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Asma Alshehri, John Ford and Rachel Leander*, Rachel.Leander@mtsu.edu. *The impact of maturation time distributions on the structure and growth of cellular populations.*

Here we study how the structure and growth of a cellular population vary with the distribution of maturation times from each stage. We consider two cell cycle stages. The first represents early G1. The second includes late G1, S, G2, and mitosis. Passage between the two reflects passage of an important cell cycle checkpoint known as the restriction point. We model the population as a system of partial differential equations. After establishing the existence of solutions, we characterize the maturation rates and derive the steady-state age and stage distributions as well as the asymptotic growth rates for models with exponential and inverse Gaussian maturation time distributions. We find that the stable age and stage distributions, transient dynamics, and asymptotic growth rates are substantially different for these two maturation models. We conclude that researchers modeling cellular populations should take care when choosing a maturation time distribution, as the population growth rate and stage structure can be heavily impacted by this choice. Furthermore, differences in the models' transient dynamics constitute testable predictions that can help further our understanding of the fundamental process of cellular proliferation. (Received September 15, 2020)