1127-92-110 **Zachariah Sinkala*** (zachariah.sinkala@mtsu.edu), Department of Mathematical sciences, Murfreesboro, TN 37132, and **Richard Ewool**. *Global existence and convergence of solutions to a cross-diffusion Phenotypic Switching on Glioblastoma Growth and Invasion system.*

In this paper, we study brain tumor glioblastoma model, the system of reaction-diffusion equations, in the brain tissue. The system attempts to simulate the progression speed of a glioblastoma tumor at the macroscopic level. This is determined by two key factors: the cell proliferation rate and the cell migration speed. At the microscopic level, however, proliferation and migration appear to be mutually exclusive phenotypes, as indicated in vivo imaging data. Here, we develop a two coupled reaction-diffusion equations model to analyze how the phenotypic switching between proliferative and migratory states of individual cells affects the macroscopic growth of the tumor. We start by considering the asymptotical stability of equilibrium points to the associated system of ordinary differential equations type. Then, the global existence of solutions and the stability of equilibrium points to the system of coupled reaction-diffusion type are discussed. Finally, the existence of nonnegative classical global solutions to the system of coupled reaction-diffusion type is investigated, and the global asymptotic stability of unique positive equilibrium point of the system is proved by constructing Lyapunov functions. (Received January 27, 2017)