

NIH Sponsored Student Summer Research Program in Heart , Lung and Vascular Biology

Program Director: Professor Larry Swift

Heart, Lung, and Vascular Biology has become a major research focus at Vanderbilt over the past 10 years. This increased emphasis parallels a growing awareness of the importance of research in this broad area to human health and is built on several Vanderbilt strengths.

First, Vanderbilt University Medical Center has a long history of excellence in basic research in Heart, Lung, and Vascular Biology and related areas. This is underscored by the presentation of the Nobel Prize in Physiology or Medicine to two Vanderbilt faculty members, Dr. Earl Sutherland in 1971, for work on cyclic AMP and signal transduction, and Dr. Stanley Cohen in 1986, for his discovery of and work with epidermal growth factor and its receptor. Several VUMC investigators have won prestigious awards in the broader field of Heart, Lung, and Vascular Biology.

Second, VUMC also has a tradition of strength in clinical Heart, Lung and Vascular studies. The new Vanderbilt Heart and Vascular Institute, opened in July 2006, provides one of the most comprehensive centers for cardiology, cardiac surgery, and vascular services in the Southeastern United States.

Third, the faculty involved in research in Heart, Lung, and Vascular Biology are found in a wide variety of Departments: Biochemistry, Cell Biology, Cancer Biology, Microbiology/Immunology, Molecular Physiology & Biophysics, Pathology, Pharmacology, Medicine, Pediatrics, Biomedical Engineering, and Biological Sciences. The research is diverse but can be organized into seven major areas: (1) Protein chemistry and enzymology; (2) Growth factor regulation/development; (3) Biology of the extracellular matrix; (4) Endothelial cell biology; (5) Lipoprotein metabolism and atherosclerosis; (6) Cardiovascular regulation and Psychology of disease; and (7) Leukocyte/red cell biology. Within each of these areas are 5-7 investigators actively pursuing research on related aspects of Heart, Lung, and Vascular Biology. Vanderbilt University School of Medicine is in a major research expansion at the present time, and many of the investigators involved in research in Heart, Lung, and Vascular Biology are located in new or newly remodeled space. Thus there is ample space available for all researchers. State of the art instrumentation and techniques are available within the laboratories of the participating faculty.

Over the past 10 years, a number of new faculty with interests in Heart, Lung, and Vascular Biology have been recruited to Vanderbilt. For example, Dr Pampee Young joined the Department of Pathology in 2004 and has an active research program that focuses on vasculogenesis. Dr Erik Skaar joined the Department of Microbiology and Immunology in 2004. Dr Skaar studies the pathogenesis of the bacterium *S. aureus* and has been recently named a Searles Scholar in addition to receiving an award from the Burrough Wellcome Fund. In 1994 Dr. Richard Hoover, a member of the SRTP Steering Committee, organized the NIH funded training program in Heart, Lung, and Vascular Biology, "Mechanisms of Vascular Disease". This training program provides a focal point for Heart, Lung, and Vascular Biology research at Vanderbilt. The training grant presently supports 8 pre-doctoral and 5 postdoctoral positions. In addition, Dr. Hoover was awarded a supplement for training minority students. Each summer this supplement supports ten minority undergraduate students who are interested in careers in Heart, Lung, and Vascular Biology research.

Faculty Mentors

Name/Degree(s)	Rank	Primary(& Secondary) Appointments(s)	Role in Program	Research Interest
Bader, David M.,Ph.D.	Professor	Medicine (Cell and Developmental Biology)	Preceptor	Commitment, differentiation and function of cardiac and vascular cells in the embryo.

Baldwin, H. Scott ,M.D.	Professor	Pediatrics (Cell and Developmental Biology)	Preceptor	molecular basis of vascular development in the mammalian embryo as an approach to understanding the etiology of congenital heart diseases.
Barnett, Joey Victor,Ph.D.	Assoc. Professor	Pharmacology (Medicine)(Microbiology and Immunology)	Preceptor	Growth Factor Signaling during Heart Development
Bock, Paul E.,Ph.D.	Professor	Pathology (Medicine)	Preceptor	Regulation of blood coagulation proteolytic enzymes.
Chen, Jin ,M.D., Ph.D.	Assoc. Professor	Medicine (Cancer Biology)(Cell and Developmental Biology)	Preceptor	Eph receptor tyrosine kinases in vascular assembly, tumor angiogenesis and metastasis.
Corbin, Jackie D.,Ph.D.	Professor	Molecular Physiology & Biophysics	Preceptor	Mechanisms of cyclic GMP mediation of hormone action
Davidson, Jeffrey M.,Ph.D.	Professor	Pathology	Preceptor	Connective tissue research; Wound healing; Gene therapy
de Caestecker, Mark ,M.D., Ph.D.	Assist. Professor	Medicine (Cancer Biology)(Cell and Developmental Biology)	Preceptor	functional role of BMP signaling in pulmonary hypertension
Denison, Mark R.,M.D.	Professor	Pediatrics (Microbiology and Immunology)	Preceptor	Coronavirus / SARS Replication and Cell Biology
Dermody, Terence S.,M.D.	Professor	Pediatrics (Microbiology and Immunology)	Preceptor	Virus structure, virus-cell interactions, and viral pathogenesis
Fazio, Sergio ,M.D., Ph.D.	Professor	Medicine (Pathology)	Preceptor	Macrophage-based gene therapy of hypercholesterolemia and atherosclerosis
Gailani, David ,M.D.	Assoc. Professor	Pathology (Medicine)	Preceptor	Regulation of blood coagulation
Haines, Jonathan L.,Ph.D.	Professor	Molecular Physiology & Biophysics	Preceptor	Gene Discovery in Complex Human Disease

Hamm, Heidi E.,Ph. D.	Professor	Pharmacology (Ophthalmology and Visual Sciences)(Orthopedics and Rehabilitation)	Preceptor	Structure, function and interactions of G-protein coupled receptors, Molecular mechanisms of signal transduction, Vascular Biology
Haselton, Frederick R.,Ph.D.	Assoc. Professor	Biomedical Engineering	Preceptor	Intracellular Engineering
Hasty, Alyssa H.,Ph.D.	Assist. Professor	Molecular Physiology & Biophysics	Preceptor	The contribution of obesity and diabetes to the development of cardiovascular disease
Hoover, Richard L.,Ph.D.	Professor	Pathology (Pediatrics)	Steering Comm. Member	Cell-cell interactions emphasizing leukocyte- endothelial systems; endothelial cell biology
Lin, P. Charles,Ph.D.	Assoc. Professor	Radiation Oncology (Cell and Developmental Biology)(Cancer Biology)	Preceptor	molecular mechanisms that govern blood vessel formation (angiogenesis)
Linton, MacRae F.,M.D.	Professor	Medicine (Pharmacology)	Preceptor	The Macrophage in Atherosclerosis; Gene Therapy
Miller, Bonnie M.,M.D.	Assoc. Professor	Medical Education and Administration (Surgery)	Advisor	Medical education
Morrow, Jason D.,M.D.	Professor	Medicine (Pharmacology)	Preceptor	Lipid Mediators in Health and Disease
Penn, John S.,Ph.D.	Professor	Ophthalmology and Visual Sciences (Cell and Developmental Biology)	Preceptor	molecular basis of ocular angiogenesis
Phillips, John A.,M.D.	Professor	Pediatrics (Biochemistry) (Medicine)(Pathology)	Steering Comm. Member	Molecular investigations of familial disorders
Pozzi, Ambra ,Ph.D.	Assist. Professor	Medicine (Cancer Biology)	Steering Comm. Member	in vivo regulation of tumor angiogenesis
Reese, John Jeffrey,M.D.	Assoc. Professor	Pediatrics	Steering Comm. Member	Prostaglandin signaling in maternal-fetal biology.
Richmond, Ann ,Ph.D.	Professor	Cancer Biology (Medicine)(Cell and Developmental Biology)	Preceptor	The Role of CXC chemokines and their receptors in tumorigenesis and wound healing

Santoro, Samuel A.,M.D., Ph.D.	Professor	Pathology (Biochemistry)	Preceptor	Structure and biology of integrin adhesive receptors for extracellular matrix proteins
Skaar, Eric Patrick,Ph.D., M.P.H.	Assist. Professor	Microbiology and Immunology	Preceptor	Pathogenesis of Staphylococcus aureus and Bacillus anthracis infections
Summar, Marshall L.,M.D.	Assoc. Professor	Pediatrics (Molecular Physiology & Biophysics)	Preceptor	Urea Cycle Enzymes in Disease States / Glutathione Metabolism In Cytotoxic Conditions
Swift, Larry L.,Ph.D.	Professor	Pathology	Principal Investigator Steering Comm.Member	Lipoprotein Metabolism, Hepatic very low density lipoprotein assembly, adipocyte metabolism
Vaughan, Douglas E.,M.D.	Professor	Medicine (Pharmacology)	Preceptor	Regulation of mammalian fibrinolytic system; vascular and tissue remodeling.
Verhamme, Ingrid M.,Ph.D.	Res. Assistant Professor	Pathology	Preceptor	Regulation of blood coagulation proteolytic enzymes
Weeber, Edwin J.,Ph.D.	Assist. Professor	Molecular Physiology & Biophysics (Pharmacology)	Preceptor	Molecular mechanisms and signal transduction processes underlying learning and memory
Williams, Scott M.,Ph.D.	Assoc. Professor	Medicine (Pediatrics)(Molecular Physiology and Biophysics)	Preceptor	Genetics of hypertension and keloids; Genetic structure of African populations
Zutter, Mary M.,M.D.	Professor	Pathology (Cancer Biology) (Microbiology and Immunology)	Preceptor	Integrin-mediated cell adhesion in development, cancer, innate immunity and vascular biology

For additional information on the faculty listed in the attachment, please visit the BRET Website:

https://medschool.mc.vanderbilt.edu/facultydata/php_files/part_dept/view_part.php?letter_search=A

