experiments and reduced cost per sample.

• Maximize cell throughput to increase statistical power for analysis of rare cell populations and larger CRISPR screening libraries.

• Utilize species-agnostic tags with whole cells or nuclei to streamline multiplexing across species, including human, mouse, rat, and more.

• Combine multiple samples in the same channel to help minimize batch effects and simplify data analysis.

• Rely on validated reagents, fully supported protocols, and our expert support team to implement robust multiplexing workflows with confidence.

• Leverage integrated data analysis pipelines that perform sample demultiplexing and multiplet identification and filtering, as well as intuitive data visualization software that lets you directly compare multiplexed samples, to accelerate discoveries.

• Combine sample multiplexing with Targeted Gene Expression to optimize experimental throughput and per-sample cost for translational studies.

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Figure 2. 3' CellPlex enables an optimized end-to-end sample multiplexing workflow. Starting with single cell or nuclei suspensions, each sample is stained with a unique tag, then pooled and loaded onto a Chromium Next GEM chip. During the Single Cell Gene Expression workflow, mRNA, 3' CellPlex sample tags, and, if desired, protein or CRISPR guide RNAs are barcoded to identify individual GEMs. After sequencing, data can be analyzed and visualized using our Cell Ranger and Loupe Browser software.
Figure 3. Resolve variation in immune cell content between multiplexed tumor samples at high cell load using protein profiling. 27,800 cells from four human primary tumor samples representing four different types of lung cancer were stained with a panel of 17 antibody-oligo conjugates, labeled using the 3’ CellPlex Kit and run in a single microfluidic channel using Single Cell Gene Expression. A. Shown is a t-SNE representation of samples clustered using 3’ CellPlex tags. The four tumor samples and all identified cell multiplets form distinct clusters. B. Samples were aggregated and clustered based on cell surface protein markers. Clusters were manually annotated using cell-specific markers to define 10 distinct cell types. Differences in the proportions of immune cell types, particularly for B (pink) and T (green and blue) cells, can be observed among the tumor samples. Variation in immune cell populations may indicate differences in immune cell activation across tumor types.

Figure 4. Sample multiplexing does not disrupt expected patterns of gene expression. 22,515 nuclei from four embryonic C57/BLK6 mouse brains (n=3 per sample) were multiplexed using the 3’ CellPlex Kit, and all 12 samples were run in a single microfluidic channel using Single Cell Gene Expression. A. Shown is a t-SNE representation of all mouse nuclei clustered using 3’ CellPlex tags. Twelve distinct clusters were observed. B. Since the samples originated from genetically identical mice, gene expression patterns were expected to be similar. Samples were clustered based on gene expression profiling, and t-SNE representation shows high levels of overlap for all samples with minimal batch effect. Nuclei are colored by sample tag identity.
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### Product specifications
- **Multiplex with up to 12 sample tags**
- **Recover up to 17,500 singlets* per channel and over 140,000 singlets per channel with 3' CellPlex sample multiplexing and standard Chromium gene expression**
- **Combine with the high-throughput (HT) Chromium gene expression kit to achieve massive scale and recover over 45,000 singlets per channel and up to 730,000 singlets per chip**
- **Utilizes species-agnostic tags**
- **Compatible with cells and nuclei**
- **Enables bioinformatic identification and filtering of multiplets**

* Singlets are single cells or nuclei captured after multiplet removal.

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<th>Gene expression profiling products</th>
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### Targeted Gene Expression products
- **Target Hybridization Kit, 16 rxns**
- **Library Amplification Kit, 16 rxns**
- **Pre-designed and custom human gene panels [Visit product page](www.10xgenomics.com/products/targeted-gene-expression)**

### Compatible instruments
- **Chromium IX & Accessory Kit, 12 Mo. Warranty**
- **Chromium IX & Accessory Kit, 24 Mo. Warranty**
- **Chromium X & Next GEM Accessory Kit, 12 Mo. Warranty**
- **Chromium X & Next GEM Accessory Kit, 24 Mo. Warranty**
- **Chromium Controller & Accessory Kit, 12 Mo. Warranty**
- **Chromium Controller & Accessory Kit, 24 Mo. Warranty**

### Software
- **Cell Ranger [Download](go.10xgenomics.com/scRNA-3/cell-ranger)**
- **Run with Cloud Analysis [Visit product page](www.10xgenomics.com/products/cloud-analysis)**
- **Loupe Browser [Download](go.10xgenomics.com/scRNA-3/loupe-cell)**

### Compatible partner products
- **Bioregent TotalSeq™-B [Learn More](www.biolegend.com/totalseq)**
- **SigmaAldrich® [Learn More](www.SigmaAldrich.com/10xCRISPRpools)**

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