

*OH-ALIVE: A Commercialization-driven Innovator Platform that Integrates the Understanding of Advanced Cell Culture Processes using Robotics and Deep Analytics*

Cellular Therapy has evolved greatly over the past decade and showed immense promise as potential therapeutic strategies in clinical trials for a many number of diseases. As there are enormous needs for derivation of pure and mature human cells of various types and multiple significant entry barriers to cell therapy, OH-Alive was formed to offer solutions to some of those at the pre-clinical phase through early stage clinical trials. The vision for OH-Alive is to be a **one-stop Stem Cell Innovator Platform** that will enable for-profit entities, clinicians and academic researchers better understand their cell culture protocols so that when they advance their cutting edge therapies from the bench to the bedside they can **report to the FDA their manufacturing tolerances and sound scientific rationale for the methods they use in preparing their cell products.**

OH-Alive merges developmental biology and stem cell biology with cutting edge hardware instrument technology, and computerized experimental design and analysis to perform **process-specific parameter optimization** for customers seeking to develop cell therapies.

Implementing Quality by Design (QbD) principles, cell culture optimization is done by utilizing Design of Experiment (DoE) theory combined with Multivariate Data Analysis (MVDA) allowing us to:

- **Generate mathematical models of the biological system**
- **Understand the effector-response relationship in cell culture**
- **Provide a systems biology analysis of the differentiation space**

Custom QuantStudio™ arrays enable deep understanding of the genetic expression of cells using proven Taqman™ assays. This cutting-edge technology has low per-sample cost and is extremely fast as compared to standard QPCR methods.

This platform brings corporate and non-profit organizations together to form OH-Alive as a truly shared effort, leveraging individual commitments, interests, and experience to advance new cell therapies to patients and enable new manufacturing intellectual property (IP) to be developed and buttress the clinical programs of both academic and for-profit companies.

Our methods are **more efficient and economical** compared to traditional methods and reflect the desires of the FDA for cell manufacturing.

OH-Alive's goals are:

1. To transform medical therapy through the use of cells rather than drugs to heal tissues and organs.
2. To create the commercial and academic infrastructure in Ohio to establish a self-sufficient, vibrant biotechnology industry and support services that will attract cell-therapy institutions across the US.

**The platform consists of specific hardware, represented by state-of-the-art equipment for automated stem cell culturing and also includes a dedicated innovation platform for determining process-specific parameter optimization. It offers computer-based experimental designs executed for advanced cell culture and greatly reduces the number of experiments and time otherwise needed for running one-factor-at-a-time experiments to optimize a large number of variables.**



## OH-Alive Supporters & Partners



The OH-Alive platform will enable new cell therapy products to be grown in an optimized, automated, state-of-the-art facility with oversight and guidance provided by the National Center for Regenerative Medicine (NCRM) to accelerate these clinically, relevant and mature ideas to the clinic.

Integrated with this physical accelerator is the NCRM's Cellular Therapy Service (CTS); a competency scaffold facilitates all aspects of a cell application from **FDA consultancy, IND-filing support, and to facilitate and guide researchers and clinicians with compliance matters involving Institutional Review Board (IRB).**

Through the Case Western Reserve University Technology Transfer Office, OH-Alive has dedicated support for managing and protecting new intellectual property (IP). **OH-Alive's clients will receive the exclusive ability to benefit from commercialization outcomes emanating from utilization of the facility and OH-Alive will assign ownership of any/all IP that is created as part of its fee based service to its clients.** Collaborative agreements to reduce fee-for-service costs will be negotiated on a case-by-case basis but royalty stream or milestone payments will be added to this co-development situation.

Customers will also get access to NCRM's existing competency in executing new cell therapies. OH-Alive staff will **collaborate on grant applications**, especially SBIR/STTR mechanisms. Together this will lead to the commercialization of new cell therapies, resulting in the creation of new IP for cell culture manufacturing and innovative cell-based treatments for diseases.

For more information on OH-Alive please contact Michael Gilkey at 216.368.2079 or e-mail michael.gilkey@case.edu

## Customer Deliverables:

- Determine optimum cell culture conditions for large number of factors using different factorial matrix designs equipped with robotics and deep analytics.
- Development and validation of analytical methods required for release of cellular materials for human use.
- Help in acquiring knowledge and results to support future grant applications.
- Significantly reduced development costs and time.
- Development and validation of analytical methods required for release of cellular materials for human-use.
- Study report that applies QbD, DoE and MVDA fundamentals.
- Support for preparation of IND documentation and regulatory guidance.

## OH-Alive Services:

- Full-Suite Optimization Project (2-3 months, ~ \$75K-\$250K/project) - minimum of 60,000 custom datapoints and complete modeling service.
- Partial optimization project (2 weeks, \$5K-\$20K) - good for preliminary data, exploration, and initial testing with or without Quantstudio analysis.
- Perturbation Media preparation and delivery (2 days, \$1600 + cost of additives) - customer receives 96 well deep plate perturbation matrix (PM) for the users own cells and analysis.
- Fee-for-service experimental design and MVDA analysis (\$100/hour).
- OA-Express services (3 hours, \$2K-\$15K) - Usage of Quantstudio in genetic testing and gene expression analysis.

OA-Express cards are configured with 48 samples/array and 56 genes/sample or 24 samples/array and 112 genes/sample.

OA-Express services are useful for:

- Industrial discovery and development research.
- Industry quality assurance applications.
- Cell culture batch production monitoring.
- Preclinical expression of cells in animal studies.
- Gene expression and genotyping analysis.

