Connector Maintenance

The connector of a chronically-implanted array is susceptible to clogging or damage due to animal manipulation, cage debris, and biological fluids. It is recommended that the connector be routinely cleaned using alcohol and air-dried using canned air, which will remove most contaminants and prevent electrical shunting. Routine cleaning is essential to maintaining the highest quality performance and recording during chronic studies. Many labs recommend sealing the connector with a rubber cap or blank male connector, though care must be taken to properly secure these options to prevent unintended removal, such as by using a droplet of hot glue.

Impedance Testing

It is recommended that the impedance values of implanted LMAs be tested routinely, which can diagnose many problems. It is expected that electrode impedances will increase rapidly during the initial two weeks of implantation due to inflammatory response. However, a very large and sudden increase in impedance (typically above 10 MOhm) can indicate a broken electrode or connector, while a sudden decrease in impedance can indicate electrical shunting due to connector contamination. **Microprobes for Life Science** offers a **Multi-Channel Impedance Tester (IMP-2MC)** which can quickly and easily measure the 1 kHz impedance of up to 18 channels. Alternatively, a potentiostat equipped with a multiplexer can be used.

Terms and Conditions

Please inspect the package carefully upon arrival and report any damage to us within 7 days of receipt of the package.

Unused items may be exchanged if items and packaging are undamaged and in good condition. Exchange must be made within 30 days of invoice date and with prior permission from our Customer Service Department.
Please call 301-330-9788 or email support@microprobes.com to request a Return Material Authorization (RMA) number. We do not accepted returns after 90 days from invoice date.

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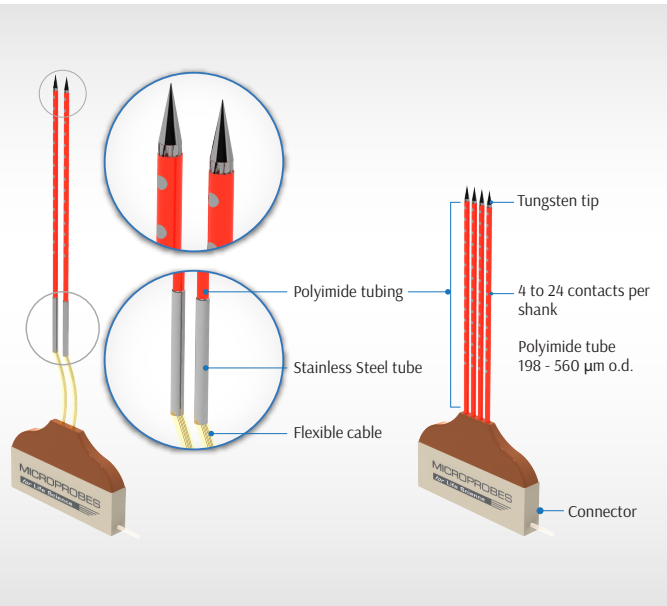
MicroProbes for Life Science

Linear MicroElectrode Array (LMA)

User Instructions



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Introduction

The **Linear Microelectrode Array (LMA)** features a polyimide tube containing a number of microwires, which are arranged in a customizable pattern within the tube to create multiple microelectrode sites along a single shaft. Due to their fragility, special care must be taken during handling and implantation to ensure proper function. Each LMA is visually and electrochemically inspected before shipping, with specifications and impedances provided within the included data sheet.

⚠ *To avoid accidental damage, it is recommended that the LMA be sterilized within its box and not be removed and handled until implantation.*

Sterilization

MLS recommends that gas (EtO) sterilization be used with LMAs. It is recommended that the lid of the LMA box be propped open slightly before insertion into a pouch, to maximize air flow. This is often done by positioning gauze pads between the lip of the box and the lid and gently holding the lid shut with surgical tape, creating a small gap.

⚠ *The sterilizer should be set to long cycle (24 hour) mode, to allow for proper out-gassing of the soft materials in the array.*

Implanting the LMA

⚠ *It is critical that the LMA only ever come into contact with soft tissue, as even light contact with hard surfaces or bone has the strong likelihood of bending the probe or blunting tip. Attempting to implant such an array will likely result in damaged tissue, buckled electrodes, and improper function.*

This manual is intended to provide general guidelines for array implantation into small animal cortex. It is expected that a large degree of variation will exist between labs and procedures with regard to many aspects of the surgery, including anesthesia method, craniotomy preparation, dural sealant and headcap cement selection, and others. Users requesting more detailed guidance or advice are encouraged to contact **Microprobes for Life Science** directly.

Once the animal has been sedated, the skull surface exposed, and the craniotomy cut according to laboratory preference, the array should be carefully removed from the foam support within its plastic container and attached to the headstage connector, taking care not to touch the microelectrodes. The safest way to hold and manipulate the array is by way of a connected headstage (or suitable facsimile, if recording is not performed during implantation).

Many labs recommend that skull screws be put in place before array implantation, as the headstage and manipulator hardware can complicate screw installation.It is critically important in rat that all dura be removed from the implantation site as it may blunt or bend probes, leading to array and tissue damage. Many labs also recommend that a piece of sterile wet gelfoam be used to protect and moisten the exposed cortex until the array is ready for implant.

If it is intended that one of the skull screws serve as a reference electrode for headstage amplification and single-ended mode recording, the ground lead can be twisted around the screw shaft and fixed using silver paint or glue followed by a cement of choice (many use nail acrylic or light-activated dental composite resin).

⚠ *It is critical that the ground screw penetrate completely through the skull and contact the soft tissue underneath.*

Once the site is prepared for implantation, the LMA should be lowered very slowly into the cortex using a micromanipulator. If implanted at a proper speed, the pia should not dimple more than 2 mm. Users have reported success using a step-wise implantation, where they insert a short distance and then wait for the depressed pia to rise up around the LMA before continuing. If recording, it is recommended that the recording system be activated at roughly half the intended depth and neural activity be observed as the array is lowered to the optimal area.

Once the target depth is achieved, the surgeon should seal the craniotomy and create the cement headcap using his or her preferred materials. Once the headcap is completely solid and secure, the headstage can be safely removed from the array and the surgeon can complete the suturing and cleaning procedure.