

Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-92-849 **L. R. Ritter*** (lritter@math.tamu.edu), Dept. of Mathematics, Texas A & M University, 3368 TAMU, College Station, TX 77843-3368, and **A. I. Ibragimov, C. J. McNeal** and **J. R. Walton**. *A Mathematical Model of Atherogenesis as an Inflammatory Response.*

We consider the onset of atherosclerosis as an inflammatory response in the presence of injury to the endothelial layer and excess levels of oxidized low density lipoproteins in the subendothelium. The bio-chemical signaling that occurs during injury or invasion by foreign bodies, and the immune system response is viewed as key to the initiation of a diseased state. We propose a mathematical model of such initiation, based in part on the classical model of chemotaxis given by Keller and Segel. We present our model as a coupled system of nonlinear reaction diffusion equations describing the state of the species involved in the disease process. We perform some numerical analyses and demonstrate that our model captures certain observed features of cardiovascular disease such as the localization of immune cells, the build up of lipids and debris, and the isolation of a lesion by smooth muscle cells. (Received September 30, 2004)