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**Anh Phong Tran\*** (tran.anh@husky.neu.edu), **Muhammad Ali Al-Radhawi**, **Irina Kareva** and **Eduardo D Sontag**. *Finding the optimal metronomic chemotherapy regimen: a delicate balance between immune recruitment, cancer resistance, and drug cytotoxicity.*

It has been shown experimentally that administration of low doses of chemotherapy at frequent time intervals can lead to improved and sustained anti-tumor immune responses. However, the trade-offs and mechanisms underlying the interplay between dose regimens, immune recruitment, and tumor burden reduction remain poorly understood and quantified. Based on detailed experimental data of a glioma mouse model treated with cyclophosphamide (CPA) on several high frequency low dose schedules, we developed a semi-mechanistic mathematical model that captures the delicate balance between the immunostimulatory and immunosuppressive effects of the drug, as well as its effects on the emergence of therapeutic resistance. We then used optimal control to identify therapeutic regimens that can maximize tumor reduction, lead to sustained anti-tumor immune activity or minimize immune-based resistance. The semi-mechanistic nature of the model allows testing hypotheses about whether and what aspects of our current understanding of tumor-immune interactions drive experimentally observed results. (Received September 17, 2019)