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ANALYZING THE IMPACT OF PROLIFERATION AND TREATMENT PARAMETERS ON LOW-GRADE GLIOMA GROWTH USING MATHEMATICAL MODELS

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ABSTRACT

Low-grade gliomas (LGGs) are characterized by their slow growth and infiltrative nature, making complete surgical resection challenging and often resulting in the need for adjunctive therapies. This study introduces a mathematical model appeared in [1] aimed at elucidating the growth patterns of LGGs and their response to chemotherapy. Our model undergoes validation against clinical data, demonstrating its efficacy in accurately describing real patient data. Through mathematical analysis, we establish the existence of a unique non-negative solution and delve into the stability of steady-state solutions. Notably, we establish the global stability of a tumor-free equilibrium under conditions of sufficiently robust constant and asymptotically dynamics in the case of periodic treatment. Additionally, a sensitivity analysis highlights the proliferation rate as the primary determinant of model outcomes. Finally, numerical simulations are employed to explore the stability of the fitting procedure. We compare results with our paper [2] where a slightly different model was proposed.

REFERENCES

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