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Mathematical Modeling of Tumor Growth and Response to Electrochemotherapy

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Electrochemotherapy, the application of electric pulses (EPs) in combination with chemotherapeutic injection, drastically increases the effectiveness of cancer therapy. Such combinations enhance the ability of tumor cells to absorb chemotherapy drugs by permeabilizing cell membranes; however, optimizing this synergy for various EP parameters and drugs is poorly understood. This presentation investigates the response of immunogenic avascular tumors to chemotherapy and EPs individually and to electrochemotherapy to quantify the synergy between treatments. We modify a previously derived mathematical model [1] to specifically quantify the synergy for cisplatin and bleomycin compared for different EP conditions. Development of a 3-D artificial tumor model to extend this mathematical model and parameter assessment independent of physiological complications, such as the immune system, will be discussed.

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