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Hongyu Miao* (hongyu_miao@urmc.rochester.edu), Saunders Research Building 4134, Dept. of Biostatistics, Univ. of Rochester, 265 Crittenden Blvd, Rochester, NY 14642. *Will Different Types of Models Give Different Answers? A Case Study in Modeling CFSE Data to Understand Immune Cell Life Cycle.*

Carboxy-fluorescein diacetate succinimidyl ester (CFSE) labeling is an important experimental tool for measuring cell responses to extracellular signals in biomedical research. However, changes of the cell cycle (e.g., time to division) corresponding to different stimulations cannot be directly characterized from data collected in CFSE-labeling experiments. A number of independent studies have developed mathematical models as well as parameter estimation methods to better understand cell cycle kinetics based on CFSE data. However, when applying different models to the same data set, notable discrepancies in parameter estimates based on different models has become an issue of great concern. It is therefore important to compare existing models and make recommendations for practical use. For this purpose, we derived the analytic form of an age-dependent multitype branching process model. We then compared the performance of different models, namely branching process, cyton, Smith-Martin, and a linear birth-death ordinary differential equation (ODE) model via simulation studies. Our results suggest that different models do give different answers and we explore the possible explanation. (Received January 13, 2012)