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**MED64** *An advanced and easy-to-use solution  
for in-vitro Electrophysiology*

*Operating Instructions*

# MED Probe

P/N: MED-P2105, MED-P210A  
MED-P5155, MED-P515A  
MED-P5305, MED-P530A  
MED-P5455, MED-P545A



**ALPHA MED SCIENTIFIC**

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## Features

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The multi-electrode dish (MED) probe is designed for use in electrophysiological studies. Electrical responses from the brain, muscle tissue, or dissociated cells are collected simultaneously from multiple sites on the microelectrode array.

The 64 microelectrodes are arranged in an 8 x 8 array in the center of the probe, and are surrounded by four reference electrodes. Recording of extracellular activity from, and delivery of stimuli to, individual electrodes are made differentially, relative to the reference electrodes.

## Directions for use

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### Cleaning

The MED probe is cleaned prior to shipping. If any dust is present, gently squirt the MED probe with distilled water to remove it.

*Caution: Do not touch the MED probe surface as this may damage the microelectrodes.*

### Sterilization

The MED probe is not sterilized. For sterilization, the following steps should be performed.

1. Soak the MED probe into 70% ethanol for 30 minutes.
2. Allow it to dry in a clean area.
3. Irradiate the probe under ultraviolet light for 30 minutes.

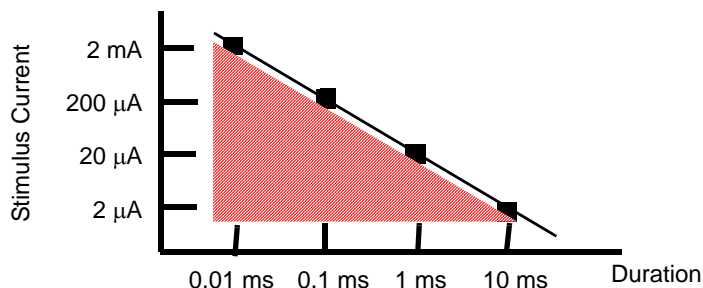
*Caution: Do not autoclave as this may affect the impedance of the microelectrodes.*

### Surface treatment before MED Probe usage

In order to improve cellular adhesion, treat the surface of the MED probe in advance with a coating material (i.e. polylysine, polyornithine, polyethyleneimine, collagen etc.). For details, refer to "Surface treatment before MED Probe usage" on the next page.

### Stimulus current to be applied to electrodes

*Caution: Do NOT use combinations of stimulus current & duration that are outside of the shaded area.*



## Storage

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For unopened probe: Store in a cool dark area.

For opened or used probe:

Store in a high humidity environment to prevent the surface of platinum black electrodes from drying out. Fill a beaker with distilled water and put the MED probe into it. Place the beaker in the refrigerator. Avoid storage for over a month.

*Caution: If stored in high temperature and/or dry environment, the platinum black plated microelectrodes can easily dry out, compromising its impedance.*



The microelectrodes on MED probe are plated with platinum black using a special process that dramatically increases the surface area (2-10x greater than standard plating methods) and reduces the impedance of the electrodes. However, if the platinum black on the microelectrode dries out, recording solution can not percolate through it. It takes a long time for the impedance to recover; recordings are suboptimal during this recovery time.

## **Surface treatment before MED probe usage**

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The surface of the MED Probe is relatively hydrophobic. Therefore, treatment with polyethylenimine (PEI) is necessary for tissue adhesion. This coating process should be done only once to new probes, as repetitive exposure to ACSF and tissue will enhance future slice adhesion.

### **PEI coating**

1. Treat the surface of the MED probe with 0.1% PEI in 25 mM borate buffer, pH 8.4, for overnight at room temperature.
2. Rinse three times with sterile distilled water.

\* Polyethylenimine (PEI): SIGMA P3143 (50% aqueous solution)

### **Collagen gel coating**

All steps should be carried out aseptically for culture preparation. This process should be done at least 8 hrs before placing tissues or cells on the probe.

1. Sterilize the MED probe with 70% ethanol (DO NOT AUTOCLAVE).
2. Dry the MED probe in a clean area and further sterilize it with UV radiation for 15 min.
3. Place the MED probe in a refrigerator for at least 1 hr.
4. Take the MED probe out of the refrigerator and add the collagen solution (see below) to completely covers the microelectrodes and the probe surface. Immediately remove the collagen solution with a glass pipette. The collagen solution can be used for the coating other probes.
5. Incubate the MED probe in a CO<sub>2</sub> incubator for 30 min for collagen to form a gel matrix.
6. Rinse the MED probe three times with sterile distilled water.
7. Pour culture medium into the probe and keep it in a CO<sub>2</sub> incubator until use (can be stored up to one week).

### **(Collagen solution preparation)**

All steps should be carried out aseptically at 4 °C

1. Add 1 ml of 10x DMEM/F-12 medium to 8 ml of collagen gel solution (Nitta Gelatin, Inc.; Cellmatrix Type I-A, 3.0 mg/ml in 0.01 N Hydrochloric acid, pH 3.0) and stir gently.
2. Add 1 ml of preparation buffer (200 mM HEPES in 0.08 N NaOH) to mixture and stir gently.
3. Place the mixture in a refrigerator for 30 min, to remove bubbles (if necessary).

## **Warranty**

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180 days from the date of original purchase only for exchange of unused defective product.

# Specifications

|                     |   |                  |   |
|---------------------|---|------------------|---|
| Grass Substrate     |   | Microelectrode   |   |
| Substrate           | glass (50 x 50 x 0.7 mm)                                      | Material         | ITO + Platinum Black  |
| Cylinder            | glass (OD: 25 mm, ID: 22 mm)                                  | Number           | 64  |
| Conducting layer    | Indium tin oxide (ITO; 0.15 $\mu\text{m}$ )                   | Size             | 50 x 50 $\mu\text{m}$ (MED-P5###)<br>20 x 20 $\mu\text{m}$ (MED-P210#)                              |
| Insulation layer    | Polyacrylamide (1.5 $\mu\text{m}$ )                           | Impedance        | < 22 k $\Omega$ (MED-P5###)<br>< 30 k $\Omega$ (MED-P210#)<br>(1kHz, 50 mV applied sinusoidal wave) |
| Dimension           | 50 x 50 x 5.7 mm (MED-P###5)<br>50 x 50 x 10.7 mm (MED-P###A) | Stimulus voltage | < 1V  |
| Reference electrode |   | Stimulus current | < 200 $\mu\text{A}$ , 0.1 msec (refer to graph)   |
| Material            | ITO + Platinum Black  |                  |   |
| Number              | 4   |                  |   |
| Size                | 200 x 200 $\mu\text{m}$                                       |                  |   |
| Impedance           | < 2.2 k $\Omega$<br>(1kHz, 50mV applied sinusoidal wave)      |                  |   |

-- Square array --

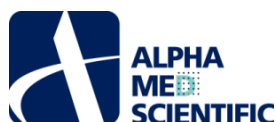
| Product number | Chamber depth | Electrode size        | Interpolar distance of electrodes |           |
|----------------|---------------|-----------------------|-----------------------------------|-----------|
|                |               |                       | Recording/Stimulating             | Reference |
| MED-P2105      | 5 mm          | 20 x 20 $\mu\text{m}$ | 100 $\mu\text{m}$                 | 8.5 mm    |
| MED-P210A      | 10 mm         | 20 x 20 $\mu\text{m}$ | 100 $\mu\text{m}$                 | 8.5 mm    |
| MED-P5155      | 5 mm          | 50 x 50 $\mu\text{m}$ | 150 $\mu\text{m}$                 | 8.5 mm    |
| MED-P515A      | 10 mm         | 50 x 50 $\mu\text{m}$ | 150 $\mu\text{m}$                 | 8.5 mm    |
| MED-P5305      | 5 mm          | 50 x 50 $\mu\text{m}$ | 300 $\mu\text{m}$                 | 9.2 mm    |
| MED-P530A      | 10 mm         | 50 x 50 $\mu\text{m}$ | 300 $\mu\text{m}$                 | 9.2 mm    |
| MED-P5455      | 5 mm          | 50 x 50 $\mu\text{m}$ | 450 $\mu\text{m}$                 | 10.2 mm   |
| MED-P545A      | 10 mm         | 50 x 50 $\mu\text{m}$ | 450 $\mu\text{m}$                 | 10.2 mm   |

*Specifications may not be satisfied depending upon the type of computer or operating environments used. Only for use in animal studies research.*

*Specifications and external appearance are subject to change without notice.*

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*Information in this document is subject to change without notice.*



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