

1116-VM-118 **Zachary Abernathy** and **Savannah V. Bates***, Savannah Bates, 2800 University Blvd N, PO Box 281037, Jacksonville, FL 32211, and **Rebecca Santorella**. *A Mathematical Model of Cancer Stem Cell Driven Tumor Growth with Radiation and Chemotherapy Treatment*. Preliminary report.

We build a tumor model that incorporates the cancer stem cell hypothesis with chemotherapy and periodic radiation treatment using aspects of current models. We calculate conditions for the existence and local stability of equilibria in the case of no treatment as well as constant radiation with and without chemotherapy. Additionally, for periodic radiation treatment, sufficient conditions for the existence of cancer persistence and cure state periodic solutions are established. Conditions for global stability of the periodic cure state are also derived using a Lyapunov function. Numerical simulations demonstrate that treatments targeting cancer stem cells are more effective in eradicating cancer. (Received July 30, 2015)