

ISHR Outstanding Investigator Award

The purpose of this award is to recognize an outstanding scientist who (i) is making major and independent contributions to the advancement of cardiovascular science, and (ii) is leading a growing research program likely to play a major role in the future. The main criteria for selecting awardees are scientific excellence, independence, and potential for future research contributions. While the Peter Harris Award recognizes lifelong accomplishments and the Richard Bing Award recognizes young investigators, the Outstanding Investigator Award (presented annually) is targeted at established investigators who are in the intermediate phase of their academic career.

In non-Congress years, the Outstanding Investigator Award is presented at the meeting of the ISHR Section to which the winner belongs. The winner presents a major lecture and receives a \$5,000 honorarium and a plaque. An announcement of this Award is published in *Heart News and Views*, and posted in the ISHR website. The winner receives free registration and reimbursement for travel expenses (up to a maximum of \$1500 when the recipient delivers the lecture at his/her local Section meeting, and \$3,000 when inter-continental travel is required).

Nominations for the Outstanding Investigator Award are sought by the Secretary General from members of the International Council, members of the Editorial Board of the *Journal of Molecular and Cellular Cardiology*, and the Councils of ISHR Sections. In addition, the Secretary General publishes an open invitation in the ISHR Website for members to submit nominations.



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International Society for Heart Research

The Outstanding Investigator Award 2012



Award Winner

Dr. Thomas Eschenhagen

“Beating heart muscle in the dish—a long path towards application”

Thomas Eschenhagen, M.D.

2012 Award Winner Belgrade, Serbia

Dr. Thomas Eschenhagen is Professor of Pharmacology and Director of the Department of Experimental Pharmacology and Toxicology at the University Medical Center Hamburg Eppendorf, Germany. Dr. Eschenhagen studied Medicine (1978-1986) and completed his experimental M.D. thesis in Pharmacology and Toxicology in 1988 at the Medical School Hannover under the direction of Prof. Hans Herbert Wellhöner. After a three years residency in Internal Medicine at the Vinzenz Hospital Hannover (1986-1989) he trained as Pharmacologist at the Institute of Pharmacology at the University Hospital Hamburg Eppendorf under the direction of Prof. Hasso Scholz. After his habilitation in Experimental and Clinical Pharmacology and Toxicology in 1994 he received a prestigious Heisenberg Stipend of the German Research Foundation (DFG) and spent several short-term fellowships (2-6 months) in Washington University School of Medicine, St. Louis, MO (Prof. Elliot L. Elson), Stanford Research Institute, Menlo Park, CA (Dr. Nanette Bishopric), National Institute on Aging, Baltimore, MD (Dr. Edward G. Lakatta), and INSERM Unit 544 in Chatenay-Malabry, Paris, France (Dr. Rodolphe Fischmeister). In 1998 he became Chair of the Institute of Clinical Pharmacology at the University of Erlangen, Germany and in 2002 he took his present position in Hamburg.

Dr. Eschenhagen has received numerous awards and honors, including the Martini-Award, University of Hamburg (1991), the Rudolf Thauer Award, German Society of Cardiology (1992), Sandoz Award for Translational Science (1995), Fraenkel Award of the German Society of Cardiology (1997) and the Ursula M. Händel Award for the Replacement of Animal Experiments of the German Research Foundation in 2011. He was named Fellow of the American Heart Association in 2004, Fellow of the European Society of Cardiology in 2010, and Fellow of the International Society of Heart Research in 2010. Since 2004 he is member of the Academy of Science, Göttingen and since 2008 member of the German Academy of Science Leopoldina. He is currently President of the ISHR European Section (2010-2012) and was recently voted member of the Senate's commission on *Sonderforschungsbereiche* (center research grants) of the German Research Foundation. Since 2011 he is coordinator and speaker of German Center of Cardiovascular Research, a long term, high volume grant initiative of the German Ministry of Research involving 7 partner site and 24 institutions. Between 2004 and 2012 he served as panel member of the reviewing board of the German Research Foundation and is frequently involved in international grant reviewing including INSERM, ANR (France) Netherland Heart Foundation, British Heart Foundation, and Swiss National Fonds. He participated in two roadmap procedures for the NIH (2007) and the German Ministry of Research

(2007). He is in the editorial board of numerous peer-review journals, and serves at the Board of the German Foundation for Heart Research, Foundation for Chronic Heart Disease, ADUMED-Foundation, Hufeland-Award, and Galenus-von-Pergamon-Award Committee.

Dr. Eschenhagen has concentrated his research efforts on understanding the molecular mechanisms of heart failure with a focus on β -adrenergic signaling, its adaptation in heart failure and consequences on contractile function. He contributed significantly to a better understanding of G protein-mediated signaling mechanisms in cardiac myocytes: the molecular adaptations underlying β -adrenergic desensitization in heart failure and their pathophysiological role (e.g. *Circ Res* 1992, *Circulation* 1996, *Editorial Nat Med* 2008), the role of NO and cGMP for β -adrenergic signaling (*J Physiol* 1998, *Nat Med* 1999), the role of increased phosphatase activity in heart failure (*J Mol Cell Cardiol* 1997), and the role of phosphatase inhibitor-1, a small conditional amplifier of β -adrenergic signaling (*FASEB J* 2003, *Cardiovasc Res* 2004, *Cardiovasc Res* 2008, *J Clin Invest* 2010). He is currently engaged in screening for first inhibitor-1 antagonists as a potential translational approach in heart failure. A second focus of his group is pharmacogenetics of β -adrenergic receptors and beta-blockers (*Clin Pharmacol Ther* 2002, *Pharmacogenetics* 2002, *Clin Pharmacol Ther* 2009, *Clin Pharmacol Ther* 2012).

Dr. Eschenhagen is perhaps best known for his pioneering work on 3-dimensional engineered heart tissue (EHT) from primary cardiac cells. In collaboration with Dr. Elson's group in St. Louis he first described a method to generate spontaneously beating, force-generating 3D heart tissue from embryonic chick hearts (*FASEB J* 1997). The original lattice technique was quickly adapted to neonatal rat cardiac myocytes (*Biotechnol Bioengin* 2000) and modified to a ring-EHT format with better tissue development and easier handling (*Circ Res* 2002, 2005). Originally designed as an improved *in vitro* model for drug testing and target validation, this technique, in combination with recently established protocols to generate EHTs from human embryonic stem cell- and human induced pluripotent stem cell-derived cardiac myocytes (*PLoS One* 2011), has opened new perspectives in biomedicine (e.g. medium throughput drug screening, LQT and cardiotoxicity testing, and iPS-mediated disease modeling) and cardiac repair (*Circulation* 2002, 2006, 2007, *Nat Med* 2006).

Dr. Eschenhagen's fourth research focus, in collaboration with Dr. Lucie Carrier, Paris (Dr. Carrier is in Hamburg since 2005), explores the functional genomics of hypertrophic cardiomyopathy.

The joint research effort resulted in the first evidence that impairment of the ubiquitin proteasome system may play a pathophysiological role in HCM (*Cardiovasc Res* 2004), and found that dysfunction/deficiency of cardiac myosin binding protein C (cMyBP-C), a common affected protein in HCM, leads to increased Ca^{2+} sensitivity of myofilaments and thereby to relaxation deficits and diastolic dysfunction (*Circ Res* 2007, 2009), suggesting that the latter is a primary defect in HCM and not the consequence of cardiac hypertrophy. This hypothesis and therapeutic approaches are presently being tested in a hiPS-EHT disease modelling approach.

Dr. Eschenhagen is also an engaged teacher and mentor. He authored several textbook chapters on cardiovascular pharmacology and drug politics, and he is an active contributor to patient information via the German Heart Foundation. He has trained more than 60 M.D. thesis and 20 Ph.D. thesis students. Dr. Eschenhagen promotes training of young scientists on several levels including career talks at the German Society of Cardiology, the creation of an MD/PhD program and an interdisciplinary Cardiovascular Research Center in Hamburg as well as an extensive training program launched in the framework of the German Center for Cardiovascular Research. His young, international research team in Hamburg and the open-minded human touch testify the success of this engagement.

Previous Award Winners....

Walter J. Koch, Ph.D.
(Philadelphia, PA: 2011)

Jeffrey D. Molkentin, Ph.D.
(Kyoto, Japan: 2010)

Mathias Gautel, M.D., Ph.D.
(Nice, France: 2009)

Joseph Loscalzo, M.D.
(Toronto, ON: 2006)

Eric Olson, Ph.D.
(New Orleans, LA: 2005)

Issei Komuro, M.D., Ph. D.
(Tokyo, Japan: 2003)

Peter Carmeliet, M.D., Ph.D.
(Szeged, Hungary: 2002)