1039-92-78 **Joseph M. Mahaffy*** (mahaffy@math.sdsu.edu), Department of Mathematical Sciences, San Diego, CA 92107. *Mathematical Models for Erythropoiesis.*

Erythropoiesis is the process by which stem cells (primarily in the bone marrow) differentiate and proliferate to supply our bodies with erythrocytes (red blood cells), the primary means of transporting oxygen to all tissues of the body via the circulatory system. On average each day the body must produce 3 billion new erythrocytes for each kilogram of body weight to supply the body with oxygen, yet it responds rapidly to stress conditions such as hemorrhaging or high elevation. The body uses a complex system of hormonal controls to regulate this production process.

Our study examines an age-structured model for this regulatory process, including an active degradation of mature cells (like a satiated predator population). With a few simplifying assumptions the mathematical model can be reduced to a system of delay differential equations with a state-dependent delay. Bifurcation analysis of the complete age-structured model shows that a variable velocity of aging stabilizes the model. Our model is compared to data for a rabbit with an induced auto-immune hemolytic anemia and to data for normal human subjects following a loss of blood typical of a blood donation. (Received March 06, 2008)