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Mitochondrial stress in monocytes is reflected in micro-vesicles and associated with metabolic and coronary artery diseases

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Obesity's negative impact on health is well-documented. Health consequences are categorized as being the result of either increased fat mass (which leads to osteoarthritis, obstructive sleep apnea, social stigma) or an increased number of fat cells (which contributes diabetes, cancer, cardiovascular diseases). Disease processes increasing risk in association with obesity are subclinical chronic low-grade inflammation and oxidative stress which are also involved in development of cardiovascular diseases. For example, recent data suggest that increased oxidative stress in adipose tissue is an early instigator of metabolic syndrome. Given the number of symptoms and risk factors which characterize metabolic syndrome, the variability in combinations of three out of five its components, and the variability in treatments and patient responses to treatment of those symptoms, there remains a need in the art for identifying patients who are at risk for developing metabolic syndrome, T2D, and/or cardiovascular diseases. In this study we discovered RNA expression patterns related to mitochondrial dysfunction and oxidative stress in monocytes which were associated with metabolic syndrome and T2D, and identified an at-risk population for new cardiovascular events in CAD patients. For the first time, we showed that signatures in monocyte-specific micro-vesicles reflects these in monocytes and have similar predictive properties. We also found that identified gene signatures were related to obesity and atherosclerosis in mice and pigs.

Biography

Paul Holvoet is a Professor in Biomedicine at the Department of Cardiovascular Sciences at the Catholic University of Leuven. His research focuses on the interaction between oxidative stress and inflammation in the pathogenesis of metabolic and cardiovascular diseases. He is a Fellow of the European Society of Cardiology and the American Heart Association. He is first inventor on international patents related to oxidized LDL and gene signatures in monocytes and derived exosomes. He is also a Co-Founder of Tank™.

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