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Simulation of pore density and pore radius based on cell electrofusion

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The existing fusion technology is mainly based on the microsecond pulse electric field. However, there is a great defect in the traditional fusion technology: the microsecond pulse electric field is sensitive to the cell size, and it is difficult to realize the effective fusion of cells with different sizes. There was a significant positive correlation between the transmembrane potential and the cell radius, when smaller cells are perforated, the larger cells may have been in a state of excessive perforation .The nanosecond pulsed electric field has the characteristics of insensitive to the size, this is more conducive to the integration of different sizes of cells. Therefore, in the current work, present paper use finite element method to establish the cell fusion model, and put forward the innovative idea of "electric fusion induced by nanosecond pulsed electric field (ns)". By comparing the numerical value and distribution of the pore density and hole radius of the cells under nanosecond, with the microsecond pulse compared the nanosecond pulsed electric field under the effect of perforation of fusion cells regardless of pore radius or hole density is concentrated in the two cell contact area, ns pulse can better induce cell fusion. The aim of this paper is to provide a new and effective physical method for cell electrofusion, which is of great significance for the development of cell electrofusion technology.

Authors: Dr KE, Qiang (Chongqing University); Prof. LI, Chengxiang; Dr LIU, Hongmei; Prof. MI, Yan; Prof. YAO, Chenguo; Dr ZHANG, Yuanyuan

Presenter: Dr KE, Qiang (Chongqing University)

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