Numerical Optimization of Plasmid DNA Delivery Combined with Hyaluronidase Injection for Electroporation Protocol

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Abstract

The definition of an innovative therapeutic protocol requires the fine tuning of all the involved operations in order to maximize the efficiency. In some cases, the price of the experiments, or their duration, represents a great obstacle and the full potential of the protocol risks to be reduced or even hidden by a non-optimal application.

The implementation of a numerical model of the protocol may represent the solution, allowing a systematic exploration of all the different alternatives, shedding the light on the most promising combination and also identifying the key elements/parameters.

In this paper, the injection of a plasmid, preceded by a hyaluronidase injection, is simulated through a mathematical model. Some key elements of the administration protocol are identified by means of a mathematical optimization procedure, maximizing the efficacy of the therapy. As a side effect of the extensive investigation, robust solutions able to reduce the effects of human errors during the administration are also obtained.

References

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