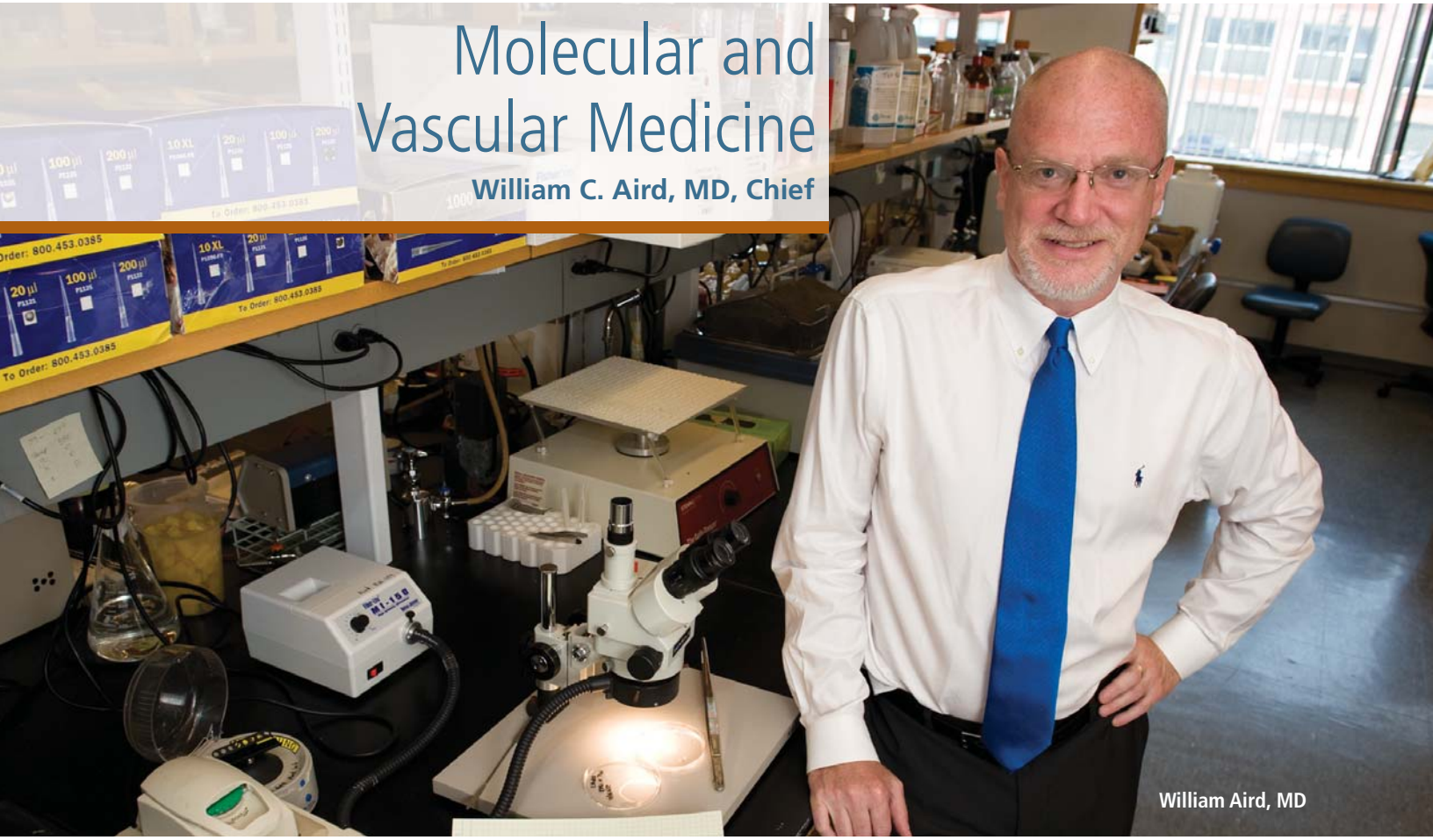
Molecular and Vascular Medicine

William C. Aird, MD, Chief

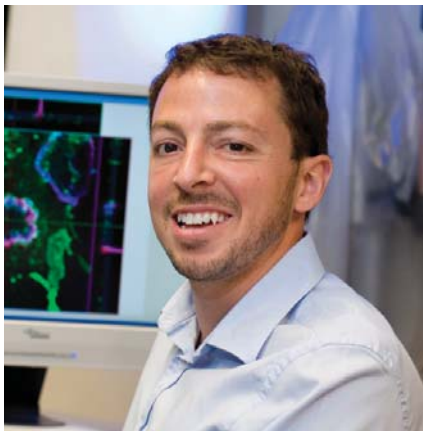


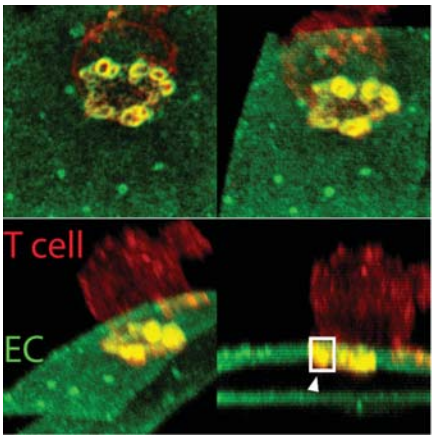
William Aird, MD

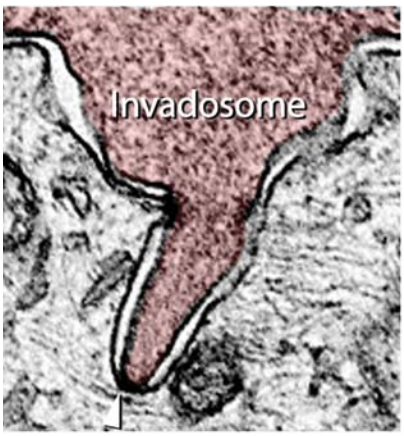
The Division of Molecular and Vascular Medicine is a research division with a focus on studying endothelial cell phenotypes in health and disease. An important goal of the Division is to promote an awareness of the endothelium as a systemically distributed organ system with untapped diagnostic and therapeutic potential. The Division incorporates a wide spectrum of technologies, including in silico modeling of endothelial networks, structural biology, intravital microscopy, cell culture and genetic mouse models.

2009–2010 HIGHLIGHTS

Dr. William Aird was awarded a Program Project Grant from the NIH to study endothelial cell phenotypes in health and disease. Drs. Aird, Ruhul Abid, Erzsébet Ravasz Regan and Marianne Grant were awarded a grant from the NIH to study the role of FOXO transcription factors in endothelial biology. Dr. Grant was awarded her first RO1 grant from the NIH to study the structure and regulatory mechanisms of transcriptional complexes important in vascular gene expression. Dr. Peter Oettgen was awarded a Project as part of Dr. Aird's PPG to study the role of the ETS factor ERG as a transcriptional regulator of endothelial differentiation using mouse embryonic stem cells and ERG knockout mice. His lab also continues to study the role of ETS factors in







Christopher Carman, PhD, in collaboration with Ann Dvorak, MD, in the Department of Pathology, has elucidated basic mechanisms for T cell recognition of antigen presented by endothelium (EC), implicating a new function for invadosomes in informational scanning.

vascular inflammation and remodeling. Dr. Huiyan Zeng continues to study the function of TR3/Nur77 in angiogenesis.

Dr. Ravasz Regan developed a theoretical modeling framework for a multiscale description of endothelial regulatory processes. Dr. Abid was awarded a Grant-in-Aid from the American Heart Association to study the mechanisms by which oxidative radicals modulate endothelial signaling and functions. Dr. Christopher Carman was awarded grants from the American Heart Association and Roche Organ Transplant Research Foundation to investigate contributions of endothelium to immune system function and immunopathology.

SELECTED PUBLICATIONS

Bhasin M, Yuan L, Keskin DB, Otu HH, Libermann TA, Oettgen P. Bioinformatic identification and characterization of human endothelial cell-restricted genes. *BMC Genomics* 2010; 11:342.

Feng J, Damrauer SM, Lee M, Sellke FW, Ferran C, Abid MR. Endothelium-dependent coronary vasodilatation requires NADPH oxidase-derived ROS. *Arterioscler Thromb Vasc Biol* 2010; 30:1703-10.

Grant MA. Integrating computational protein function prediction into drug discovery initiatives. *Drug Develop Res* 2010; 7:4-16.

Kamei M, Carman CV. New observations on the trafficking and diapedesis of monocyte. *Curr Opin Hematol* 2010; 17:43-52.

Jin E, Liu J, Suehiro J, Yuan L, Okada Y, Nikolova-Krstevski V, Yano K, Janes L, Beeler D, Spokes KC, Li D, Regan E, Shih SC, Oettgen P, Minami T, Aird WC. Differential roles for ETS, CREB and EGR binding sites in mediating VEGFR1 expression in vivo. *Blood* 2009; 114:5557-66.

Liu J, Yuan L, Molema G, Regan E, Janes L, Beeler D, Spokes KC, Okada Y, Minami T, Oettgen P, Aird WC. Vascular bed-specific regulation of the von Willebrand factor promoter in the heart and skeletal muscle. *Blood* 2011; 117:342-51.

Liu X, Zhao D, James L, Li J, Zeng H. Requirement of the nuclear localization of transcription enhancer factor 3 for proliferation, migration, tube formation, and angiogenesis induced by vascular endothelial growth factor. *FASEB J* 2010 Dec 17. [Epub ahead of print].

Nikolova-Krstevski V, Yuan L, Le Bras A, Virjayaraj P, Kondo M, Gebauer I, Bhasin M, Carman C, Oettgen P. ERG is required for the differentiation of embryonic stem cells along the endothelial lineage. *BMC Dev Bio* 2009; 9:72.

FACULTY

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Marianne Grant, PhD

Peter Oettgen, MD

Erzsébet Ravasz Regan, PhD

Nathaniel Shapiro, MD, MPH

Huiyan Zeng, PhD

RESEARCH FUNDING

	Direct	Indirect
Federal	1,445,875	744,853
Non Federal	2,070,009	54,763