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COMPARISON OF TREATMENT METHODS IN THE MATHEMATICAL MODEL OF CAR-T CELL THERAPY

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ABSTRACT

The aim of this work is to compare two methods of CAR-T cell therapy in the treatment of glioblastoma multiforme using mathematical modeling. The model we base comes from the paper of León-Triana et al. (2021). However, we assume logistic tumor growth, taking into account the time delay necessary to trigger CAR-T cells proliferation in the patient's organism, focusing on the influence of this time delay. We focus on the analysis of stability of two solutions that reflect full recovery for two different methods of treatment. The first method involves administering a single portion of CAR-T cells, which we define as the initial condition. The second way is a periodic treatment consisting of injecting a portion of CAR-T cells every specified period of time. By examining tumor-free solutions and their stability, we gain insights into the treatment efficacy and the potential for treatment optimization.

Keywords:
Mathematical modelling, glioblastoma, CAR-T cell therapy, impulsive equation