Regeneron Pharmaceuticals, Inc.
Thomas M. DeChiara, Ph.D., Sr. Director of Transgenic Technology and Research Animal Facility
William Poeymirou, Sr. Manager of the Velocigene Vivarium and Transgenic Technology
Joseph Hickey, RAIII (Microinjector)
Jennifer Escaravage, RAIII (Microinjector)
http://www.regeneron.com

XYClone® + Velocigene™ = VelociMouse™: A Revolutionary Technology

Regeneron Pharmaceuticals, Inc. is a biopharmaceutical company that not only discovers and develops therapeutic medicines but also develops proprietary technology platforms which speed the discovery and development process. One such technology, VelociGene, which produces genetically altered mice in a high-throughput and precise way, holds the promise to "revolutionize the transgenic mouse field," says Thomas M. DeChiara, Ph.D., Sr. Director of Transgenic Technology and Research Animal Facility.

DeChiara's staff "works on transgenic technology development to improve the quality of chimera production from the microinjection of gene-targeted ES cells into early stage mouse embryos, and performs the breeding required to obtain mutant mice for phenotypic studies." With the XYClone's proven ability to easily and quickly assist in the microinjection process, without damaging the host embryo, this field of work is a perfect fit for the XYClone laser system.

DeChiara first became aware of XYClone's possibilities as an alternative to the piezo method of blastocyst injection when a colleague, Wojtek Auerbach, saw the laser system demonstrated at a transgenic conference. Since its installation, William Poueymirou has performed a number of critical experiments to establish the XYClone as an integral component in VelociMouse production (see side bar). Says DeChiara, "The laser-assisted injection of 8-cell stage mouse embryos has allowed us to generate fully ES cell-derived F0 mice (VelociMice) in high yield using

inbred or hybrid ES cells. Last year we generated about 200 lines of mice. The use of the XYClone Laser System has made our process much more efficient and has resulted in phenotypable F0 mice at dramatically lower mouse costs."

In addition to 8-cell stage balstocyst injection, his staff is also conducting experiments using the laser for in vitro fertilization of mouse oocytes – something they had not performed prior to installation of the XYClone. Pleased with the initial results, DeChiara says, "The use of the laser for IVF has allowed us to fertilize mouse oocytes much more efficiently when using frozen/thawed sperm from C57BL/6 mice."

When asked to describe his overall impression of the XYClone and Hamilton Thorne, DeChiara replied, "The XYClone laser system has performed beautifully under a heavy microinjection schedule (300-400 laser pulses/embryos/week) without the need for service. It is very easy to use for processing large number of embryos for injection. Our experience with Hamilton-Thorne has been an excellent one. Kathy Bradley has been an excellent resource for information."

The Velocigene research team have recently submitted a manuscript entitled, "Rapid Production of F0 Generation Mice Fully Derived from Gene-Targeted Embryonic Stem Cells, Allowing for Immediate Phenotypic Analyses." They have also presented the VelociMouse technology at the 6th Annual Transgenic Technology Meeting in Barcelona, Spain (2005) and the World Pharmaceutical Congress in Philadelphia, PA (2006).

[Our thanks to Kathy Bradley, VP Sales, for recommending Regeneron for this Customer Profile. If you would like us to profile one of your customers, please email Cynthia Rodzen at crodzen@hamiltonthorne.com.]

The VelociMouse technology is a method by which laser-assisted injection of ES cells into 8-cell stage embryos efficiently yields F0 generation mice that are fully ES cell-derived. The 8-cell injection method is effective with both inbred and hybrid ES lines, including male and female ES cell subclones, and produces F0 mice that are normal, healthy, and exhibit 100% germ-line transmission. Importantly, these mice can be used directly in phenotypic analyses, greatly accelerating the timelines for understanding gene function.

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