Leica Stereotaxic Solutions

Available through myNeuroLab.com

Living up to Life
Supporting Neuroscience

To assist with the most advanced neuroscience, Leica Microsystems has developed a complete range of solutions for small-animal surgery. Through myNeuroLab.com researchers can find innovative stereotaxic instruments, perfusion systems and specialized accessories such as impactors and micro-injectors. Add to this Leica’s leading fixation, sample preparation and imaging systems and researchers have a single source for integrated solutions backed by comprehensive support.

Leica Microsystems creates these neuroscience solutions in close collaboration with the research community. This leads to highly innovative instruments with the fundamental qualities researchers expect: precision, quality and durability. Researchers also enjoy the confidence of knowing these advanced instruments are fully backed by Leica’s world-wide service and support network which offers expert advice and professional maintenance for a life-time of high-performance operation.

Find out more, visit Leica Microsystems’ dedicated neuroscience site:
www.myNeuroLab.com

For corporate information and the complete Leica Microsystems range visit:
www.leica-microsystems.com
A Complete System for Small-animal Brain Surgery

Stereotaxic surgery is easier, faster and requires fewer animals with our stereotaxic instruments.

Leica Microsystems offers a complete solution for small-animal brain surgery. Manipulators, bases and species adaptors, as well as a wide range of accessories are available for all your laboratory needs.
Visit myNeuroLab.com – the Source for Innovative Neuroscience

Visit myNeuroLab.com for a comprehensive range of products and expert information.

**Ask the Expert.** Got a question? myNeuroLab’s experts can help with advice on many aspects of neuroscience and small-animal surgery.

**Instant Quotes.** Visit myNeuroLab.com when you need a quote instantly. The easy on-line quote generation systems mean accurate pricing information is always just a click away.

**Find Your Solution.** With a comprehensive product range covering most aspects of neuroscience, myNeuroLab.com can help with innovative solutions for many applications.

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<th>Bases and Species Adaptors</th>
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<td>Leica Microsystems offers a selection of probe holders, bases and species adaptors to suit most stereotaxic surgery requirements.</td>
<td>Choose from five stereotaxic manipulators, ranging from low cost conventional vernier scale models to full-featured digital stereotaxic models. Angle One and Angle Two make it practical to do every surgery from a different angle, removing the confound of path, with no loss of time or accuracy. Angle Two includes Virtual Skull Flat and Atlas Integration.</td>
<td>An extensive range of valuable and unique accessories is available to enhance stereotaxic accuracy and research results.</td>
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<td>- Species Adaptable “U” Frame</td>
<td>- Angle Two</td>
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<td>- Mouse Only</td>
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Leica Microsystems features a selection of probe holders, bases and species adaptors to cover most common needs.

**Mouse/neonatal Rat Adaptor**

Leica Microsystems offers base plates for the hypothermic anesthesia of neonatal rats. The bases feature a well that cools the plate with dry ice and alcohol. Another base plate option features Peltier feedback-controlled cooling to a precise temperature. To create a stable three point hold for mice and neonatal rats, miniature earbars and incisor clamps are available. For adult mice, a gas anesthesia solution featuring a nose cone and gas flow is available.

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**“U” Frame**

The “U” Frame is the most popular frame due to its versatility and efficient size. The “U” Frame may be configured with one or two manipulators. This base comes equipped for adult rat surgeries. Several species adaptors are also available to use with mice, guinea pigs, birds or other species.

**Mouse Only Frame**

The Mouse Only Frame is the most economical frame for performing stereotaxic surgery on mice. Five manipulator options are available with this base. The frame features two head holders that allow the manipulator to swivel to either one from the left side of the animal.
Parallel Rail Frames allow two manipulators to be mounted on each side of the animal for a total of four. There are two models of parallel rail frame available:

a. Small animal
   Suitable for mice, rats or cats. Requires the frame, base plate and species adaptor with earbars. Choose up to four manipulators.

b. Large animal
   Suitable for pigs, sheep, dogs, monkeys or other moderately large animals. Includes large animal head holder with eye socket stabilizers, incisor bar and skull pins instead of earbars. Choose up to four manipulators.

Manipulators

Choose the stereotaxic manipulator that suits your application. Leica Microsystems has a solution for virtually any application, from advanced computer-guided systems to cost-effective traditional vernier instruments.

The Angle Two is the most technologically advanced animal stereotaxic instrument commercially available. It is the world’s only computer-guided stereotaxic instrument yet it also maintains the manual tactile feel that allows neuroscientists to carefully move the probe into the brain.

With the Angle Two, any approach angle can be achieved without losing accuracy and time. It also significantly reduces human error, allowing use of fewer animals.

Encoder input to a computer from 5 axes allow angled surgeries without user calculations. Atlas Integration allows clicking on the target and watching the path the probe follows. Target coordinates can be stored for future use.

A big plus for researchers is the ability to quickly and accurately vary the approach angle so they can avoid the confound that occurs when the same path to target is used for each surgery.

Touch at Bregma and click. The instrument will show how far to move along each linear axis, correcting for tilt and rotation of the manipulator.

Another unique feature is the Virtual Skull Flat instrument correction software – the instrument corrects exactly for any deviation from skull flat orientation. Touch the probe at Lambda, click, and Angle Two will show how to reach the target given head tilt and the tilt and rotation of the manipulator.

The Angle Two includes an alignment kit for the initial setup of three orthogonal axes. Upgrades are available for existing Benchmark™ and most other commercial animal stereotaxic instruments.

Angle Two is well suited to electrophysiology and with a 10 µm resolution it offers superior precision to vernier instruments (typically 100 µm).

With the Angle One researchers have an exceptionally accurate instrument that lets them easily vary the angle of approach.

For precise positioning, Angle One uses the same stereotaxic instrument as the Angle Two with encoders on three linear and two rotational axes. However instead of a computer interface, Angle One uses a touch screen display.

Even though it’s missing the Angle Two’s atlas integration and Virtual Skull Flat, the Angle One’s touch screen still guides researchers to the desired target point from different manipulator angles. This means no pilot studies, no calculations and every surgery can done from a different angle of approach to eliminate the traditional path/position confound.

Just like the Angle Two, researchers using the Angle One can easily vary the angle of approach. It also provides exceptional accuracy with encoders on three linear and two rotational axes it.

The Digital Manipulator with Fine Drive is the cost-effective way to achieve exceptional accuracy.

Its features include fine drive on the DV axis and a superior compression lock on the tilt.

There are three linear encoders on the linear axes. A display counter box shows the relative positions of each axis after zeroing at Bregma.

This instrument’s includes a fine drive with 10 µm resolution on the vertical axis, making it an order of magnitude more precise that traditional 100 µm instruments.

An alignment kit is available separately.

These traditional read-by-eye Vernier Manipulators are a stable, precise and proven solution for affordable small animal surgery.

To use a Vernier Manipulator the operator writes down the reading at the zero point (Bregma), adds or subtracts the target coordinates, then moves along each scale to the calculated result.

Neuroscience Accessories

Leica Microsystems offers a wide range of accessories to address most common needs. Included in the range is the Video Microscope One – used instead of a surgical microscope; the Perfusion One and Perfusion Two sacrifice perfusion instruments; the Impact One for the study of head impact injury; the NanoInjector for injection protocols and Cerebond Skull Fixture Adhesive.

We also offer rodent gas anesthesia equipment, post surgery animal assessment equipment and animal histology equipment.
The Perfusion One and Perfusion Two are used for sacrifice perfusion, or the rapid removal of red blood cells for prompt fixation.

The Perfusion One and Perfusion Two avoid shrinkage and distortion by removing sodium from the extracellular spaces before the fixative arrives. The Perfusion One manual pump sacrifice perfusion apparatus and the Perfusion Two automated sacrifice perfusion apparatus both enable significant improvements in the quality and reproducibility across sizes and species of animals.

References:

Neuroscience Accessories

For injection protocols, Leica Microsystems offers the stepper motor-driven NanoInjector for the precise rate and volume for injections into the brain. The NanoInjector includes an actuator and a controller. The actuator mounts directly on the stereotaxic manipulator. A clamp offset adaptor is included. It holds a Hamilton 700 series syringe (not included). A stepper motor pushes or pulls the plunger at a controlled preset rate and to a specific volume. The stereotaxic instrument is used to position the needle tip from Bregma to the target.

References:

Video Microscope One™

The Video Microscope One can be used instead of a surgical microscope to lessen the intrusion on a manipulator’s movement range, improve accuracy and aid in surgery training. A traditional microscope can get in the way of the manipulator and restricts access to one viewer at a time. In contrast, the Video Microscope One can be positioned anywhere and puts the image on a view screen. The more advanced model can also capture an image for slides or publications. The Video Microscope can help locate Bregma precisely, greatly improving accuracy.

Video Microscope One includes a zoom module to give a full screen view of the entire skull or the 2 mm circle around Bregma or the burr hole.

Impact One™

Impact One, the world’s only impact device that mounts to a stereotaxic manipulator, allows unmatched control during the study of head impact injury. Developed with an SBIR grant, the Impact One makes precisely controlled and positioned impacts on the skull, brain or spinal cord. This facilitates the study of the behavioral or anatomical effects of head impact and neuronal damage. Impact One has a remote actuator that mounts on the stereotaxic manipulator. Settings can be preset for impact velocity, penetration depth and dwell time.

References:

Nanoinjector™

For injection protocols, Leica Microsystems offers the stepper motor-driven NanoInjector for the precise rate and volume for injections into the brain. The NanoInjector includes an actuator and a controller. The actuator mounts directly on the stereotaxic manipulator. A clamp offset adaptor is included. It holds a Hamilton 700 series syringe (not included). A stepper motor pushes or pulls the plunger at a controlled preset rate and to a specific volume. The stereotaxic instrument is used to position the needle tip from Bregma to the target.

Reference: Anorexia Induced by Activation of Serotonin 5-HT4 Receptors is Mediated by Increases in CART in the Nucleus Accumbens. Alexandra Jean, Grégory Conductier, Christine Manrique, Constantin Bouras, Philippe Berta, René Hen, Yves Charnay, Jöll Bockaert and Valérie Compan. PNAS October 9, 2007 vol. 104 no. 41 16335-16340.
The Manual Drill facilitates making burr holes in a skull for probe entry without dipping into the cortex.

The Manual Drill has an outer cylinder affixed to the stereotaxic instrument and an inner cylinder that can move up, down or around without wobble. The drill bit is installed on the inner cylinder which hangs by a stop. The surgeon operates the stereotaxic instrument to lower the bit to the bone, then lets the tip rest on the bone and lowers a preplanned additional amount. The inner cylinder moves up and pushes the stop away from the outer cylinder. When manually rotating the spokes, the drill will cut until the stop is against the outer cylinder. The hole depth is limited to the distance the stereotaxic was moved down following bone contact.

Cerebond™ Manual Drill with Stop

Cerebond Skull Fixture Adhesive is used to cement stainless steel cannulas or acrylic to skull.

Neuroscientist’s occasionally need to affix stainless steel or other fixtures to the skull. A space filling adhesive that adheres to live bone is needed. Commonly, a dental cement of Methyl Methacrylate is used. This has an offensive odor, and cures in five minutes. Cerebong from myNeuroLab.com cures in one minute, adheres even better to live bone, and has no detectable odor. It cures clear and transparent.

Leica Microsystems operates globally in four divisions, where we rank with the market leaders.

- **Life Science Division**

The Leica Microsystems Life Science Division supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement, and analysis of microstructures. Our strong focus on understanding scientific applications puts Leica Microsystems’ customers at the leading edge of science.

- **Industry Division**

The Leica Microsystems Industry Division’s focus is to support customers’ pursuit of the highest quality end result. Leica Microsystems provide the best and most innovative imaging systems to see, measure, and analyze the microstructures in routine and research industrial applications, materials science, quality control, forensic science investigation, and educational applications.

- **Biosystems Division**

The Leica Microsystems Biosystems Division brings histopathology labs and researchers the highest-quality, most comprehensive product range. From patient to pathologist, the range includes the ideal product for each histology step and high-productivity workflow solutions for the entire lab. With complete histology systems featuring innovative automation and Novocastra™ reagents, Leica Microsystems creates better patient care through rapid turnaround, diagnostic confidence, and close customer collaboration.

- **Medical Division**

The Leica Microsystems Medical Division’s focus is to partner with and support surgeons and their care of patients with the highest-quality, most innovative surgical microscope technology today and into the future.

Active worldwide

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and representatives in more than 100 countries