LECTURE

Human 3D heart muscles for improved in vitro testing and cardiac repair.

Dr. THOMAS ESCHENHAGEN

He is Professor of Pharmacology and Director of the Department of Experimental Pharmacology and Toxicology at the University Medical Center Hamburg Eppendorf, Germany. He is also chairman of board of directors of the German Centre of Cardiovascular Research (DZHK).

Dr. Eschenhagen has concentrated his research efforts on understanding molecular mechanisms of heart failure with a focus on □-adrenergic signaling, its adaptation in heart failure and consequences on contractile function. He contributed significantly to a better understanding of molecular mechanisms and functional consequences of □-adrenergic desensitization in heart failure, the role of NO and cGMP for □-adrenergic regulation of heart function, the role of phosphatase inhibitor-1 and its potential as a therapeutic target, and pharmacogenetics of beta-blockers.

Dr. Eschenhagen is best known for his pioneering work on 3-dimensional engineered heart tissue (EHT) from primary cardiac cells, starting 1994 in collaboration with Elliot Elson, St. Louis, USA. Originally designed as an improved in vitro model for drug testing and target validation, the EHT technology has been expanded to an automated 24-well screening platform. In combination with recently established protocols to generate cardiac myocytes from human embryonic and induced pluripotent stem cells, this technique opens new perspectives in biomedicine, e.g. medium throughput drug screening, LQT and cardiotoxicity testing, disease modeling and others. In parallel, he and his group have developed the EHT technology towards cardiac repair applications and have shown that EHTs survive after implantation on injured hearts, can couple to host myocardium and improve cardiac function after myocardial infarction.

For his contributions to science, he received the Fraenkel Award of the German Society of Cardiology (1997) and the Outstanding Investigator Award of the ISHR (2012). He is member of the German Academy of Science Leopoldina (2008) and received an ERC Advanced Grant (2013).