Electroporation: from new improvements in membrane permeabilization to electrochemotherapy: recent developments

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Extended Abstract

Electrochemotherapy is an antitumor treatment combining the delivery of a cytotoxic drug that cannot cross the cell membrane and short intense electric pulses that permeabilize the membrane. Electrochemotherapy has proven its efficacy and it is approved (present in the guidelines and reimbursed) in a number of countries, mainly in the EU, for the treatment of cutaneous or subcutaneous tumor nodules of various origins. It is also widely used in veterinary oncology. Electrochemotherapy is not an ablative procedure but a method to vectorise efficient and selective drugs to the tumor cells in the patient’s body.

At Villejuif we continue to study how it would be possible to improve the effectiveness and selectivity of the electrochemotherapy, as well as how it is possible to make it more comfortable by decreasing the side effects linked to the application of the electric pulses. These studies are based on the models we develop to explain the interactions of the electric fields with the cells and in particular with the cell membrane, and they include the addition of conductive nanoparticles [1] or the combination with non-thermal-plasmas-treated liquids [2]. We are motivated because electrochemotherapy is being shown very interesting for the treatment of tumor/metastasis nodules located in areas for which no ablative oncological procedure could be applied [3].

References

