

Texas Tech University. Applied Mathematics Seminar.

Angiogenesis, Atherogenesis, Wound Healing. What is in common from mathematical perspectives

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ABSTRACT. I will present a linear, asymptotic stability analysis for a reaction-diffusion-convection system modeling atherogenesis, angiogenesis, and wound healing as an inflammatory instability. Motivated by the diseases paradigm, all these processes are viewed as an inflammatory spiral with a positive feedback loop involving key cellular and chemical species interacting and reacting within the intimal layer of muscular arteries. The inflammatory spiral is initiated as an instability from a healthy or near healthy state which is defined to be an equilibrium state devoid of certain key inflammatory markers. Disease initiation is studied through a linear, asymptotic stability analysis of a healthy (near healthy) equilibrium state. Presentation is based on the joint research and discussion with Jay Walton (Texas A&M), Lake Ritter (Southern Polytechnic State University), and Jianzhong Su (UT Arlington).