



Enhancing gene editing operations through automated oligo inventory management

About EditCo Bio

EditCo Bio offers genome engineering solutions, including high-quality edited cells and user-friendly CRISPR kits and gRNA libraries. These tools facilitate research in target-based drug discovery and disease modeling, allowing scientists to focus on their core research rather than CRISPR optimization. The company aims to make gene editing easier, faster, and more reliable, thereby enhancing researchers' efficiency.

Leveraging a unique targeting strategy, EditCo creates fragment deletions, which enhance the reliability and efficiency of gene function studies and loss-of-function screens. With deep expertise in automation and biology, they offer a broad spectrum of gene edits—from knockouts to knock-ins—across diverse cell lines, including immortalized, iPSC, and primary cells such as CD4+ and CD8+ T-cells. Their combination of smart bioinformatics, advanced automation, and state-of-the-art biology accelerates drug discovery and cell model development through a high-throughput and highly consistent manufacturing process.

The need for an automated solution

EditCo sought an automated solution for their inventory management to store a large library of oligonucleotides, specifically guide RNAs for gene editing mediated by programmable nucleases. The required rate and volume of sample retrieval and reformatting meant that manual operation with lab technicians simply wasn't feasible.

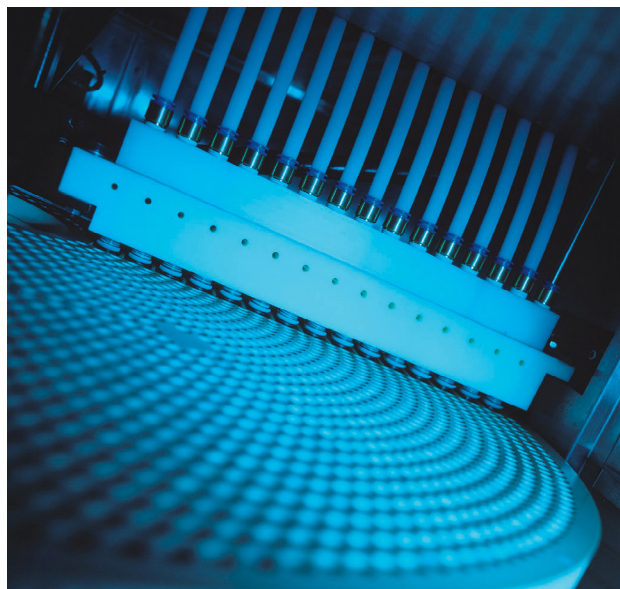
comPOUND®: Secure and reliable sample management

EditCo selected SPT Labtech's comPOUND® system for automated -20°C sample storage and retrieval. comPOUND features a high-density rackless storage layout, maximizing capacity in a small footprint. Each tube is encoded with a unique 2D barcode, enhancing inventory management and enabling efficient sample selection.



comPOUND was chosen as it met the following criteria:

- **Robust and reliable performance:** Reliable operation and a low failure rate were paramount to ensuring the integrity of valuable customer samples.
- **Cherry-picking capability:** comPOUND's rackless honeycomb storage structure allows the team to cherry-pick target oligo samples without exposing others to harmful thawing and refreezing.
- **Fast service and support:** SPT Labtech's reliance® team of engineers provide dedicated service and support to minimize instrument downtime and ensure peak performance.
- **Integration compatibility:** Seamless integration with existing work cells was essential to deliver the desired hands-free efficiency.



comPOUND uses an innovative carousel system for high density, low footprint storage. Individual tubes can be cherry-picked and transported via pneumatic tubes without exposing other samples to ambient air.

Implementing comPOUND: A fully automated inventory management work cell

EditCo stores its entire oligonucleotide library, over 30,000 unique tubes and growing, in comPOUND, along with a small number of tubes for development activities.

The system is integrated into an automated work cell for downstream sample handling, designed by Peak Analysis and Automation (PAA). A scheduler delivers hands-free coordination between all instruments in the setup, to provide full end-to-end processing capabilities, including:

- BioMicroLab Scan HS – a high-speed camera-based 2D barcode scanner
- BioMicroLab VolumeCheck 384 – fast, non-contact volume verification

Retrieving new sample inventory

New oligos arrive in tube racks and are stored at 4°C. Lab associates load them into the comSTACKER 2, initiating the storage process in comPOUND. Upon completion, an automated report updates the EditCo inventory system with the new samples and associated metadata.

Day-to-day operations

comPOUND facilitates a fully automated closed-loop process for retrieving source tubes, plating, measuring, and returning them to storage. On average, the system retrieves 1100 unique tubes per day, with some days going above 2000 tubes. Selected samples are automatically pulled from comPOUND in batches and transferred via pneumatic technology to the connect module on the work cell, where they are thawed before processing. Post-processing, samples are returned to storage in comPOUND via the connect. This system ensures that only necessary samples are thawed and exposed to ambient conditions, maintaining the rest at -20 °C which preserves sample quality and extends their shelf life.

Output and efficiency gains

As shown in table 1, the fully automated integration of comPOUND within the work cell via the connect has significantly reduced manual intervention, saving approximately 65 minutes per batch of tubes flip to 20 batches daily and around 35 minutes per new sample inventory intake (2-3 times weekly). This time saving allows the Operations team to focus on other tasks, enabling parallel workflows, and further enhancing lab efficiency.

Table 1. Comparison of lab user touch time required for inventory management tasks before and after installation of comPOUND.

During regular operations:	User Touch Time (mins)	
User Action	With comPOUND integration	Without comPOUND
Retrieve source labwares	0	20
Scan barcodes and record source retrieval in inventory system	0	10
Scan barcodes and record source return & locations in inventory system	0	15
Return source labwares	0	20
TOTAL	0	65

During inventory loading:	User Touch Time (mins)	
User Action	With comPOUND integration	Without comPOUND
Load new source labwares into inventory	5	20
Scan barcodes and record locations in inventory system	0	15
TOTAL	5	35

Team feedback

- The team values the integration between comPOUND and lab2lab connect, which allows for precise sample selection and control over destination layout, optimizing downstream liquid handling processes.
- The automated inventory system ensures up-to-date records and metadata without the need for manual input, enabling optimal sample retrieval with minimal error and turnaround time.
- The system's ease of use meant that users were comfortable after a single training session, with no steep learning curve.
- The comSTACKER allows users to load 10 racks of tubes, reducing touch time, and allowing users to perform other parallel tasks. Users also do not need to perform a separate barcode scan step.
- The integration between the comPOUND with the work cell via the connect also enables close-loop end-to-end processing of a work order, ensuring full traceability of samples and processes.



Future outlook

As EditCo's guide RNA library continues to expand by hundreds each week, the company's commitment to enhancing processes through automation remains steadfast. By advancing their cell engineering workflow capabilities and expanding into additional oligonucleotides used in process, like DNA primer pairs and DNA donor repair templates, we are not just scaling operations—we're setting new industry standards. Our dedication to meeting the ever-increasing demands for access, speed, and scale empowers our customers to explore without boundaries, driving the next wave of scientific discovery. At EditCo, we understand that our work today is shaping the future of biotechnology, ensuring that innovation knows no limits.