HAMILTON THORNE

XYClone®

and

XYRCOS®

Research Laser Systems

Research Laser Applications

Blastocyst and 8-cell Injections

Using the laser to open the zona pellucida prior to injection of embryonic stem cells into blastocysts or 8-cell embryos allows use of a blunt injection pipette, which results in less trauma on the cell. (Image 1: Xin Yu Rairdan, UC Davis Mouse Biology Program)

Inner Cell Mass Isolation

The laser offers a simple, efficient and reliable technique for ICM isolation without use of xenogenic reagents. Even greater efficiency can be achieved using the Staccato multipulse option. (Image 2: Hamilton Thorne)

Somatic Cell Nuclear Transfer

The laser speeds the process of enucleation to a matter of seconds, without eliciting damage to the egg. In addition to facilitating the removal of nuclear material via aspiration, the laser has been used to deactivate the DNA in zebrafish eggs. (Image 3: Nguyen Van Thuan, Konkuk University, Seoul, Korea)

Embryo Biopsy

Used for both blastomere and trophectoderm biopsy, the laser assists in the removal of cells for genetic testing. (Image 4: Boston IVF and Image 5: Georgia Kokkali, Ph.D., Genesis Athens Clinic)

Laser-Assisted IVF

By opening the zona pellucida of oocytes with the laser, increased levels of fertilization may be obtained with certain inbred mouse strains or with poor quality sperm. (Image 6: Kathy Mohr, MMRRC, University of North Carolina)

Laser-Assisted Hatching

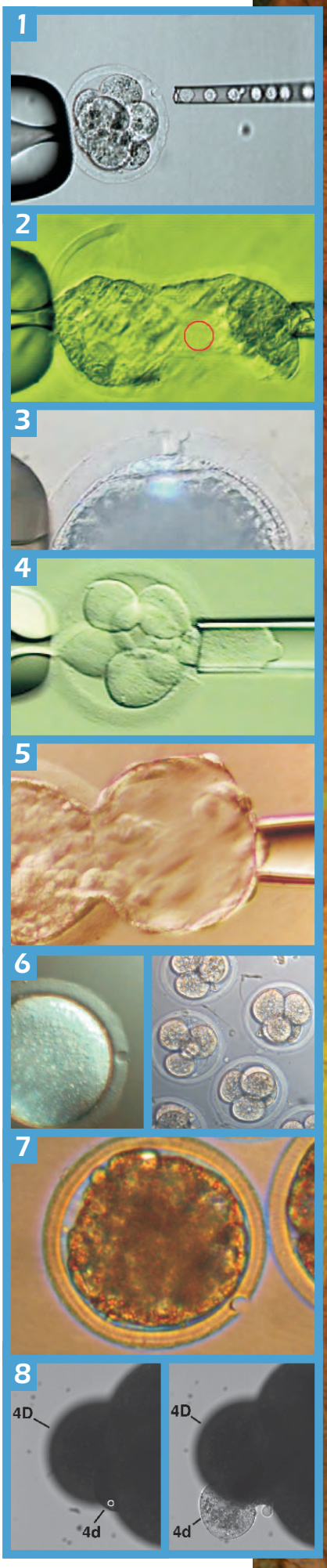
Laser-assisted hatching may be performed prior to embryo transfer or to facilitate trophectoderm biopsy. (Image 7: Charles Looney, Ovagenix, Inc.)

Developmental Biology

The laser ablates cellular structures for developmental biology studies on organisms such as zebrafish, C. elegans, planaria, and slipper snails. The laser may be installed on an upright microscope for these types of applications. (Image 8: Jon Henry, University of Illinois, Department of Cell & Developmental Biology)

Cell Culture Maintenance

The laser helps to maintain the purity of mammalian tissue cell cultures by allowing selective targeting and ablation of unwanted cells. By using the Staccato multipulse option, larger areas of cells may be quickly eliminated.



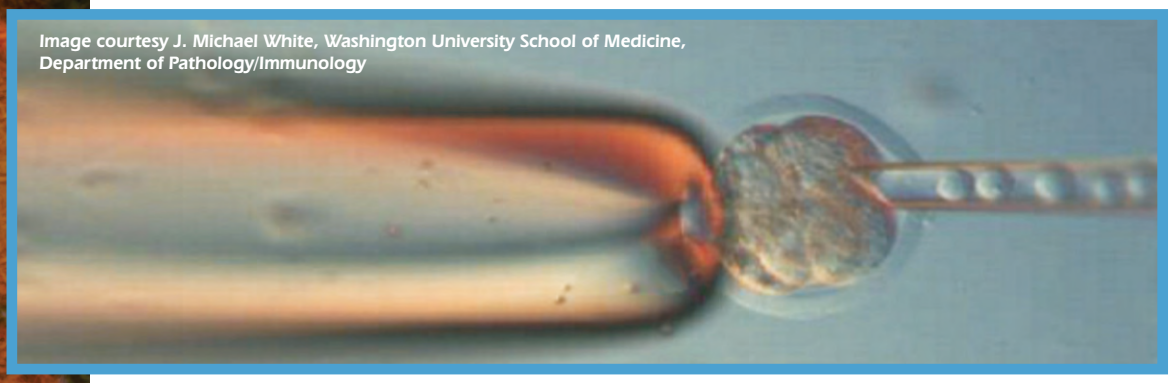


Image courtesy J. Michael White, Washington University School of Medicine, Department of Pathology/Immunology

Hamilton Thorne offers two research laser systems: the new XYRCOS® laser and the legacy XYClone® laser.

HT Laser Systems

The HT lasers permit non-contact ablation of targeted membranes or structures. Both the XYRCOS and XYClone integrate a high power, Class 1, 1460 nm infrared laser with a specially designed 40x or 20x objective that functions in both visible and near infrared wavelengths. The lasers attach to the turret just like a typical objective and allows full use of all the microscopes standard features, such as fluorescence and Hoffman imaging. In addition, the integrated laser is factory-aligned and locked in place to ensure safe ablation.

Why Use Our Lasers

- Increase productivity and efficiency
- Easy to learn and use
- Minimizes cell trauma
- Mercury-free system
- Xenogenic-free process
- Eliminates need for sharp micropipettes
- No expensive needles or pipettes required
- Micromanipulators not needed for operation
- May be used with fluorescence
- Compatible with Oosight™ imaging system from CRi
- Portable between labs - great for field work

Isotherm Rings™

Isotherm Color Key

- Laser Beam
- 140°C (Hole Size)
- 100°C
- 80°C
- 60°C
- 50°C

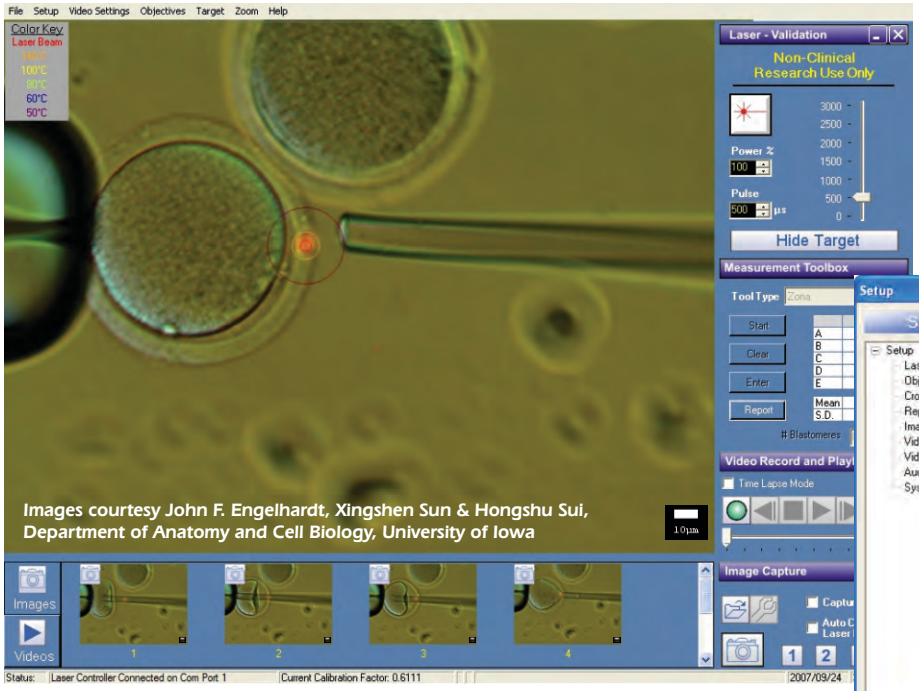
Image courtesy Shoukhrat Mitalipov, Masahito Tachibana & Michelle Sparman, Oregon National Primate Research Center, Oregon Health and Science University

The Isotherm Rings feature of the laser software helps you prevent potential harmful effects on adjacent cellular structures due to the heat from the laser drilling.

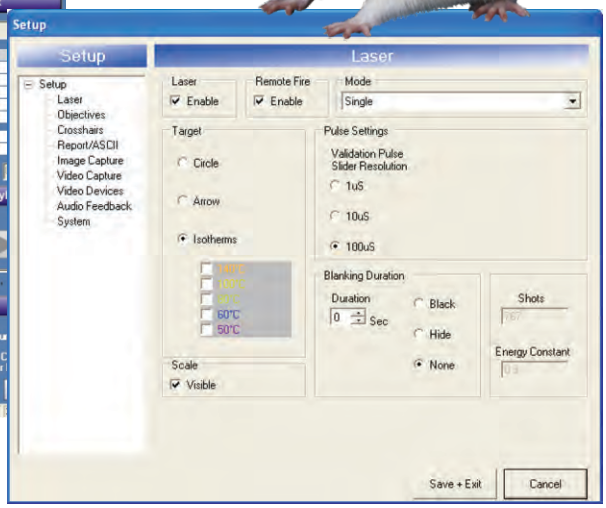
Each colored ring represents a specific peak temperature. The Isotherm Rings automatically adjust size based on the selected laser power and pulse length.

By allowing you to "see" both the peak temperature and the drill hole size, the Isotherm Rings eliminate the guesswork prior to activating the laser.

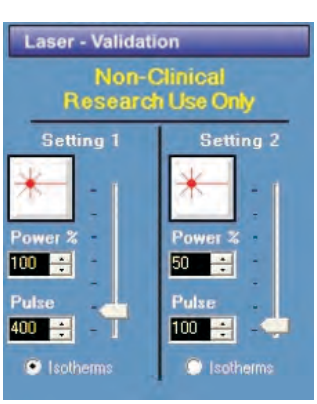
Research Laser Software Features

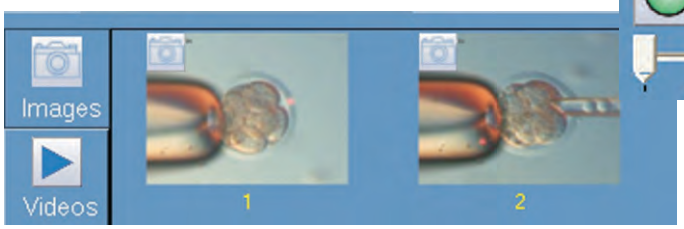


Images courtesy John F. Engelhardt, Xingshen Sun & Hongshu Sui, Department of Anatomy and Cell Biology, University of Iowa



- *Laser Panel: The size of the ablated area is easily controlled by varying the laser pulse time and the laser energy.*
- *Double Laser Mode: Provides simultaneous access to two distinct settings for laser pulse time and laser power, a great feature for protocols that require a quick change of settings.*
- *Image Area: View direct camera image, saved images, or saved video files.*
- *Target Options: Isotherm Rings, Circle or Arrow targets. The Isotherm Rings are used to preview heat generation based on the selected laser power and pulse times selected.*
- *Image Capture Controls: Images may be stored manually or automatically upon laser firing. You may also choose to save the graphic image overlays within the image.*
- *Video Recording: One touch video recording allows storage of .avi files for use in training, presentations, or archiving. Record in real-time or time-lapse mode.*
- *Measurement Tool Box and Documentation: Allows measurements of various cell characteristics, such as diameter and zona width, with automatic calculation of means and standard deviations. Measurements may then be transferred to the built-in report and data exported to ASCII.*
- *Image Toolbox: Add freehand text, drawings, and measures to any captured image.*
- *Auto-labeling: Captured images may be labeled automatically with user-defined input. Multiple labels may be stored and enabled.*
- *Scale Bar: Visible on the live image, the scale bar is saved on captured images and videos.*

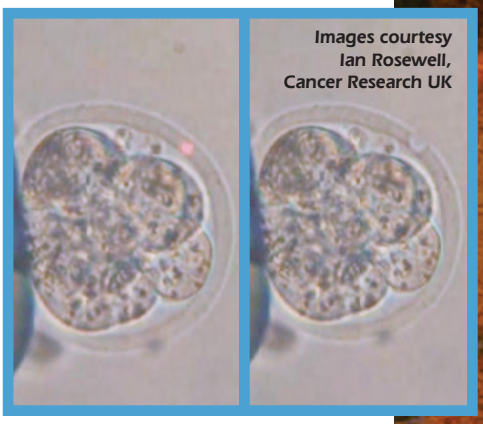




RED-i®

The RED-i speeds workflow by allowing you to position the cell under the laser beam without looking at the monitor.

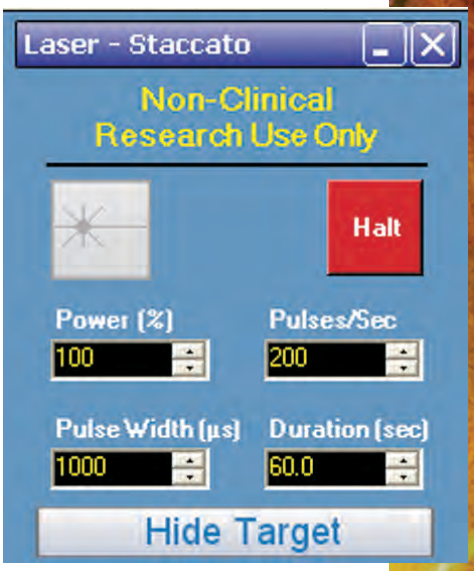
- Included with XYRCOS, optional on XYClone
- Red LED indicator spot visible through microscope eyepieces
- Adjustable brightness level
- Always remains in focus
- Laser beam is NOT transmitted to eyepieces - SAFE for your eyes
- Simple alignment process
- Available in 40x and 20x



Staccato® Software Option

Staccato software allows rapid, multipulse firing for near-continuous application of laser to the sample. Uses include:

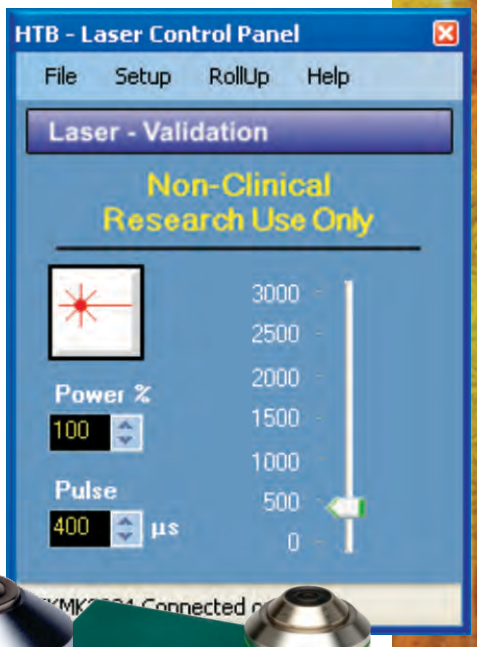
- ICM excision for embryonic stem cell derivation
- Trophectoderm biopsy for genetic testing
- Ablation of unwanted cells in tissue culture
- Ablation of organelles, cells and tissues



Laser Control Panel

The laser control panel optimizes use of the laser with the Oosight™ imaging system from CRi.

- A standalone laser control panel is configured to work side by side with the Oosight™ software.
- XYRCOS and XYClone lasers are compatible with the Oosight™ camera.



On-Screen Measures

- Make on-screen measurements of zona thickness, embryo diameter, pronuclei diameters, and drill hole size on stored images. One user-defined ruler is also available.
- Measurements, calculated means, and standard deviations are transferred to the report at the touch of a button.
- Images may be saved to report with graphic measurement overlay.
- Toolbox feature allows measuring of additional image areas (for storage with image file only).

Comprehensive Reports

- Create comprehensive reports combining general information, measurements, and pre- and post-treatment images
- Reports saved in JPG format for easy import into other applications
- Import field data and export report data in ASCII (txt and mer) format.
- Option to replace Embryo Evaluation report data with two additional images
- Choose to save images to report with or without measurement overlay

XYRCOS® Components

Standard XYRCOS configuration includes:

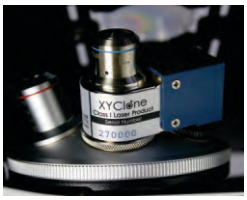
- Class 1 laser diode, 1460 nm, 40x or 20x objective-laser combination, and turret adapters for installation on inverted microscopes
- RED-i Target Locator
- Laser controller box
- Proprietary laser software
- Color analog or digital camera, with de-magnifier lens
- Remote foot switch for firing laser
- Choice of high speed, customized desktop system with 20" flat panel monitor or laptop system

Optional Components

- Staccato multi-pulse software

XYClone® Components

Standard XYClone configuration includes:



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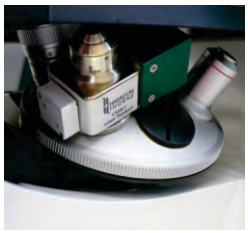

Optional Components

- RED-i Target Locator
- Staccato multi-pulse software

Call us or visit our website today for more information or to arrange an on-site demonstration!

HAMILTON THORNE

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