

عنوان مقاله:

A Quantitative Study of the Effect of Electroporation on the Electroporability and Cell Survival

محل انتشار:

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خلاصه مقاله:

Introduction: Electroporation is a practical technique used to transport the molecules across the cell membrane. The utilization of fluorescent molecules is the method widely used to evaluate the electroporability of cell membrane as a result of pulse application. It is also possible to use mathematical methods to predict the changes caused in cell electroporability as a result of the changes made in the pulse parameters. So the technique can be managed in such a way that the maximum permeability and minimum cell death can be achieved when desirable. **Material and Methods:** In this study, MCF-7 cell line of human breast adenocarcinoma tumor was used. Propidium Iodide (PI) and Fluorometry technique was used to monitor the cell electroporability and the cell survival. The cells were incubated in PI and electrical pulses were applied affecting the cell permeability. As a result the cell membrane is disrupted releasing the fluorescent molecules affiliated with PI. The fluorescence signal emitted by the dead cells was determined by fluorometry and the obtained result was used to generate a curve in terms of the signal and the percent cell survival. The curve was used to resolve the fluorescence signal emitted by the permeated live cells. The incubation of the cells in PI and its uptake by the cells affects their electric pulses. The permeability and cell survival for six different doses of electrical pulses was assessed immediately and also 72 hours after the application of the pulses. **Results:** The maximum fluorescence emission and excitation wavelengths of PI solution attained at 490 and 600 nanometers, respectively. The highest permeability signal and the least cell survival percentage were recorded for electrical pulses of 1500 volts at 25-microsecond duration and 800 volts at 500-microsecond duration, respectively. The cell death rate, immediately after getting the pulses was assessed lower than the one after 72 hours. **Discussion and**

Conclusion: It is predicted that the increased strength or duration of the pulse will enhance the cell electroporability provided the cell does not die and the cell membrane is not interrupted. A mathematical equation was obtained in terms of the level of electroporability signals, cell survival percentage and pulse parameters. Based on the equation the permeability is correlated to the pulse duration by the second power and pulse strength by the first power. It seems that there are some processes that not only induce immediate cell death but also inhibit the injured cells to recover or ... proliferate. These processes a

کلمات کلیدی:

Electroporation, MCF-V Cell Line, Electroporability, Electric Pulse, Fluorometry

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