

CELLECTA

CRISPR & RNAi Functional Genomics Capabilities

For Screening, Analysis, and Discovery

- Identify essential genes
- Discover and validate drug targets
- Study mechanisms of resistance
- Characterize signaling pathways precisely and reproducibly

High-Complexity Gene Perturbation Libraries

Collecta specializes in the design and construction of pooled lentiviral CRISPR and shRNA libraries for functional genomics. We provide off-the-shelf, ready-to-use, genome-wide collections and custom libraries targeting specific gene sets or pathways.

- Genome-wide libraries: Human, mouse, pig, cow, and other species
- Custom libraries: sgRNA or shRNA designs based on user-specified targets,
- Specialized designs: Dual-sgRNA constructs, CROP-seq-compatible vectors, non-Cas9 CRISPR variants (e.g., Cas12a, Cas13b, Cas13d), gene-tiling, and barcode lineage tracing applications

Our proprietary cloning and amplification methods minimize sequence bias, maintain library diversity, and enable production of large-scale, highly complex libraries (Fig. 1) for loss-of-function (CRISPR KO, shRNA knockdown), gain-of-function (CRISPRa), gene repression (CRISPRi), and barcode-based lineage tracing/clonal tracking applications. We offer the following with every library:

- **Validated construction:** We sequence and validate full inserts for every custom and off-the-shelf library we produce. Our unique cloning and amplification methods maintain complexity and minimize bias. (Fig. 2)
- **NGS-verified quality:** Every library batch is sequence-verified to ensure full representation and narrow distribution before it is delivered as plasmid DNA or packaged lentiviral particles.
- **Comprehensive controls:** Libraries include validated non-targeting, intron-targeting, and lethal sgRNA controls to provide essential reference standards for accurate hit analysis.
- **Flexible customization:** We carry out reliable and flexible custom library construction to target selected gene sets or unique design requirements (e.g., dual sgRNA, CROP-seq vector design, vector barcoding).

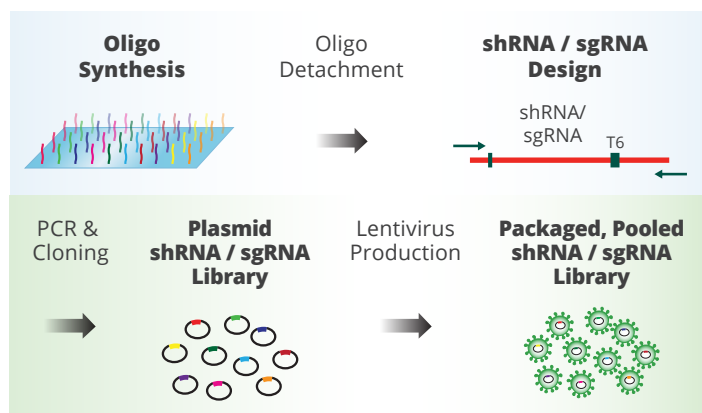


Figure 1. Library Construction: Send us a gene list, Collecta will design the guides, clone oligos into your vector of choice, QC the library (Sanger sequencing of individual clones) and full NGS analysis, and provide plasmid or ready-to-transduce lentiviral particles.

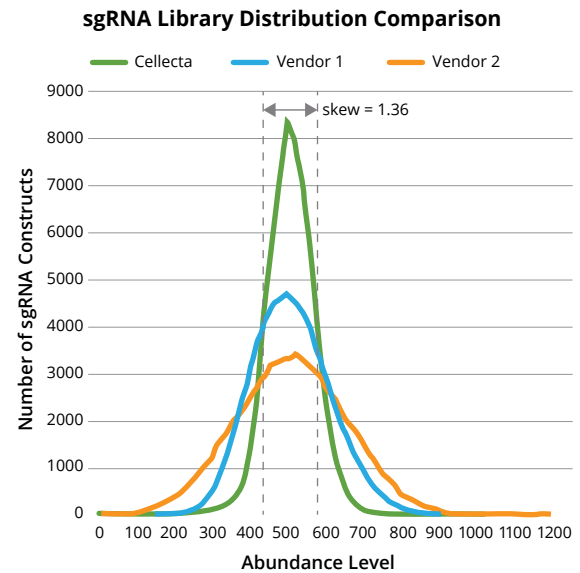


Figure 2. Collecta pooled lentiviral libraries consistently exhibit minimal distribution skew when compared to its leading competitors.



(A) Example cell pool sequence validation. (B) Clone sequencing shows a single nucleotide insertion in clones 6,7,8 and a 3-nt deletion in clones 1-5.

Figure 3. Cell Engineering Services: Generate knock-in, knockout or inducible expression models, validated Cas9 expression lines, reporter cell lines and more

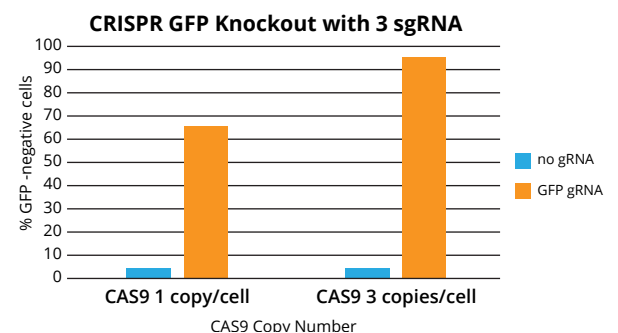


Figure 4. Functionally validated Cas9 and dCas9 expressing cell lines are important for reliable, successful CRISPR screens.

Complete Support Across the Entire CRISPR and RNAi Functional Screening Pipeline

Collecta offers complete, start-to-finish support for your functional genetic screening projects using pooled CRISPR and RNAi libraries. Whether you need a complete screening solution or a few individual components, our portfolio supports every phase of the workflow — from cell engineering and library construction, running the screen, next-generation sequencing (NGS) and data analysis, to downstream validation and pathway analysis. (Fig. 5)

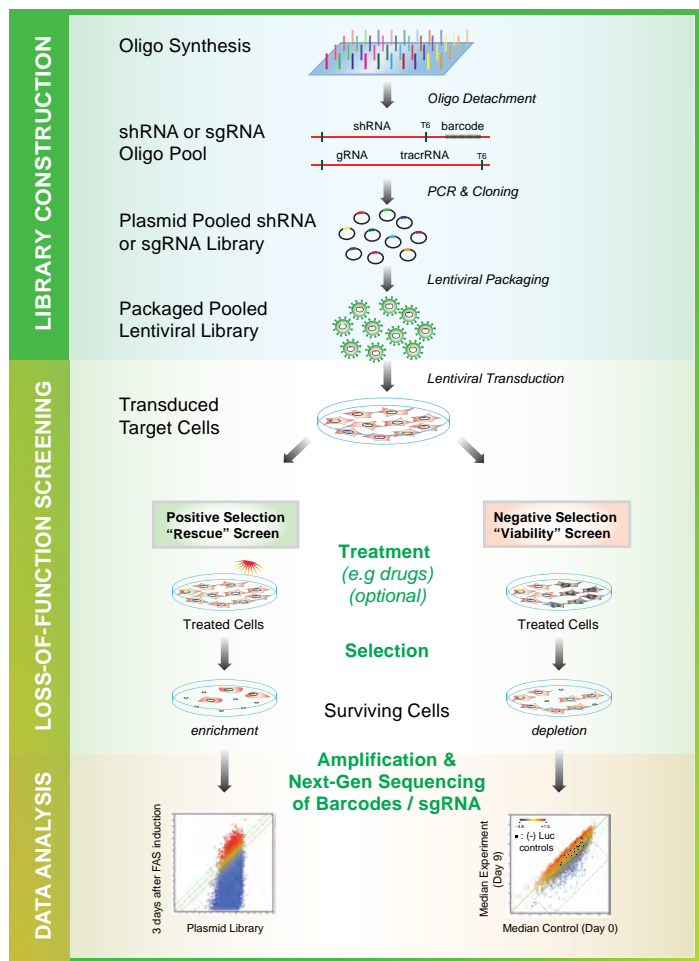


Figure 5. Collecta offers support across the whole CRISPR or RNAi functional screening workflow

Custom Cell Engineering

Collecta provides contract engineering services to generate knock-in, knockout, or inducible expression models. We deliver both polyclonal pools or clonal lines (Fig 3) suitable for primary or secondary screening assays, reporter-based functional readouts or hit confirmation and downstream mechanistic studies.

Accurately Assess Cas9 Activity in Cells: CRISPR-test Assays

Quantitatively and directly measure the activity of the Cas9 nuclease for CRISPR KO (CRISPRu), dCas9 repressor for CRISPRi, or dCas9 activator for CRISPRa in any cell line to ensure successful screening

The CRISPR-Test assay kits contain a mix of lentiviral particles with both green fluorescent and red fluorescent proteins. One fluorescent marker responds to Cas9 or dCas9 activity, and the other provides a control. A standard FACS analysis helps you detect functional Cas9 in your cells.

Cas9 Expressing Cell Lines

CRISPR-based pooled screening requires cell populations with robust and consistent Cas9 expression. (Fig. 4) Collecta offers a portfolio of ready-to-use, functionally validated Cas9 cell lines, optimized for knockout (Cas9), transcriptional activation (dCas9-VPH for CRISPRa), transcriptional inhibition (dCas9-KRAB for CRISPRi), and base editing (nCas9-ABE and nCas9-CBE for CRISPR-BE). Each lot is validated using Collecta's CRISPR-Test assay, ensuring sufficient nuclease or effector activity to support reliable genome-scale screens.

NGS Library Preparation Kits and Services

Researchers can send us frozen cell pellets, tissue, or genomic DNA from CRISPR/RNAi screens they have run in their labs, and Collecta will perform the NGS library prep, sequencing, and alignment. We sequence all Collecta libraries and a wide range of other pooled lentiviral libraries, such as Brunello and GeCKO, cloned into non-Collecta vectors.

Bioinformatics Analysis Services

We provide in-depth computational analysis for CRISPR and RNAi screens using established pipelines, e.g., MAGeCK, DrugZ. (Fig. 6) These in-depth reports can include:

- Identification of enriched or depleted genes
- Hit prioritization and statistical scoring
- Pathway and network-level insights

This integrated approach enables researchers to move directly from raw NGS data to biologically meaningful conclusions.

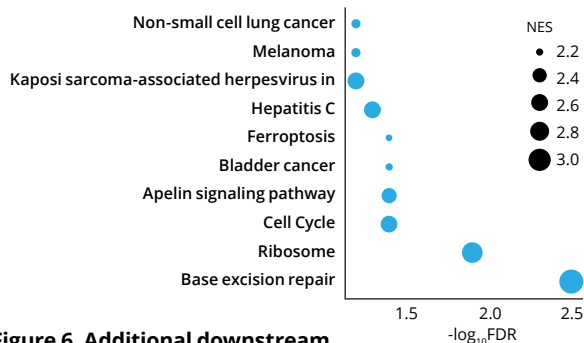


Figure 6. Additional downstream analysis is offered on an as-needed basis using established pipelines and custom scripts.

Comprehensive Functional Genomics Services

For labs that want to outsource their functional genomics projects, Collecta offers turnkey contract screening services. We perform every stage of pooled library screens — from engineering the appropriate Cas9/dCas9-expressing model to delivering final hit lists with full bioinformatic analysis.

Our capabilities include

- **Genome-wide or focused screens** with CRISPR KO, CRISPRa, CRISPRi, CRISPR-BE, or RNAi libraries.
- **Single-cell profiling and analysis** either alone or combined with CRISPR screening (e.g., CRISPR-seq, Perturb-Seq).
- **Protocols fully aligned with your research goals:** essential gene discovery, drug resistance and sensitivity, synthetic lethal interaction mapping, and mechanism-of-action studies.
- **Flexible assay endpoints including viability,** FACS-based selection, antibody or reporter readouts.
- **End-to-end support:** Cas9 cell line creation, assay optimization, library design and delivery, NGS, and data interpretation.
- **Follow up analysis,** hit validation, and cell engineering for assay development.

By partnering with Collecta, you gain access to state-of-the-art tools and an expert team of scientists experienced in running large-scale, pooled genetic screens across diverse cell types and experimental models.

Functional Genetic Screening with CRISPR or RNAi

Functional genetic screening with CRISPR or RNAi libraries, and bioinformatics analysis can help you:

- **Identify Mechanisms of Action:** Precisely define the gene-level interactions and synergistic targets of novel and existing drugs.
- **Understand Complex Phenotypes:** Find genetic drivers controlling critical cellular processes like differentiation, senescence, infection, oncogenesis, and metastasis.
- **Elucidate Causes of Drug Resistance:** Accurately map the genetic mechanisms of resistance to compounds and treatments.

Collecta Functional Screening Products and Services: Your One-Stop Shop

- Genome-wide and custom pooled CRISPR, shRNA and barcode libraries
- Ready-to-use and custom engineered cell lines
- End-to-end functional genetic screening services: pooled libraries or single-cell genetic analysis
- Viral vector constructs for gene editing, functional genomics, and screening

For more information on Collecta products and services, for scientific publications, manuals and other resources, and to request a quote, visit **Collecta.com**



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