

AgilePulse

IN VIVO SYSTEM TECHNICAL SPECIFICATIONS

MAXIMUM EFFICIENCY DNA DELIVERY

Effectively introduced DNA vaccines represent a powerful and safe means for stimulating an immune response that recognizes and eliminates target molecules in the body. However, traditional DNA vaccine delivery systems such as gene gun delivery electroporation suffer from poor efficiency. The BTX AgilePulse In Vivo System provides an intra-dermal/muscular electro-poration solution to produce maximum transfection efficiency. The AgilePulse In Vivo System can be purchased with software supporting intra-dermal (ID) or intra-muscular (IM) applications.

For vaccine applications, DNA vaccination through the dermal layer is preferred since it is an easily accessible site that is immunologically active. After direct injection of plasmid DNA in the dermal layer, a programmed sequence of electric pulses is applied through a miniature parallel-needle electrode array to promote cellular uptake and transfection. All cells in the surrounding tissue are transfected, including dendritic antigen-presenting cells and mesenchymal origin cells.

Gene expression simulates the immune system to respond to the secreted antigen. Gene expression in skin is 100-fold higher when delivery is enhanced by electroporation compared to simply injecting plasmid DNA.

FEATURES & BENEFITS

AgilePulse is well-suited for applications requiring high doses and robust immune responses such as gene therapy and cancer vaccines. AgilePulse includes a user-friendly, programmable waveform generator with patented Pulse Agile[®] technology and a miniature parallel-needle electrode array.

Simple User Interface – Touch screen user interface, USB key data storage, and Windows[®] Mobile 6.0 operating system. The system automatically stores a digitized record of all pulse parameters for quality control. EN 60601-1, EN 60601-1-1 EN 60601-1-2, UL60601-1 and CSA 601.1 compliant.

Pulse Agile® Advantage – The patented Pulse Agile® technology combines a unique sequence of short, high-intensity pulses to open pores in cell membranes, followed by long, low-intensity pulses to further drive the DNA into cells via electrophoresis. The dual-phase of pulses improves efficiency while maintaining cell viability. The specialized use of Pulse Agile® waveform protocols has shown to significantly enhance antigen specific CD8+ T-cell response when standard protocols do not.

Uniform, Reliable Electroporation – AgilePulse parallel-needle arrays produce uniform electric fields across the treatment volume for a more thorough transfection of the tissue. Electrode impedance is monitored through software analysis to ensure reliable electrode placement in tissue each and every time.

Simple, Fast Treatment – Simple yet effective intra-dermal or intra-muscular electrode design allows for shorter delivery times of less than a second. The electrodes provide a uniform pulse to cover and target larger areas of tissue using a single application.

Optimal Design – Miniature, 2-mm length needles easily penetrate the layers of skin or muscle and target cells for high efficiency gene delivery.

Safety – Each needle electrode array comes with a safety cover and easy grip sides to make the electrode insertion procedure simple and safe.

AgilePulse technical specifications

At a Glance – Electroporation Increases the Immune Response

Dermal delivery of DNA vaccine along with electroporation using the AgilePulse[™] In Vivo System increases the immune response of PSA-specific CD8 + T cells over intradermal (i.d.) alone or intramuscular injection (i.m.), with or without electroporation (see figure below).

Methods: C57BI/6 mice were immunized once with 10 mg pVax-PSA/20 ml PBS intradermally (i.d.) on each flank with or without electroporation (EP) or intramuscular (i.m.) in each TA muscle. Blood was collected on days 11, 13 and 15 and effector cells were stimulated for 4 h with 100 nM PSA-derived peptide psa65-73 or a control peptide GP33. The activated CD8+ T cells were quantified by intracellular cytokine staining for IFN and analyzed by flow cytometry.

Roos, A-K, et al., 2006 Molecular Therapy 13(2):320-327.



THE AGILEPULSE IN VIVO SYSTEM INCLUDES

- AgilePulse ID System (47-0400N)
- AgilePulse IM System (47-0500N)
- o Footswitch for hands-free operation (Optional) (47-0320)
- Parallel-Needle Electrode Array, specify type:
 - 4 x 2 electrode array, 4 mm spacing (47-0040)
 - 6 x 2 electrode array, 4 mm spacing (47-0050)
- Electrode Connector Cable
- O User Manual

WAVEFORM GENERATOR SPECIFICATIONS

User Interface	Touch Screen Display, Footswitch
Voltage Range	50 to 1000 volts
Pulse Width Range	0.050 to 10 ms
Pulse Interval	0.200 to 1000 ms (5 kHz to 1 Hz)
Data Export	USB Flash Key
Dimensions (with handle)	32 cm w x 20 cm h x 40 cm (12.6 in w x 7.9 in h x 15.7 in)
Weight	25 pounds, 11.3 kg
Operating Temperature	10 to 40 oC
Mains Voltage	100 to 250 VAC
Fuse	5 Amp Slo-Blo [®] , 5 mm x 20 mm
Software	(Intra-muscular) IM (Intra-dermal) ID

POTENTIAL LICENSE REQUIREMENTS

No license is required for research use of the AgilePulse In Vivo System but may be required for clinical use in human or in clinical veterinarian applications. Please contact BTX for more information.

TECHNICAL & CUSTOMER SERVICE

For further references regarding specific applications and optimization, please contact Technical Support:



Australian distributors: **Fisher Biotec Australia** free call: 1800 066 077 fisher biotec email: info@fisherbiotec.com australia web: www.fisherbiotec.com

For Research Purposes only.







AgilePulse MAX[™] LARGE VOLUME TRANSFECTION SYSTEM TECHNICAL SPECIFICATIONS

EFFICIENT TRANSFECTION FOR UP TO 20 ML VOLUMES

The AgilePulse MAX[™] System is an advanced electroporation solution for fast, efficient transfection of 2 to 20 mL of cell suspension. Specifically engineered for large-volume applications, our system maximizes cellular uptake with minimal heating and short cycle-time to ensure high cell viability in further cell processing.

Simple-to-use, cells and polynucleotide are suspended in our proprietary BTXpress Cytoporation[®] Medium T and transferred via sterile syringe to the large-volume electroporation chamber where a programmed sequence of electric pulses is applied. First, a sequence of short, high-intensity pulses opens pores in the cell membranes, followed by long, low-intensity pulses that drive the material into cells via electrophoresis. The patented Pulse Agile[®] technology optimizes these pulse parameters to maximize efficiency and cell viability.

The system includes a user-friendly, programmable waveform generator with patented Pulse Agile[®] technology, the patent-pending large-volume electroporation chamber, and proprietary BTXpress Cytoporation[®] Medium T; optimized for large-volume electroporation. The system is engineered to provide uniform electric fields in a stable temperature environment, for excellent cell viability.

FEATURES & BENEFITS

Direct Scale-up – Transfection protocols readily scale-up from standard laboratory cuvettes to large-volume transfection in the AgilePulse MAX[™] system. No new complicated processes need to be learned.

Maximal Efficiency with Cytoporation® Medium – BTXpress Cytoporation® Medium T used with the AgilePulse MAX[™] system has been optimized for maximal efficiency with a number of cell lines, including K562, A20, HEK293 and CHO-KI. It is compatible with a large range of transfectants including DNA, RNA, siRNA, and olignonucleotides. It can be directly diluted in complete growth medium for post-electroporation cell culture.

Simple User Interface – All controls are operated with the simple touch screen on the front panel. Data is quickly retrieved by USB key and can be analyzed for detailed pulse characteristics including pulse voltage and pulse current.

Pulse Agile® Advantage – Transfection efficiency and cell viability are enhanced by specialized, programmable electrical pulse waveforms, particularly important for larger polynucleotide delivery such as DNA plasmids. The patented Pulse Agile® technology combines a unique sequence of short high-intensity pulses to porate cell membranes, followed by long low-intensity pulses to further drive transfectants into cells via electrophoresis, while maintaining cell viability.

AgiePulseMAX^T technical specifications

LARGE-VOLUME ELECTROPORATION APPLICATIONS

- Transfect cells such as bone marrow cells to produce or replace a missing protein
- Deliver siRNA to suppress gene expression
- Deliver genes for permanent gene correction
- Load cells with a drug for drug delivery
- Cancer immunotherapy
- Transfect eukaryotic cells for protein production in bioreactors
- Large-scale production of replication-deficient viruses

AT A GLANCE SCALE-UP OF K562 CELL mRNA TRANSFECTION

The figure below demonstrates the simple direct scale-up of transfection using the AgilePulse MAX[™] System. K562 cells (myelomonocytic cells commonly used for natural killer target cell assays) were transfected with GFP+ mRNA in both laboratory cuvettes (0.5 mL) and the large-volume AgilePulse MAX[™] System (5- and 15-mL). The efficiency of transfection was comparable for all three volumes.

Methods: Cells were suspended to a cell density of 20 million cells/mL in Cytoporation[®] Medium. GFP mRNA was added to the cell suspension to a final concentration of 40 µg/mL. The small 0.5 mL volume transfections were carried out using standard 4 mm gap electroporation cuvettes. The large volume transfections were performed with the AgilePulse MAX[™] using a 4 mm gap large volume chamber. Identical pulse parameters were applied to all three volumes.

At 24 hours post-electroporation, the percent transfection was determined by flow cytometry.

Efficiency of GFP RNA Delivery is the same in 4 mm





THE AgilePulse MAX[®] ELECTROPORATION SYSTEM INCLUDES

- AgilePulse MAX Complete System (47-0200N)
- o AgilePulse MAX[™] Waveform Generator (47-0201N)
- Large Volume Chamber (6 mm gap, 5 ml max volume) (47-0204N)
- Cytoporation[®] Low Conductivity Medium T (47-0002)
- Safety Stand for Cuvettes (47-0203)
- Large Volume Chamber Stand (47-0202N)
- Oser Manual

SYSTEM SPECIFICATIONS

User Interface	Touch Screen Display
Chamber Electrode Gap	6-mm
Chamber Volume	2 to 5 mL
Chamber Connector	Female Luer Lock connector for loading cells and a separate luer lock with vent attached with Vent Filter
Pulse Amplitude	50 to 1200 volts
Pulse Width	0.050 to 10 ms
Pulse Interval	0.200 to 1000 ms (5 kHz to 1 Hz)
Data Access	USB Flash Key

TECHNICAL & CUSTOMER SERVICE

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