Mohammed Rabiul Hosen1#, Xu Xiang1, Philip Roger Goody1, Andreas Zieter2, Sven Thomas Niepmann1, Alexander Sedaghat1, Vedat Tiyerili1, Joseph B. Moore IV2, Shizuka Uchida3, Jan-Malte Sinning4, Sebastian Zimmer1, Eicke Latz5, Nikos Werner6, Georg Nickenig1, Felix Jansen1

1Heart Center Bonn, Department of Internal Medicine II, University Hospital Bonn, Venusberg-Campus 1, 53127 Bonn, Germany., 2Diabetes and Obesity Center, University of Louisville, 580 S. Preston St. Louisville, KY 40202, USA., 3Center for RNA Medicine, Department of Clinical Medicine, Aalborg University, Frederikskaj 10B, 2., DK-2450 Copenhagen SV, Denmark., 4Internal Medicine-III, St. Vinzenz Hospital, Merheimer Str. 22-23, 50733 Cologne, Germany., 5Institute of Innate Immunity, University Hospital Bonn, University of Bonn, Venusberg-Campus 1, 51327 Bonn, Germany., 6Department of Internal Medicine / Cardiology, Krankenhaus der Barmherzigen Brüder Trier, Nordallee 1, Trier, Germany.

Contact: hosenmr@uni-bonn.de

Transcatheter aortic valve replacement (TAVR) is a well-established treatment option for high- and intermediate-risk patients with severe symptomatic aortic valve stenosis (AVS). The majority of patients experience an improvement of the left ventricular ejection fraction (LVEF) after TAVR in response to TAVR-associated afterload reduction. Whereas some studies have explored the role of miRNAs and EVs in patients with CVD, the expression of miRNAs in AVS patients with low LVEF that undergo TAVR has not been explored. Thus, it is of high interest to delineate the role and function of the differential expression of miRNAs in pathogenesis and cardiac remodeling in these patients.

In this study, we aim to identify the expression levels of circulating miRNAs associated with LVEF in response to TAVR and explore in the pathological changes in AVS patients with impaired heart function. Herein, we profiled the differential expression of miRNAs in circulating extracellular vesicles (EV-miRNAs) in patients after TAVR and, in particular, the novel role of circulating miR-122-5p in cardiomyocytes.

Introduction

Transcatheter aortic valve replacement (TAVR) is a well-established treatment option for high- and intermediate-risk patients with severe symptomatic aortic valve stenosis (AVS). The majority of patients experience an improvement of the left ventricular ejection fraction (LVEF) after TAVR in response to TAVR-associated afterload reduction. Whereas some studies have explored the role of miRNAs and EVs in patients with CVD, the expression of miRNAs in AVS patients with low LVEF that undergo TAVR has not been explored. Thus, it is of high interest to delineate the role and function of the differential expression of miRNAs in pathogenesis and cardiac remodeling in these patients.

In this study, we aim to identify the expression levels of circulating miRNAs associated with LVEF in response to TAVR and explore in the pathological changes in AVS patients with impaired heart function. Herein, we profiled the differential expression of miRNAs in circulating extracellular vesicles (EV-miRNAs) in patients after TAVR and, in particular, the novel role of circulating miR-122-5p in cardiomyocytes.

Circulating microRNA-122-5p correlates with improvement of left ventricular function after transcatheter aortic valve replacement and regulates viability of cardiomyocytes via extracellular vesicles-mediated cellular crosstalk