

Project Title: Contrast-enhanced Ultrasound Assessment of Angiogenesis

Project Start: 01-JUL-2004

Project End: 30-JUN-2008

ICD: NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Abstract: *DESCRIPTION (provided by applicant): Novel strategies for promoting angiogenesis are being developed to treat patients with chronic coronary artery disease or peripheral vascular disease who are not amenable to revascularization. The overall purpose of this proposal is to apply novel contrast-enhanced ultrasound techniques to non-invasively assess molecular and cellular processes that are thought to contribute to angiogenesis. Contrast-enhanced ultrasound has been used to non-invasively assess microvascular perfusion in ischemic heart and limb disease, and can provide information on blood flow and blood volume in the different vascular compartments. Novel microbubble contrast agents targeted to either alpha-v integrins or to activate leukocytes have been developed to non-invasively image integrin expression and inflammation. The first aim will be to apply these techniques to spatially and temporally characterize the relation between alpha-v integrin expression, the cellular inflammatory response, and perfusion in different models of angiogenesis. First, we will study these events in a matrigel model of angiogenesis in mice. Second, we will study the relation between alpha-v integrin expression, inflammation, and perfusion in a model of endogenous angiogenesis that occurs in response to ischemia produced by severe peripheral vascular disease in rats. The second aim of this proposal is to determine how patterns of alpha-v integrin expression and inflammation are influenced by pro-angiogenic therapy with FGF-2 in the setting of severe peripheral vascular disease in rats. Successful completion of these studies will provide information that will likely be important for developing new proangiogenic strategies. These studies will also validate the potential use of targeted contrast ultrasound for non-invasively evaluating new pro-angiogenic treatments and for guiding their use in patients.*