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Hybridoma Production / Nuclear Transfer

ECFG21 Super Electro Cell Fusion Generator

High performance, Downsizing & Lightweight

The world first device that can automatically reads out Voltage and Current.

The fusion efficiency is dramatically higher than PEG!

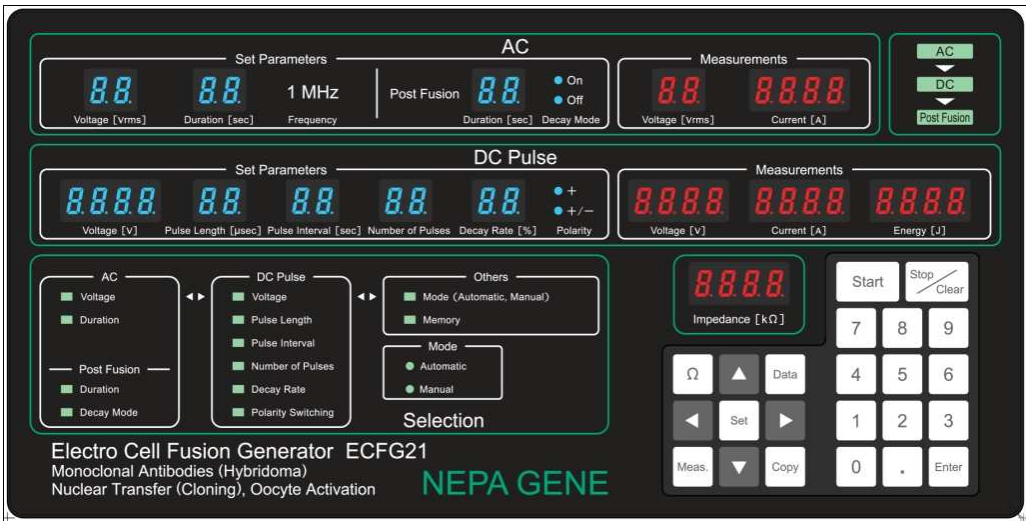
◆Applications

- Lymphocytes/spleen cells and myeloma cells
  Hybridoma Production — **Monoclonal Antibodies** (a large volume chamber is available.)
- Enucleated oocytes and somatic cells
  Somatic Cell Nuclear Transfer (SCNT) — **Animal Cloning**
- Two-cell embryos
  Tetraploid embryo complementation — **Tetraploid Chimeras**, **ES/iPS-cell-derived Mice**
- ES/EG cells and thymocytes — **Nuclear reprogramming of somatic cells**
- Dendritic cells and tumor cells
  Anti-cancer immunity — **Cancer Vaccines**
- Plant protoplasts — Hybrid Vegetables
- Liposome/droplets — Electrofusion Device
- Yeasts/fungi

*The ECFG21 can cover all application range of the old-type LF201 and so on.

Request a Demo
See the performance of the ECFG21 cell fusion generator.

◆ Valuable readout and easy operation



Measuring and Displaying AC and DC-pulse parameters

ECFG21 is the world first fusion device that can automatically reads out voltage and current of AC and voltage, current and joule of DC pulse. This can greatly help researchers optimize their experiments to achieve higher fusion efficiency with lower cell damage.

Easy to operate

The new user interface has been much improved compared with the old-type fusion generators (LF201, etc.) and makes it possbile to visually and easily set the electric parameters of alternate current (AC) and direct current (DC) pulse.

Hybridoma Production for Monoclonal Antibodies

The fusion efficiency achieved by the ECFG21 for hybridoma production is dramatically higher than PEG.

New electrode chambers correspond to a large volume solution (up to 8ml).

Electro Cell Fusion Process

AC --> 2-Step DC Pulses with Voltage Decay --> Post Fusion (AC)

1) **AC**

The AC is applied so that the cells are aligned in a chain for touching on each side; **"Pearl Chain" Formation**

2) **Fusion Pulse: 2-Step Pulses with Voltage Decay**

The aligned cells are **high-efficiently fusioned by the 2-step DC pulses with voltage decay** (multiple pulses from setting a decay rate and a polarity switching).

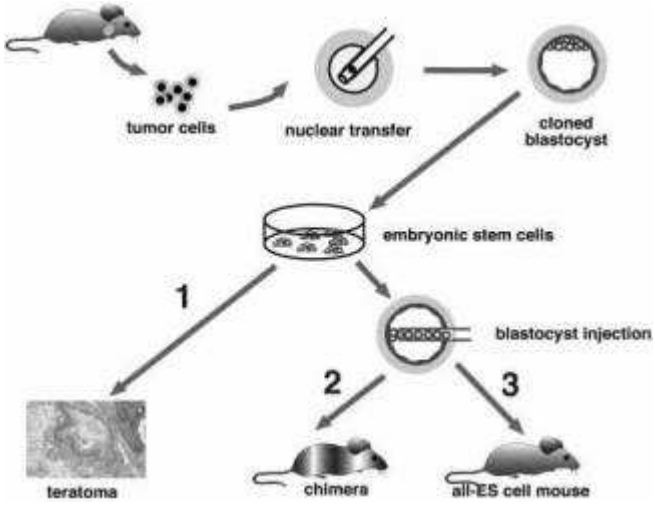
3) **Post-Fusion AC**

The post-fusion AC is applied so that the fusion process begins to mature and high fusion efficeincy is achieved with low cell damage.

***Please click here for the application notes.**
***Please click here for the electrodes.**

Tetraploid Chimera Production

- **Reprogramming of a melanoma genome by nuclear transplantation**



Two-step cloning procedure to produce mice from cancer cells.
Different tumor cells were used as donors for nuclear transfer into enucleated oocytes. Resultant blastocysts were explanted in culture to produce ES cell lines. The tumorigenic and differentiation potential of these ES cells was assayed in vitro by inducing teratomas in SCID mice (1), and in vivo by injecting cells into diploid (2) or tetraploid (3) blastocysts to generate chimeras and entirely ES-cell-derived mice, respectively.

Genes Dev. 2004 Aug 1;18(15):1875-85.
Hochedlinger K et al., Whitehead Institute for Biomedical Research, and Department of Biology, Massachusetts Institute of Technology

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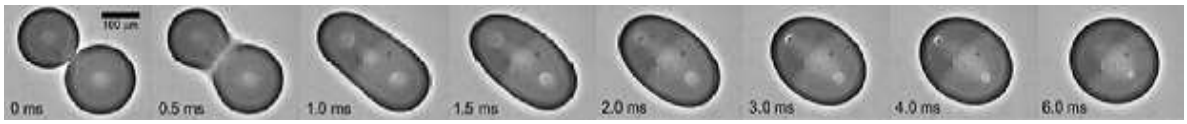
*Please click here for the electrodes.

Liposome/droplet Fusion

- **Timing controllable electrofusion device for aqueous droplet-based microreactors**



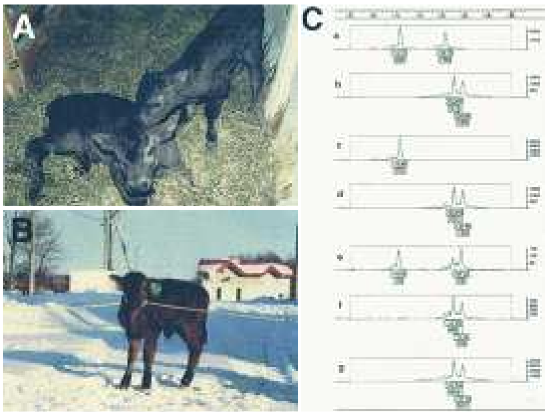
High speed camera images of the fusion process
This fusion process is almost instantaneous. The two droplets combined into one single "peanut-shaped" droplet within about 1ms. It took about another 5ms for the droplet to adopt a spherical shape under the effect of surface tension. Throughout the fusion process, the darker colored blue ink droplet (leftmost) was distinctly separated from the lighter colored water droplet (rightmost).
Lab Chip. 2006 Jun;6(6):757-63. Epub 2006 Mar 31.
Tan WH, Takeuchi S., CIRMM/IIS, Institute of Industrial Science, University of Tokyo

*Please click here for the application notes.
*Please click here for the electrodes.

Nuclear Transfer for Animal Cloning

● Generation of cloned calves and transgenic chimeric embryos from bovine embryonic stem-like cells

Photographs of calves obtained after nuclear transfer.



A: Two days after birth
B: Four weeks after birth
C: Fingerprinting of DNA from cloned calves, recipient cows, and donor ES-like W3 cells.

Electrophoretograms show amplified fragments of DNA derived from leukocytes from recipient cows (panels a, c and e) and cloned calves (panels b, d and f) and from donor ES-like W3 cells (panel g). Upper and right-side scales indicate the sizes of DNAs (bp) and the intensities of DNA fragments, respectively. Numbers in boxes indicate the sizes of DNAs (upper) and the intensities of DNA fragments (lower).
After insertion of donor ES-like cells into the perivitelline space of oocytes, cells and cytoplasts were fused electrically in fusion medium.
(DC: 20V, Pulse length: 50us, Pulse interval: 100ms, 2 Pulses)

Biochem Biophys Res Commun. 2003 Sep 12;309(1):104-13.
Saito S et al., Saito Laboratory of Cell Technology, Japan

*Please click here for the application notes.
*Please click here for the electrodes.

ECFG21 Specifications

■Alternate Current (AC)

Voltage	0 - 80 Vrms
Frequency	1 MHz
Duration	0 - 99 sec
Post-Fusion Duration	0 - 99 sec
Post-Fusion Decay Mode	On/Off
Pause between AC / DC	5 µsec

■Direct Current (DC) Pulse

Pulse Wave	Square Wave
Voltage	1 - 1500 V
Pulse Length	1 - 99 µsec
Pulse Interval	0.1 - 9.9 sec
Number of Pulses	0 - 99
Decay Rate	0 - 99 %
Polarity Switching	On/Off

■Output Measurements

Voltage	AC / DC
Current	AC / DC

Energy (J)	DC

■**Others**

Impedance Measurement	0.01 - 50 kΩ
Operation Mode	Automatic / Manual
Memory	99 programs
Weight / Dimensions	386W x 370D x 121H mm / 9kg

*All features and specifications subject to change without notice.

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