

as Chemistry or Physics, to Solving Biology's Most Important Fundamental Problems," Outstanding Contributions to Research Awards 2003. She was a 2011 Woman to Watch, *Nashville Medical News* and Nashville Health Care Council. Dr. Hamm has served on many Editorial Boards, NIH panels, and Advisory Boards including the Board of Scientific Counselors, NHLBI, the HHMI Review Board, 2004, 2008, the NIH Peer Review Advisory Committee, Board of Directors, Keystone Symposia, and was President of ASBMB, 2006–2008. She is also on the Scientific Advisory board of the Max Planck Society Center of Advanced European Studies and Research, 2009–2014.

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**HEIDI HAMM, Ph.D.**

STUDIES OF G PROTEIN REGULATION:  
THE VANDERBILT YEARS

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JUNE 12, 2014  
4:00 P.M.  
208 LIGHT HALL

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## STUDIES OF G PROTEIN REGULATION: THE VANDERBILT YEARS

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My work is focused on understanding the molecular basis of signaling mechanisms mediated by G proteins, which are switch proteins. G proteins are normally inactive, but a receptor that has received a specific signal can activate G proteins, leading to changes in cellular activity. We have used biophysical and structural approaches to understand how G proteins become activated by receptors, how they in turn activate effector enzymes, and how they turn off. The resulting changes in cellular activity underlie a large number of physiological processes. We have also studied how GPCRs regulate exocytosis of hormones and neurotransmitters. We discovered a novel mechanism of inhibition of the vesicular fusion machinery by a direct binding of  $G\beta\gamma$  to SNARE proteins at the site of synaptotagmin binding. We have targeted this interaction by synthesis of compounds that block the  $G\beta\gamma$ -SNARE interaction, and are probing its importance with physiological studies using the compounds. Another line of research investigates the roles of protease activated receptors in regulation of hemostasis of human platelets and the pathological consequence of thrombosis, thrombin signaling gone awry. We are targeting antagonists and negative allosteric modulators of PAR4 as novel anti-platelet drugs.



### **HEIDI HAMM, Ph.D.**

**AILEEN M. LANGE AND ANNIE MARY LYLE CHAIR IN  
CARDIOVASCULAR RESEARCH**

**PROFESSOR OF PHARMACOLOGY**

**VANDERBILT UNIVERSITY SCHOOL OF MEDICINE**

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Heidi E. Hamm, Ph.D. is the Aileen M. Lange and Annie Mary Lyle Chair in Cardiovascular Research and Professor of Pharmacology at Vanderbilt University. Her research focuses on the structure and function of GTP binding proteins and the molecular mechanisms of signal transduction. G protein-mediated signaling cascades are key regulators of many physiological processes, including processes of development, differentiation, and regulation of cell division. In the brain, many key neurotransmitters and neuromodulators mediate a myriad of functions by activation of such G protein cascades. Her laboratory has been involved in studying G protein coupled signal transduction for many years. Dr. Hamm obtained her Ph.D. in 1980 from the University of Texas-Austin and did postdoctoral training at the University of Wisconsin-Madison from 1980–1983. She held faculty appointments at the University of Illinois at Chicago School of Medicine and Northwestern University before moving to Vanderbilt in 2000. She has published almost 200 scholarly publications. Dr. Hamm is a Fellow of the American Association for the Advancement of Science since 2011. She received the Fritz Lipmann Memorial Lectureship “In recognition of Outstanding Research Contributions” at the American Society for Biochemistry and Molecular Biology (ASBMB), 2001, and is a popular keynote lecturer at national and international conferences. She was Faculty of the Year at the University of Illinois College of Medicine, 1996, and she received the Ariens Award from the Dutch Pharmacological Society, 2012, and the Vanderbilt University Medical School Stanley Cohen Award “For Research Bringing Diverse Disciplines, such

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