1067-92-141 **Hayley M Belli*** (hbelli@uoregon.edu), **Jay R Walton** and **May Boggess**. *A Mathematical Model of the Effects of Antioxidants on Atherosclerotic Lesion Growth.*

Atherosclerosis is a form of cardiovascular disease characterized by an accumulation of cellular debris and inflammation in the innermost layer of the arterial wall. Statin drugs have been the primary method for treating atherosclerotic lesions, but recent research suggests that lifestyle changes, in particular consuming a diet rich in antioxidants, may be equally effective at preventing the process of atherogenesis. In this paper, two mathematical models are developed to simulate the effects of antioxidants on lesion regression and the reaction-diffusion process of atherosclerosis at the biological level. The first model is a system of six ordinary differential equations, and the second is a one-dimensional spatial model composed of partial differential equations. The ODE model helps to define a healthy state through the computation of equilibrium values. Meanwhile, the PDE system adopts the form of a discrete Taylor series approximation in order to model atherosclerosis under distinct parameters and boundary conditions. To avoid a numerical instability, a finite difference scheme is used to develop a diffusion coefficient for the model. These mathematical equations supply cardiologists with means for simulating and numerically analyzing various lesion regression scenarios. (Received July 27, 2010)