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**Elpiniki Nikolopoulou\***, 900 S Palm Walk, Tempe, AZ 85281. *Mathematical Modeling of an Immune Checkpoint Inhibitor and Its Synergy with an Immunostimulant.*

Immune checkpoint inhibitors (ICIs) are a novel cancer therapy that may induce tumor regression across multiple types of cancer. There has recently been interest in combining the ICIs with other forms of treatments, as not all patients benefit from monotherapy. We propose a mathematical model consisting of ordinary differential equations to investigate the combination treatments of the ICI avelumab and the immunostimulant NHS-muIL12. We validated our model using the average tumor volume curves provided in Xu et al. (2017). We initially analyzed a simple generic model without the use of any drug, which provided us with mathematical conditions for local stability for both the tumorous and tumor-free equilibrium. This enabled us to adapt these conditions for special cases of our model. Additionally, we conducted systematic mathematical analysis for the case that both drugs are applied continuously. Numerical simulations suggest that the two drugs act synergistically, such that, compared to monotherapy, only about one-third the dose of both drugs is required in combination for tumor control. (Received September 11, 2019)