

ELECTROPORATION OF BIOLOGICAL MEMBRANES

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Summary. In recent years, manipulation of biological cells and cell tissue by external electric fields gains increasing importance for biophysics and cell biology in general and in biotechnology and medicine in particular. Especially, the method of electroporation has become a powerful tool for cell manipulations. In electroporation cells are subjected to a pulsed high-voltage electric field, resulting in a temporary increase of cell membrane conductivity and permeability. This increase of permeability is large enough to allow both small molecules and macromolecules to enter or leave the cell. The process can be fully reversible and after resealing of the membrane, the cell regains its original state.

Although the actual molecular mechanism underlying this process is not yet fully understood, most investigators agree that transient hydrophilic pores are responsible for a membrane's behaviour at elevated membrane voltages.

Here, a short historical survey on the investigations of the influence of strong electric fields on biological membranes has been presented. Main features of cell electroporation phenomenon and underlying mechanism have also been discussed.

Key words: Cell electroporation, electrofusion, electroinsertion, electrotransformation, transdermal drug delivery.