Atherosclerosis is an inflammatory disease of the large and medium sized arteries that is characterized by accumulation of lipids, and immune cells in the arterial wall. The disease is the major underlying cause of cardiovascular disease (CVD) including stroke, heart failure and myocardial infarction. Though atherosclerosis per se can promote CVD via formation of atherosclerotic plaque which results in reduced blood flow, the major complications are usually due to thrombotic occlusion of the arteries caused by rupture of an atherosclerotic plaque. In the last two decades it has become more evident that inflammation most likely plays an important role in the development and progression of atherosclerosis. The inflammatory response is mediated via the assembly of the NLRP3 inflammasome, which is responsible for the production and release of pro-inflammatory cytokines. The NLRP3 inflammasome is a trimeric protein that consist of the proteins NLRP3, ASC and caspase-1. The NLRP3 inflammasome was initially also associated with the CARD8 protein, although this has more recently been questioned. However, the role of NLRP3 and CARD8 in the development of CVD is not fully known.

The present thesis shows that CARD8 and several of the components associated to the NLRP3 inflammasome are expressed in atherosclerotic lesions. Genetic risk markers associated with altered levels of cytokines and chemokines have been identified in the CARD8 gene and in a regulatory region of the NLRP3 gene, but they play no role on the risk for myocardial infarction. The thesis also shows that CARD8 is involved in the regulation of inflammatory markers in vascular cells. The results presented in this thesis contributes to increased knowledge about NLRP3 and CARD8 in the pathogenesis of CVD.