1154-92-353 **Suzanne L Weekes*** (sweekes@wpi.edu), Department of Mathematical Sciences, WPI, 100 Institute Road, Worcester, MA 01609. *A multicompartment mathematical model of cancer stem cell-driven tumor growth dynamics.*

Tumors are appreciated to be an intrinsically heterogeneous population of cells with varying proliferation capacities and tumorigenic potentials. As a central tenet of the so-called cancer stem cell hypothesis, most cancer cells have only a limited lifespan, and thus cannot initiate or reinitiate tumors. Longevity and clonogenicity are properties unique to the subpopulation of cancer stem cells. To understand the implications of the population structure suggested by this hypothesis, we develop a mathematical model for the development of the aggregate population. We show that overall tumor progression rate during the exponential growth phase is identical to the growth rate of the cancer stem cell compartment. Tumors with identical stem cell proportions, however, can have different growth rates, dependent on the proliferation kinetics of all participating cell populations. Analysis of the model reveals that the proliferation potential of non-stem cancer cells is likely to be small to reproduce biologic observations. Furthermore, a single compartment of non-stem cancer cell population may adequately represent population growth dynamics only when the compartment proliferation rate is scaled with the generational hierarchy depth. (Received September 02, 2019)