

The search for better diagnostic methods for cardiovascular disease

Cardiovascular disease is a general term for several conditions affecting the heart or blood vessels. It is one of the main causes of death in both Europe and the United states and one of the first symptoms are often sudden death. New diagnostics and prevention methods have to be developed in order to save all these lives.

The current diagnostics and prevention methods for cardiovascular disease (CVD) are bad and outdated and the need for more accurate methods are on high demand. A popular diagnostic method is to use a so-called biomarker to diagnose a specific disease. A biomarker is something that indicates a biological state. The purpose of this master thesis study was to analyze if some proteins can be used as a biomarker for CVD and if it can indicate the risk of CVD before a life-threatening event. This were done by measuring the relative protein levels in 1 068 blood samples, from people in Gothenburg between the ages of 50 and 64. All blood samples were from a study called SCAPIS (Swedish CardioPulmonary bioImage Study) pilot study, which is a large national project in Sweden. The project focuses on analyzing potential biomarkers for CVD. This master thesis study was a part of the SCAPIS pilot study.

The protein selected to be analyzed were endothelial specific, which is proteins that are overexpressed in endothelial cells. Endothelial cells line the blood vessels throughout the body and are involved in many important processes, such as regulation of blood pressure, homeostasis, plaque formation and inflammation. These functions are highly related to CVD and several studies have shown that dysregulation of endothelial function could lead to vascular damage and cardiovascular disorder.

There are several known risk factors for CVD such as smoking, obesity, diabetes and high blood pressure. These groups were used to analyze the difference in protein levels between the subgroups within the four risk groups, such as the protein levels of a certain protein between smokers and non-smokers and diabetics and non-diabetics. Since this groups are known to be related to CVD, the protein that has a higher protein level in for example obese people might be a potential biomarker and an indication of an ongoing CVD. However, this protein could just be an indication of the obesity and not a CVD. For that reason, proteins that have higher protein levels in several risk groups are of more interest in this study, since these might indicate an underlying CVD.

The protein levels were measured by a single binder assay, which measure the protein levels with the help of one antibody per analyzed protein. 221 proteins were analyzed in this project and 28 of them had protein levels that were higher in two or more risk groups. These proteins should be analyzed further in order to investigate if any of them could be used as biomarker, or in other words, an indication of CVD.