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## Featured Investigator :: Dr. Jeffrey Davidson

**Jeffrey M. Davidson, Ph.D.**

**Professor of Pathology**

**Vanderbilt University School of Medicine**

**Research Specialty:**

Regulation of Collagen and Elastin Synthesis

**Research Description:**

Laboratory research centers on regulation of elastin and collagen gene expression in acquired and genetic diseases. The fibrous protein, elastin, is intimately involved in vascular, pulmonary and cutaneous physiology. We have identified and partially characterized biosynthetic defects in fibroblast strains of individuals with excess and insufficient production of the protein, elastin. Current investigations are designed to delineate whether defects are directly linked to the elastin gene or attributable to signal transduction. In a related project, we are trying to understand the relationship between unregulated elastin production and premature aging. Molecular studies are evaluating the role of an RNA structure in posttranscriptional regulation of elastin gene expression. Considerable effort in the laboratory focuses on the action of growth factors and biomaterials in wound repair. Impaired healing in the rat, rabbit, and the pig is modelled by diabetes, steroid treatment, and aging. Through antibody neutralization and antisense RNA studies, experiments are underway to determine which cytokines are rate-limiting in the process of repair, as measured by accumulation of connective tissue and morphometric analysis of tissue organization. Related studies in the laboratory examine the mechanisms of pulmonary fibrosis. The most recent efforts have been directed towards the development of an in vivo transfection system for the transient introduction of cytokine genes into the wound site. This new methodology will be extremely useful as an analytical tool with potential therapeutic application.

