1044-34-12 **K. Renee Fister*** (`renee.fister@murraystate.edu`), 6C Faculty Hall, Department of Mathematics and Statistics, Murray, KY 42071, and **Craig Collins** and **Molly Williams**. *Optimal Control Study of Neuroblastoma.* Preliminary report.

A mathematical model is used to investigate the effectiveness of the chemotherapy drug Topotecan against neuroblastoma. Optimal control theory is applied to minimize the tumor volume and the amount of drug utilized. The model incorporates a state constraint that requires the level of circulating neutrophils (white blood cells that form an integral part of the immune system) to remain above an acceptable value. The treatment schedule is designed to simultaneously satisfy this constraint and achieve the best results in treating the tumor. Existence and uniqueness of the optimality system, which is the state system coupled with the adjoint system, is established. Numerical simulations are given to demonstrate the behavior of the tumor and the immune system components represented in the model. (Received June 09, 2008)