

Materials List for:

Impedance Pneumography for Minimally Invasive Measurement of Heart Rate in Late Stage Invertebrates

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Materials

Name	Company	Catalog Number	Comments
1.6 mm (1/16 in) drill bit	Milwaukee Tool at Home Depot	1001294900	This is for a 1.6 mm (1/16 in) diameter drill bit. This item can be found at most home-improvement stores.
38 AWG Copper Magnet Wire	TEMCo	MW0093	This wire is used to make the wire electrode leads that are implanted into the test subjects. This listing is for a 4 oz coil of 38-gauge magnetic wire. TemCo also has 36-gauge magnetic wire that is also suitable for use in constructing wire electrodes.
Cyanoacrylate glue	Loctite	852882	This item includes a brush tip, which makes it easier to control the amount of glue used to secure electrodes to the carapace.
Ethanol, 70% Solution, Molecular Biology Grade	Fisher BioReagents	BP82931GAL	This reagent is used in combination with the sterile cotton balls to disinfect the carapace prior to electrode implantation.
Excel	Microsoft	N/A	This program is used in the protocol for organizing, manipulating, and analyzing data. It is compatible with both PC and Mac operating systems.
Fisherbrand 8-Piece Dissection Kit	Fisher Scientific	08-855	This kit includes the forceps, scissors, dissecting knife (and blades), and dissecting needle needed to accomplish the electrode implantation steps in the protocol.
Fisherbrand Isotemp Refrigerated/Heated Bath Circulators: 5.4-6.5L, 115V/60Hz	Fisher Scientific	13-874-180	This is a complete system that consists of an immersion circulator and a bath. It can be used as a temperature controlled bath or to circulate fluid externally to an application. Temperature range of this water bath is -20 to +100 °C, and the unit heats/cool rapidly and is easy to drain upon conclusion of use.
Fisherbrand Sterile Cotton Balls	Fisher Scientific	22-456-885	These swabs should be soaked in 70% ethanol before being used to disinfect the carapace prior to electrode implantation.

Fork Terminal, Red Vinyl, Butted Seam, 22 to 16 AWG, 100 PK	Grainger	5WHE6	Terminals are soldered to the magnetic wire to construct the wire electrodes. These can be purchased from a variety of home-improvement vendors.
Impedance converter	UFI	Model 2991	Measures impedance changes correlated with very small voltage changes, ranging from 0.2 ohm to over 5 ohms. This model can convert impedance changes that stem from resistance, capacitance, or inductance variations, as well as a combination of all three.
LabChart software	ADInstruments	N/A	Purchase of the PowerLab datalogger includes the LabChart software, but a license for the software can also be directly downloaded online. LabChart allows the user to record data, open and read LabChart files, analyze data, as well as save and export files. There is a free version of the software, LabChart Reader, but users can only open and read LabChart files and analyze them (i.e., it cannot be used to record, save, or export data files). One also has the option of selecting LabChart Pro, which includes LabChart teaching modules that can be used for educational purposes.
LED Soldering Iron	Grainger	28EA35	This is a generic soldering iron that can be used to solder the magnetic wire to the fork terminals to create the wire electrodes.
PowerLab datalogger	ADInstruments	ML826	There are a variety of models of the PowerLab. This catalog number is for the 2/26 model that is a 2 channel, 16 bit resolution recorder with two analog input channels, independently selectable input sensitivities, two independent analog outputs for stimulation or pulse generation and a trigger input. The PowerLab features a wide range of low-pass filters, AC or DC coupling and adaptive mains filter. This unit has a USB interface for connection to Windows or Mac OS computers and a sampling rate of 100,000 samples/s per channel.
Prism8	GraphPad	N/A	This program provides an additional option for calculating the Arrhenius Break Temperature through its "Segmental linear regression" data analysis option. This program does not require any programming and is compatible with both Mac and Windows operating systems.
R	R Project	N/A	This is free software for statistical computing that is compatible with UNIX platforms, as well as Windows and Mac operating systems. This program can also

			be used to calculate the Arrhenius Break Temperature using the “segmented” package. There are a number of tutorials and user guides available online through the r-project.org website.
Rosin Core Solder	Grainger	331856	This product has a diameter of 0.031 in (0.76 mm) and is ideal for use in soldering speaker wire (similar gauge as magnetic wire used for electrodes).
SAS	SAS Institute	N/A	This program provides an additional option for calculating the Arrhenius Break Temperature. However, it does require programming and is not compatible with Mac operating systems.
SigmaPlot	Systat Software, Inc.	N/A	This is the authors' preferred program for statistical determination of the Arrhenius Break Temperature. The “Regression Wizard” is easy to use and does not require any programming. One can obtain a free 30-day trial license before purchase. However, it is compatible only with PC computers.
T-type Pod	ADInstruments	ML312	Suitable for measurement of temperatures from 0-50 °C using T-type thermocouples.
T-type Thermocouple Probe	ADInstruments	MLT1401	Compatible with the T-type Pod for connection. Measures temperature up to 150 °C, and is suitable for immersion in various solutions, semi-solids, and tissue (includes a needle for implantation). This product is a 0.6 mm diameter isolated probe that is sheathed in chemical-resistant Teflon and a lead length of 1.0 m.
UV Cable Tie, Black	Home Depot	295813	This is for a 100-pack of 8-inch (20.32 cm), black cable ties. However, based on the size of test subjects, smaller or larger cable ties may be needed. This item, and others like it, can be purchased at any home-improvement store.