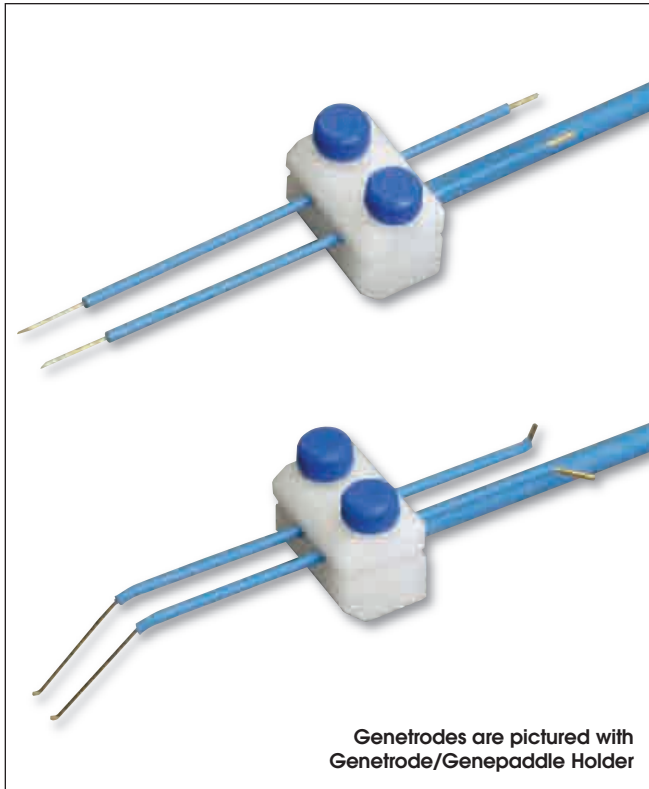


Genetrodes™

In Vivo, Ex Vivo & In Ovo Electroporation



Genetrodes are pictured with Genetrode/Genepaddle Holder

Applications

- In Vivo Gene Delivery
- Ex Vivo Gene Delivery
- In Ovo Gene Delivery

BTX Genetrodes are paired, reusable, needle-style or L-shaped type electrodes that are ideal for in vivo and in ovo electroporation applications, including drug and gene delivery. Genetrodes come in five models to suit the size and shape of the target electroporation area. Each model consists of a pair of electrodes configured as either straight or bent L-shaped electrodes with gold tips.

The Electrodes are placed into target tissue following injection of the molecule of interest. An electroporation pulse is then delivered using a BTX Generator. The electric field introduced by the Genetrodes causes transient pores to form in the cells of the tissue, allowing uptake of the molecules into cells. Genetrodes are positioned in parallel at a predetermined gap in tissue using the Genetrode/Genepaddle Holder.

Specifications

Generator Compatibility	ECM 830, ECM 2001
Voltage Range	0 – 200 V DC
Pulse Length Range	10 μ sec – 99 msec
Diameter	Electrode tip 0.5 mm
Genetrode Holder:	
Electrode Gap	1 – 10 mm range
Life Span	Approximately 1500+ pulses

Genetrodes*

Item #	Tip Size	Shape
45-0113*	5 mm	Straight
45-0114*	10 mm	Straight
45-0115*	5 mm	L-Shapped
45-0116*	3 mm	L-Shapped
45-0117*	1 mm	L-Shapped

Genetrode Kits**

Item #	Tip Size	Shape
45-0160**	5 mm	Straight
45-0161**	10 mm	Straight
45-0162**	5 mm	L-Shapped
45-0163**	3 mm	L-Shapped
45-0164**	1 mm	L-Shapped

Genetrode Accessories

Item #	Description
45-0203	Genetrode/Genepaddle Holder (Model 515)
45-0216	Connection Cable, Micrograbber to Banana Plug Cable
45-0217	Banana to Banana Plug, 10ft.
45-0089	Adapter Set Banana to Square Post
45-0087	Adapter Micrograbber for ECM 2001

* Requires 45-0203 Genetrodes/Genepaddle Holder and 45-0216 Connection Cable

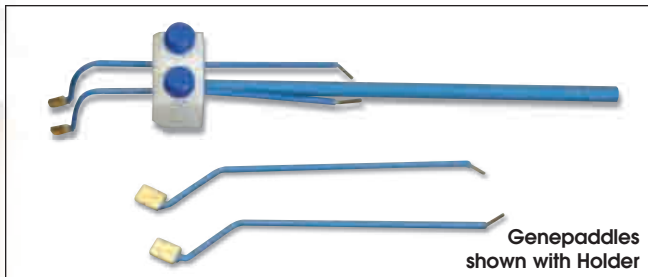
** Kit Includes Genetrode Electrode, 45-0203 Genetrodes/Genepaddle Holder and 45-0216 Connection Cable

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Genepaddles™

In Vitro Embryo &
In Vivo Gene Delivery



Genepaddles
shown with Holder

Applications

- In Vivo Gene Delivery
- Ex Vivo Gene Delivery

BTX Genepaddles are designed for in vivo applications such as Gene Delivery in mouse embryo. Genepaddles are non-invasive, paddle-style, reusable electrodes suitable for a variety of applications. These electrodes are gold plated and are available in two models, each model consisting of a pair of electrodes. The electrodes are placed anterior and posterior to the embryo following injection of the molecule of interest, and then an electroporation pulse is delivered using a BTX Generator. The Genepaddles may be positioned in parallel at a predetermined gap in tissue using the Genetrode/Genepaddle Holder.

Specifications

Generator Compatibility	ECM 830, ECM 2001
Voltage Range	0 – 200 V DC (Do not use AC)
Pulse Length Range	10 µsec – 99 msec
Paddle Configuration	Rectangular, 1 mm thick
Gold Plating Thickness	0.04 mm
Genetrode Holder	Electrode gap 1 – 10 mm range, life span (depending on care) approximately 200+ sets of pulses

Genepaddle Electrodes

Item #	Paddle Size
45-0122*	3 x 5 mm
45-0123*	5 x 7 mm

Genepaddle Kits

Item #	Paddle Size
45-0169**	3 x 5 mm
45-0170**	5 x 7 mm

Genetrode Accessories

Item #	Description
45-0203	Genetrode/Genepaddle Holder (Model 515)
45-0216	Connection Cable, Micrograbber to Banana Plug Cable
45-0216	Connection Cable, Micrograbber to Banana Plug Cable
45-0217	Banana to Banana Plug, 10ft.
45-0089	Adapter Set Banana to Square Post
45-0088	Adapter Set F/F Banana to Square Splice
45-0087	Adapter Micrograbber

* Requires 45-0203 Genetrodes/Genepaddle Holder and 45-0216 Connection Cable

** Kit Includes Genepaddle Electrode, 45-0203 Genetrodes/Genepaddle Holder and 45-0216 Connection Cable

Tweezertrodes™

In Vivo Drug/Gene
Delivery



Applications

- In Vivo Drug or Gene Delivery
- Ex Vivo Drug or Gene Delivery
- In Utero Drug or Gene Delivery

The Tweezertrodes™ are reusable, tweezer style electrodes for in vivo, and in utero drug or gene delivery. Tweezertrodes™ consist of a standard 12 cm tweezer that has been modified with stainless steel or platinum circular electrodes at the tip. The gap between the electrode disks may be adjusted from under 1 mm to over 2 cm. Stainless Steel Tweezertrodes are available in two sizes 10 mm and 7 mm diameters. Our **NEW!** Platinum Tweezertrodes™ are available in 7 mm, 5 mm, 3 mm and 1 mm diameters. These electrodes are connected to an electroporator with the Model 524 Connection Cable, and are compatible with the BTX ECM® 830 and ECM® 2001.

Specifications

Generator Compatibility	ECM 830, ECM 2001
Voltage Range	0 – 200 V
Pulse Length Range	10 µsec – 99 msec
Monitoring	Enhancer 3000 Recommended
Autoclave	No

Platinum & Stainless Steel Tweezertrodes™

Item #	Description
45-0118*	Stainless Steel Tweezertrode Electrode, 7 mm Diameter, no Cables (Model 520)
45-0165	Stainless Steel Tweezertrode Kit, 7mm, Includes Cable (Model 520KIT)
45-0119*	Stainless Steel Tweezertrode Electrode, 10 mm Diameter, no Cables (Model 522)
45-0166	Stainless Steel Tweezertrode Kit, 10 mm, Includes Cable
45-0486	Platinum Tweezertrode, 1 mm Diameter, Includes Cables
45-0487	Platinum Tweezertrode, 3 mm Diameter, Includes Cables
45-0489	Platinum Tweezertrode, 5 mm Diameter, Includes Cables
45-0488	Platinum Tweezertrode, 7 mm Diameter, Includes Cables
45-0204	Tweezertrode Cables (Model 524)

* Needs cable 45-0204 to connect to generator

2-Needle Array™

In Vivo Muscle Gene Therapy



Applications

- In Vivo Drug or Gene Delivery
- Muscle Gene Therapy

The BTX 2-Needle Array Electrodes are needle-style electrodes designed for in vivo drug or gene delivery applications. The electrode is available in two gap sizes, 5 mm and 10 mm. The 5 mm 2-Needle Array and Handle is recommended for small muscle masses such as mouse tibialis. The 10 mm 2-Needle Array and Handle is recommended for larger muscle masses such as rat gastrocnemius. Among the non-viral techniques for in vivo gene transfer, the direct injection of plasmid DNA into muscle is simple, inexpensive and safe.

These Electrodes are supplied in a convenient kit that includes one 2-Needle Array Handle and six 2-Needle Arrays. Components may also be purchased separately.

Specifications

Generator Compatibility	ECM 830, ECM 2001
Voltage Range	0 – 500 V
Pulse Length Range	10 µsec – 99 msec
Handle Length	8 cm (3.2 in)
Handle Material	Delrin
Needle Length	20 mm
Needle Material	Stainless Steel

2-Needle Array™ Electrode Kits

Item #	Gap Size	Handle	2-Needle Array
45-0168*	5 mm	1 each	Package 6, 5 mm gap
45-0167*	10 mm	1 each	Package 6, 10 mm gap

2-Needle Array™ Electrodes, pkg. of 6

Item #	Gap Size	Package	Sterile
45-0121**	5 mm	pkg 6	Yes
45-0120**	10 mm	pkg 6	Yes

2-Needle Array Handles Only

Item #	For Gap Size	Quantity
45-0206	5 mm	1 each
45-0205	10 mm	1 each

* Kit Includes 2-Needle Array Electrode and Handle with Cable

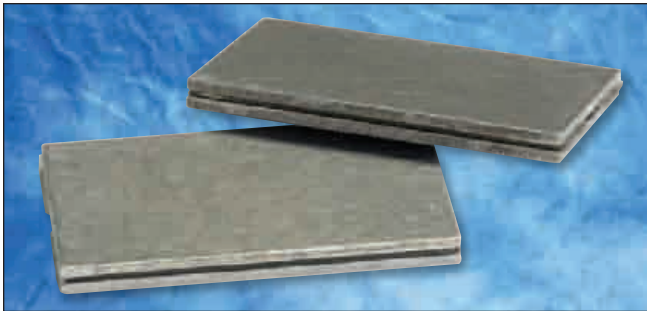
** Requires 2-Needle Array Handle with Cable

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Flatpack Chambers



Applications

- Bacterial Transformation
- Yeast Transformation
- Stem Cell Transfection

Flatpack Chambers are primarily used for prokaryotic applications; however they are used often for high efficiency stem cell transfection as well. The one of a kind flow-through construction of the 0.56 mm gap has a volume capacity from 10 to 85 μ l. This design provides the unique combination of small sample volumes with field strengths as high as 40 kV/cm. The Flatpack Chamber 1.83 mm has a three-ply solid sandwich construction of stainless steel and mylar plastic holds a volume of 1.5 ml, ideal for stems cells. Flatpack chambers are gamma sterilized in individual packages. They are provided in sets of 50 and may be used in the Safety Stand.

Specifications

Generator Compatibility ECM 830, ECM 2001 and ECM 630

Flatpack Chambers

Item #	Gap Size	Package	Volume
45-0109	1.83 mm	50 each	1.5 ml
45-0110	0.56 mm	50 each	80 μ l

Flat Electrode for Cell Fusion



Applications

- Cell Fusion
- Hybridoma Production
- Plant Protoplast Fusion
- Mammalian Cell Transfection

The Flat Electrode can be used for both electroporation and electro cell fusion. The Flat Electrode generates either a divergent or homogeneous field depending on the orientation of the grooved electrodes.

The Flat Electrode can be oriented with the grooved sides of the electrode facing one another to generate a divergent field for use in electro cell fusion. Alternatively, it can be oriented with the flat sides facing each other providing a homogeneous field for electroporation.

The Electrode is made of two rectangular, parallel plates of high grade stainless steel that are press-fitted into a polysulfone base.

Specifications

Generator Compatibility ECM 830 and ECM 2001
Field Type Divergent or Homogeneous
Autoclavable No

Flat Electrode*

Item #	Gap	Package	Volume
45-0108*	1 mm	1 each	0.5 ml

Cable

Item #	Description
45-0217	Electrode Connection Cable, Banana to Banana, 10ft.

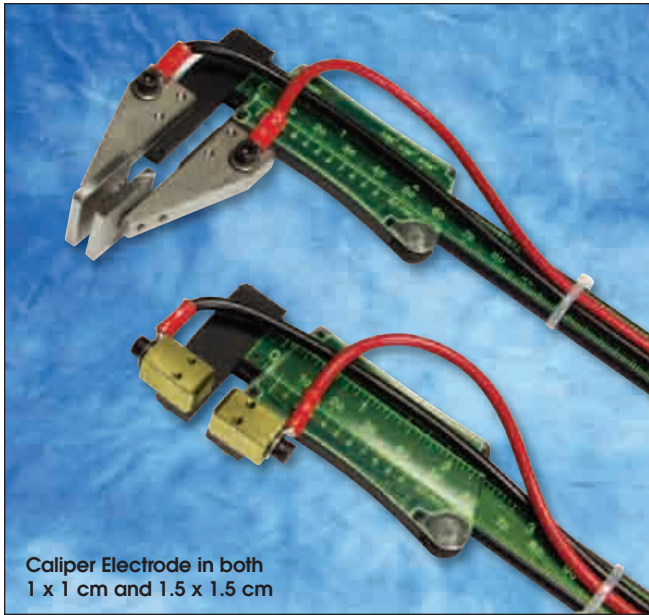
* Requires 45-0217 Connection Cable

accessories

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Caliper Electrodes

In Vivo Transdermal/Muscle Gene and Drug Delivery



Specifications

Generator Compatibility	ECM 830, ECM 2001
Voltage Range	0 – 500 V (depending on electrode gap)
Pulse Length Range	10 μ sec – 99 msec (multiple pulsing permitted)
Electrode Gap	0.1 to 13 cm
Electrode Dimensions	1 x 1 cm brass or 1.5 x 1.5 cm and 2 x 2 cm stainless steel

Caliper Electrodes

Item #	Plate Dimensions	Material
45-0101	1 x 1 cm	Brass
45-0102	1.5 x 1.5 cm and 2 x 2 cm	Stainless Steel

Applications

- In Vivo Drug or Gene Delivery
- Transdermal Applications
- Intact Plant Applications

BTX Caliper Electrodes are reusable, caliper-style electrodes used for a variety of in vivo applications such as drug or gene delivery into muscle tissue, skin and whole organs. Caliper Electrodes consist of a caliper and a pair of plate electrodes.

Two models are available. The 45-0101 Calipers have 1 x 1 cm brass electrode plates and are used for smaller animals. The 45-0102 Calipers are supplied with two pairs of stainless steel electrode plates, 1.5 x 1.5 cm and 2 x 2 cm, and are used for larger surface areas. The Electrode plates on the caliper may be adjusted by using the roller mounted on the caliper.

The Electrodes clasp the target tissue area following injection of the molecule of interest. Electroporation pulses are then delivered using a BTX 830 or 2001 Generator. The electric field introduced by the Caliper Electrodes causes transient pores to form in the cells of the tissue, allowing uptake of the molecules into cells.

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Petri Pulser™



Applications

- Mammalian Cell Transfections, Gene Therapy, Protein or Drug Delivery
- Plant/Yeast Applications

The Petri Pulser is designed for the electroporation of adherent cells in situ or as an alternative to cuvette electroporation for larger cell suspension volumes. The electroporation of adherent cells avoids the need for chemical dissociation of cells and eliminates the problems associated with low plating efficiencies following electroporation, interruption of cell cycles and intercellular communications.

To perform electroporation, simply add the exogenous molecule of interest into the electroporation buffer. The buffer can range in volume from 1.0 ml to 3.0 ml and is added to the cells grown in the plate. The electrode is lowered into the well plate containing the sample and then pulsed.

The Petri Pulser is designed to be reusable and fits into a single well of a 6-well plate or in an individual 35 mm dish. It consists of 13 gold plated electrodes spaced 2 mm apart. The Petri Pulser can be used with most BTX Generators.

Specifications

Generator Compatibility	ECM 830, ECM 630, ECM 399 and ECM 2001
Pulse Length Range	1 µsec – 35 msec
Voltage Range	0 – 300 V
Volume Range	0.5 – 3.0 mls
Autoclavable	No
Field Type	Homogeneous
Gap Size	2 mm

Petri Pulser Electrode

Item #	Description	Volume	Electrode Material
45-0130	Petri Pulser, 2 mm gap for 6-well or 35 mm Petri Dish (Model PP35-2P)	0.5 – 3.0 ml	Gold plated

Petri Dish Electrode



Applications

- Adherent Mammalian Cell Transfections
- Plant Tissue Cell Transfections

The Petri Dish Electrode is designed to be used with a 100 mm petri dish that functions as the electroporation chamber. The Petri Dish Electrode is used to electroporate adherent cells or tissue grown in a petri dish.

To perform electroporation, simply add the exogenous molecule of interest into the electroporation buffer. The buffer can range in volume from 10 ml to 50 ml and is added to the cells grown in the plate. The electrode is lowered into the petri dish containing the sample and pulsed.

The electrode assembly has a 2 mm gap size. It contains parallel stainless steel electrodes which generate a homogeneous field. The Petri Dish Electrode is compatible with most BTX Generators.

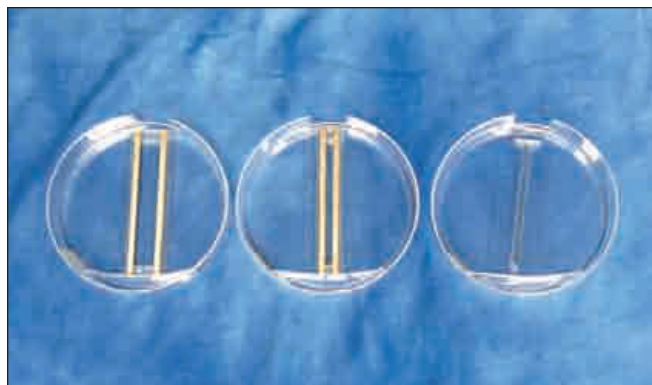
Specifications

Generator Compatibility	ECM 830, ECM 630 and ECM 2001
Voltage Range	0 – 2000 V
Volume Range	10 – 50 ml
Gap Size	2 mm
Autoclavable	No
Field Type	Homogeneous
Pulse Length	10 µsec – 10 msec

Petri Dish Electrode

Item #	Description
45-0100	Petri Dish Electrode, 2 mm Gap, for 100 mm Petri Dish (Model 366)

Microslides



Applications

- Hybridoma Production
- Cell Fusion
- Nuclear Transfer
- Embryo Manipulation
- Plant Protoplast Fusion
- Oocyte Transfections

BTX Microslides are used for cell fusion, plant protoplast fusion and embryo manipulation applications. They are available in 4 gap sizes, 0.5, 1.0, 3.2 and 10 mm. The 0.5 and 1.0 mm microslides produce a divergent field of energy ideal for efficient embryo fusion. While the 3.2 and 10 mm slides provide a homogenous field for high fusion rates of hybridoma cells. The Microslides are designed to easily fit on a microscope stage to allow easy observation of the alignment of cells during electrofusion.

The Microslides are composed of a glass slide and two strips of stainless steel (wire or bar) set in a plastic petri dish.

Specifications

Generator Compatibility	ECM 830 and ECM 2001
Field Type:	
45-0103 & 45-0104	Divergent
45-0105 & 45-0106	Homogeneous
Max Voltage	500 V
Autoclavable	No

Microslides

Item #	Description
45-0103*†	Microslide*, 0.5 mm Gap, 20 µl, pkg. of 10* (Model 450)
45-0104*†	Microslide*, 1.0 mm Gap, 40 µl, pkg. of 10* (Model 450-1)
45-0105*†	Microslide*, 3.2 mm Gap, 650 µl, pkg. of 1* (Model 453)
45-0106*†	Microslide*, 10 mm Gap, 2.0 ml, pkg. of 1* (Model 453-10)
45-0216	Connection Cable, Micrograbber to Banana Plug Cable

* Requires 45-0216 Micrograbber to Banana Plug Cable for connect on 830

† Requires 45-0087 Adapter Set to connect with 450216 when connecting to EMC 2001

Meander Fusion Chamber



Applications

- Cell Fusion
- Plant Protoplast Fusion

The BTX Meander Fusion Chamber is a novel microslide design which is specifically used for electro cell fusion. The Meander Fusion Chamber generates a divergent field and is used for fusion of mammalian cells, plant, yeast, fungi and microorganisms.

This specialty electrode is constructed of a conductive metal alloy. It has two primary bars that are connected by many tiny fingerlike projections. These projections are spaced 0.2 mm apart. This electrode is mounted on a glass slide. It is designed for direct viewing of dimer formation during alignment while under a microscope.

Specifications

Generator Compatibility	ECM 2001
Field Type	Divergent
Max Voltage:	
AC	16 V (0 – peak)
DC	480 V
Gap Size	0.2 mm
Autoclavable	No

Meander Fusion Chamber

Item #	Description
45-0107*†	Meander Fusion Chamber*, 0.2 mm Gap*, pkg. of 4 (Model 454)

* Requires 45-0216 Micrograbber to Banana Plug Cable

† Requires 45-0087 Adapter Set for Connection to EMC 2001
(See page 43 for cables and cable description)

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Platinum Needle L-Shaped Electrode



Specifications

Generator Compatibility	ECM 830, ECM 2001
Voltage Range	0-100 Volts
Pulse Length Range	10 μ sec to 100 msec
Needle Lengths	3 mm
Electrode Length	3 mm
Electrode Material	Platinum

Platinum Needle L-Shaped Electrode

Item #	Description
45-0510*	Platinum Needle L-Shaped Electrode Kit, 3 mm, Includes Cables
45-0509*†	Platinum Needle L-Shaped Electrode, 3 mm, Needle Electrode Only
45-0508	Micrograbber Adapter for Needle Electrode
45-0204	Banana Adapter Cables

* Requires 45-0508 and 45-0204 to Banana Adapter

† Also requires 45-0088 Adapter Set, female to female for ECM 2001

Applications

- Ex-Vivo Tissues Gene or Drug Delivery
- In Vivo Tissues Gene or Drug Delivery
- Nuclear Transfer

These **NEW!** needle style platinum electrodes are specifically designed for in vivo applications on the most fragile of tissue types, such as brain tissue. In vivo transfection of delicate brain tissue can be difficult to perform without damage to the tissue. The ultra thin electrode enables pinpoint transfection for greater ease and efficiency in fragile or in accessible tissue. These electrodes are ideal for delivering the electrical pulses directly to oocytes or embryos for nuclear transfer fusion applications. Our L-shaped electrodes are available in 3 mm tip length in order to accommodate the most research needs in small animal models.

To order these products, please contact BTX at **800-272-2775** (US) or **508-893-8999** (outside the US) or techsupport.btx@harvardapparatus.com or visit www.btxonline.com to get complete list of distributors in your area.

Petri Dish Platinum Electrode for Tissues



Specifications

Generator Compatibility	ECM 830, ECM 2001						
Voltage Range	0-200 Volts						
Pulse Length Range	10 μ sec to 100 msec						
Dimensions:							
Chamber 5mm:	<table border="0"> <tr> <td>Length</td> <td>8 mm</td> </tr> <tr> <td>Width</td> <td>5 mm</td> </tr> <tr> <td>Depth</td> <td>3 mm</td> </tr> </table>	Length	8 mm	Width	5 mm	Depth	3 mm
Length	8 mm						
Width	5 mm						
Depth	3 mm						
Chamber 15mm:	<table border="0"> <tr> <td>Length</td> <td>10 mm</td> </tr> <tr> <td>Width</td> <td>15 mm</td> </tr> <tr> <td>Depth</td> <td>5 mm</td> </tr> </table>	Length	10 mm	Width	15 mm	Depth	5 mm
Length	10 mm						
Width	15 mm						
Depth	5 mm						

Petri Dish Platinum Electrode for Tissues Kits

Item #	Description
45-0505	Petri Dish Platinum Electrode for Tissue Chamber Kit, 5 mm Includes Glass Petri Dish with Tissue Chamber 5 mm, Glass Petri Lid and Micrograbber Cables*
45-0507	Petri Dish Platinum Electrode for Tissue Chamber Kit, 15 mm Includes Glass Petri Dish with Tissue Chamber 15 mm, Glass Petri Lid and Micrograbber Cables*

Petri Dish Platinum Tissue Chamber

Item #	Description
45-0504*	Petri Dish Platinum Electrode, Chamber Only, 5 mm gap
45-0506*	Petri Dish Platinum Electrode, Chamber Only, 15 mm gap

Cables

Item #	Description
45-0216*	Micrograbber Cables (positive and negative)

* Cables required are not included

Applications

• Ex-Vivo Tissues Gene or Drug Delivery

This **NEW!** tissue chamber is specifically designed to handle ex-vivo tissue samples that are either larger than normal or have a unique shape making it difficult to transfect using other standard electrodes. Transfection of ex-vivo tissue samples is an efficient method to deliver genes and drugs to a wide range of tissue types including cornea, muscle and skin. With the use of this chamber, transfection is made simple and easy. The chambers are available in two widths; 15mm and 5mm to accommodate many tissue sample sizes. The reusable chamber is made of a lab grade Pyrex glass petri dish and two platinum electrodes embedded in an inert silicone, creating the rectangular chamber that provides a homogeneous field of energy for high efficiencies.

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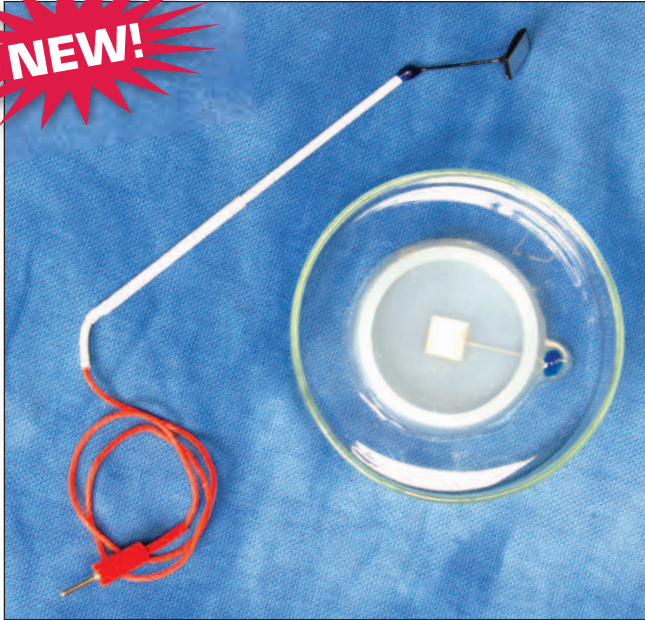
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accessories



Petri Dish Platinum Electrode for Tissue Slices

NEW!



Applications

• Ex-Vivo Tissues Gene or Drug Delivery

This **NEW!** electrode is designed for delicate and/or difficult tissue transfection. Ex vivo electroporation is an efficient, effective method to introduce genes, drugs or any number of molecules into a tissue. A common application is mouse brain slice for studying neuronal development. This specialty electrode makes transfection quick and simple and is compatible with the BTX ECM 830 and ECM 2001 generators.

The electrode is comprised of two parts, the petri dish and wand. The petri dish contains a platinum electrode chamber to secure the tissue. The wand incorporates an identical shaped platinum electrode, which is placed over the chamber to complete electroporation. This sandwich configuration ensures a homogeneous field of energy for optimum transfection.

Specifications

Generator Compatibility	ECM 830, ECM 2001	
Voltage Range	0-100 Volts	
Pulse Length Range	10 µsec to 100 msec	
Chamber Depth	1 mm	
Electrode Material	Platinum	
Wand Material	Platinum	
Dimensions:		
Dish Electrode:	10 mm 7 mm	10 mm x 10 mm x 1 mm 7 mm x 7 mm x 1 mm
Wand Electrode:	10 mm 7 mm	10 mm x 10 mm 7 mm x 7 mm

Petri Dish Platinum Electrode for Tissue Slices Kits

Item #	Description
45-0500*	Petri Dish Platinum Electrode for Tissue Slices Chamber Kit, 10 mm
45-0490*	Petri Dish Platinum Electrode for Tissue Slices Chamber Kit, 7 mm

* Kits include dish chamber, wand and cables

Petri Dish Platinum Electrode Chambers and Wands

Item #	Description
45-0501**	Petri Dish Platinum Electrode Chamber Only, 10 mm, negative
45-0491**	Petri Dish Platinum Electrode Chamber Only, 7 mm, negative
45-0502***	Platinum Electrode Wand Only, 10 mm, positive
45-0492***	Platinum Electrode Wand Only, 7 mm, positive

** Requires, 45-0502, 45-0503, 45-0504

*** Requires, 45-0501, 45-0503, 45-0504

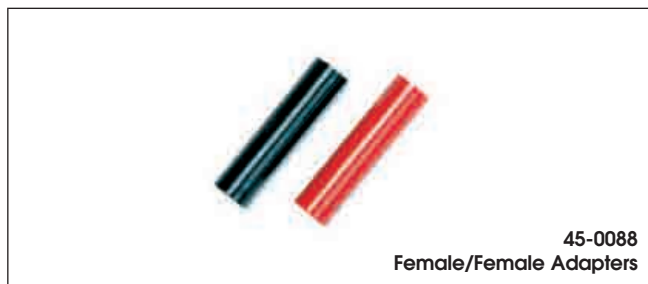
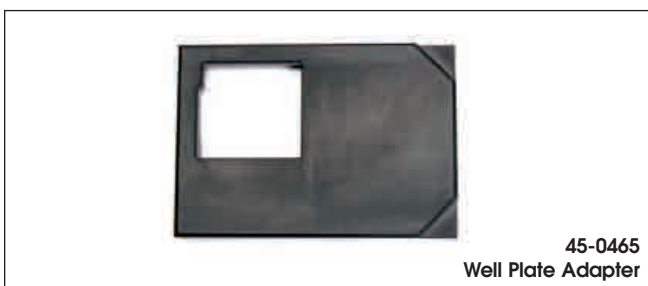
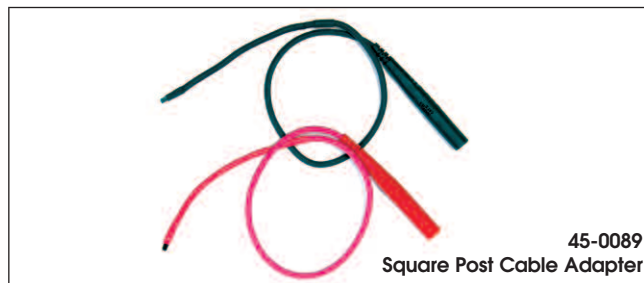
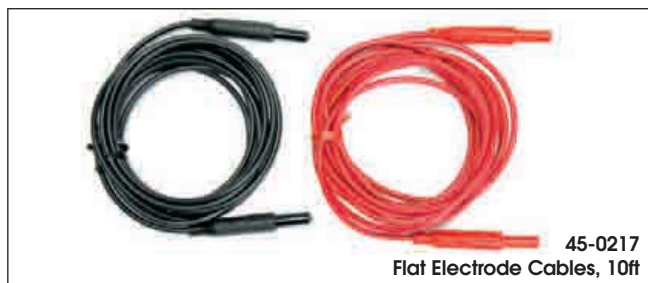
Cables

Item #	Description
45-0503	Micro-Grabber Cable for Chamber, negative
45-0511	Single Adaptor Cable for Wand

accessories

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Cables & Adapters



Item #	Description
45-0217	Black and red banana to banana cables 10ft in length. Used with flat electrode.
45-0465	The 25 well plate adaptor for plate handler HT 200 and HT 100.
45-0216	A pair of black and red micrograbber to banana plugs cables, 10ft length. Used for microslides, genetrodes, genepaddles and tissue petri dish.
45-0088	Black and Red female/female adaptors for banana plug cables.
45-0087	A pair of black and red micrograbber adaptors for banana plug cables. Used with cables 45-0217 and ECM 2001 coaxial banana plug cables for all micrograbber, genetrode, genepaddle and Tissue petri dish.
45-0089	A pair of red and black square post adaptor to banana plugs cables. Used with cable 45-0217 and 45-0052 for connecting to genetrodes and genepaddles.
45-0083	A pair of coaxial to banana plug cables both black and red, 10ft long. Connector cables for the ECM 2001 unit.
45-0204	A pair of red and black adaptor banana plug cables for Tweezertrode electrodes.

accessories