

# Intracerebral Guides for BR Brain Probes

NOT APPROVED FOR USE IN HUMANS! THESE PRODUCTS ARE DESIGNED SOLELY FOR USE IN EXPERIMENTAL ANIMALS.

Revised 02-06

## Introduction

The role of the intracerebral guide is to target an implant site and support a microdialysis probe during *in vivo* sampling experiments in the brain. A guide is commonly used for studies in awake, freely moving animals. Although the microdialysis probe could also be cemented directly to the skull, the use of a guide allows more time for the animal to recover from surgical trauma.

The use of an intracerebral guide offers several benefits:

1. The guide is positioned just above the tissue that will be sampled by the probe and thus “targets” the site.
2. The guide itself does not penetrate the tissue that is eventually sampled by the probe membrane.
3. There is less acute damage to the brain when the probe is inserted. The tissue recovers faster and the microdialysis experiment can begin sooner.
4. The probe is better protected from the animal.

## Usage

When a BR or IBR Microdialysis Probe is placed inside a guide, only the dialysis membrane extends beyond the end of the guide cannula. When the intracerebral guide is implanted, it is placed just above the tissue that will eventually be sampled by microdialysis. After the animal recovers from the surgery (3-5 days), the edema will subside and ruptured blood vessels will have been sealed. Any glial cell formation will be restricted to the tissue disrupted by insertion of the guide and not the target site. The damage caused by insertion of the probe will now be restricted to a very small path that is the length and diameter of the dialysis membrane. This is considerably less trauma for the brain than the damage caused by opening the skull, puncturing the dura, and then inserting the longer and wider intracerebral guide. In many cases, a recovery of targeted analytes will achieve steady state within a few hours. After a sampling experiment, the probe can be removed and the guide can be re-sealed with its stylet. The probe can then be reinserted at a later time.

**In studies which involve comparisons of blood-brain levels, it is wise to allow even more time for the micro vasculature to heal so that there is no opportunity for contamination from tiny, ruptured blood vessels.**

## Features

- Permits insertion and removal of a single BR brain microdialysis probe.
- Once the probe is in place, the guide/probe pair will be completely non-metallic (MD-2250 guides only). This permits magnetic imaging (NMR) during microdialysis.
- Made from biocompatible thermoplastic resins.
- During stereotaxic surgery, guide patency is maintained by a stainless steel stylet. The stylet remains in the guide until it is replaced by a BR probe which uses the same locking-head design.
- The locking mechanism in MD-2250 guides is an O-ring which secures a small notch in the probe head. The O-ring

has sufficient tension to hold the probe in place, but also releases it when the probe head is pulled sufficiently.

- The guide will necessarily raise the probe higher on the head. This feature, together with the lock, makes it more difficult for a rodent to disrupt a probe by normal grooming.
- An alternate guide with a steel lock (MD-2251) is available for users with active animals. The lock is shaped like an Omega and rotates to lock or unlock the same notch in the probe head.

## Procedure

Implantation of intracerebral guides requires two special accessories: the MD-1520 Clamp Assembly and MD-1521 Clamp Rod. The rod will fit on most stereotaxic devices, including ASI models offered by BASi. For other models, please check to make sure the instrument will accommodate the clamp rod, which has a diameter of 7.9 mm (5/16"). Ordering information for the additional accessories mentioned in this procedure are listed on the last page.

1. Attach the clamp assembly to the clamp rod. Tighten the two adjacent screws to secure the clamp.
2. Mount the clamp and rod on the stereotaxic frame.
3. When the implant is complete, the guide's keyway should face the animal's snout. Thus, when a probe is inserted, the outlet tubing will point away from the animal's face, out of the animal's field of vision and reach.  
  
In placing the guide in the clamp, the guide's keyway should point either toward the clamp's open U end or the interior slot, not to the clamp's side. Importantly, this insures that the probe sits squarely in the clamp, with the underside of the head resting flatly on the shelf of the clamp, as illustrated. Which direction the guide faces in the clamp will differ depending on how you orient the clamp relative to the animal's snout.
4. Tighten the front screw to secure the guide in place.
5. Anesthetize and prepare the animal for surgery and position the animal on the stereotaxic frame. 6. Expose the skull. Control excessive bleeding. Drill (MF-5362) small holes for bone screws and insert at least two screws (MF-5182) on adjacent bone plates.
7. Position the guide above the exposed skull, using the coordinate system defined by your stereotaxic atlas. Lower it until it is just above the bone.
8. Mark the planned entry point into the skull and then raise the guide to make room for the drill. 9. Use a sharp trephine drill bit (MF-5176) to cut a clean circle of bone from the skull. Lift the bone circle carefully to expose the dura. 10. Carefully pierce the dura by pricking it with a sharp syringe needle, being careful not to jab it into the brain tissue below.
11. Lower the guide to the depth determined by the stereotaxic coordinates of the targeted tissue.

12. In a small plastic microfuge vial, mix a small amount of the two-part acrylic cement (MD-1300). While still fluid, draw the cement into a disposable syringe or transfer pipette. Begin to dispense cement around the bone anchor screws and into the groove at the base of the guide cannula. While the cement begins to thicken inside the dispenser, keep dispensing it to form a mound around the base of the guide and screws.
13. Allow cement to harden (curing time ~ 10 to 20 min) and repeat step 12 if additional cement is needed to secure the guide.
14. During surgical recovery following guide implantation, the animal should be individually housed in containment without wire grids or descending protrusions upon which the animal might strike or catch the guide.
15. When you are ready to conduct the microdialysis experiment, place a lightweight animal collar (MF-5371) around the animal's neck, leaving room for the animal to breathe but not enough to allow it to escape the collar. An Awake Animal System's tether wire then hooks to the collar during awake animal studies to relay the animal's locomotion to a liquid swivel or the Return's optical sensors. This protects the probe inlet and outlet tubing from twisting.

To insert a microdialysis probe, first remove the stylet. For MD-2250 guides, pull gently on the stylet head in an upward motion. For MD-2251 guides, first rotate the Omega ring until the stylet is unlocked (if oriented as described above, to unlock turn the open end of the ring toward the animal's snout). Carefully insert the prepared BR probe by gently aiming the probe into the guide's lumen until it snaps in place (MD-2250) or bottoms out.

For MD-2251 guides, after the probe has bottomed out, rotate the Omega ring to lock.

### Other Applications

The probe and guide may also be used for other techniques. For example, a microdialysis probe without a membrane can be used as an injector. Ask for BASi part no. MD-2252.

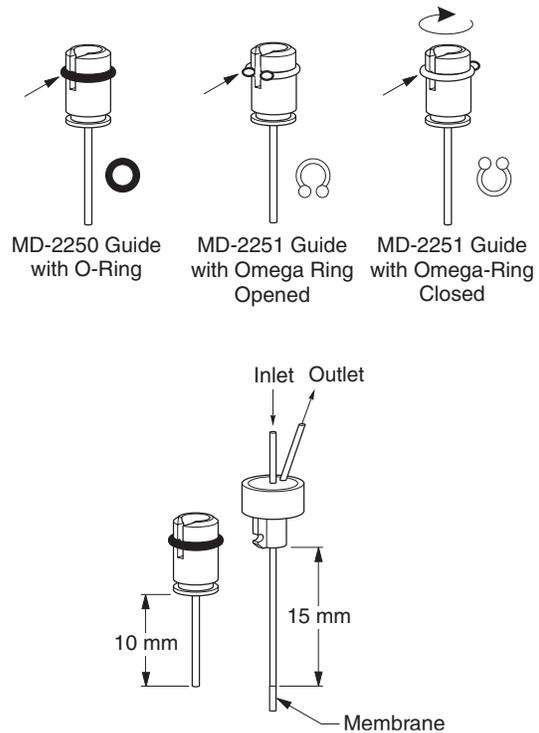
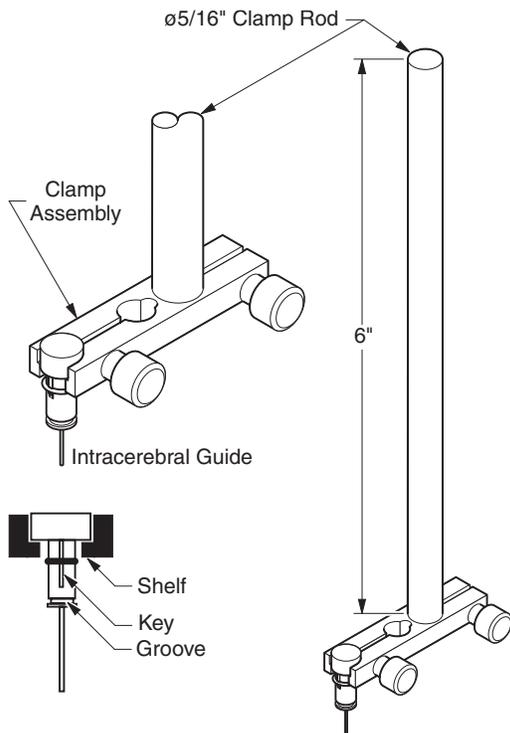
### Ordering Information

MD-2250	Standard Intracerebral Guide Cannula and Stylet with O-Ring, 6/pkg.
MD-2251	Locking Intracerebral Guide Cannula and Stylet with Omega ring, 6/pkg.
MD-1520	Clamp for BR Brain probes
MD-1521	Clamp Rod MD-1522 Calibration Station
MD-1300	Acrylic Cement
MF-5182	Screw Anchors, 100/pkg.
MF-5362	Drill Bits for Screw Anchors, 5/pkg.
MF-5176	Trephine Bone Drills, 3/pkg.
MF-5371	Animal Collars, 100/pkg.
MD-1401	Return Interactive Awake Animal Microdialysis System

### Warranty

Intracerebral guides are warranted to be free from manufacturing defects and viable for a single use. BASi is liable only to the extent of replacement of defective items for claims registered within 90 days of the shipping date. BASi will not be liable for any personal injury, property damage, or consequential damages of any kind whatsoever arising from the use of the guide. This warranty does not cover damage to membranes or cannulas through improper preparation, inappropriate connections or faulty handling by the user. The foregoing warranty is in lieu of all other warranties expressed or implied but not limited to the implied warranties of merchantability and fitness for a particular purpose.

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