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Atherosclerosis – novel mechanisms and therapeutic targets

Atherosclerosis is a long-term, chronic inflammatory disease of the vessel wall leading to the formation of occlusive or rupture-prone lesions in large arteries. Complications of atherosclerosis can become severe and lead to cardiovascular diseases (CVD) with lethal consequences. During the last three decades, chemokines and their receptors earned great attention in the research of atherosclerosis as they play a key role in development and progression of atherosclerotic lesions. They orchestrate activation, recruitment, and infiltration of immune cells and subsequent phenotypic changes, e.g., increased uptake of oxidized low-density lipoprotein (oxLDL) by macrophages, promoting the development of foam cells, a key feature developing plaques. In addition, chemokines and their receptors maintain homing of adaptive immune cells but also drive pro-atherosclerotic leukocyte responses. Recently, specific targeting, e.g., by applying cell specific knock out models have shed new light on their functions in chronic vascular inflammation. My presentation covers recent findings on the role of immunomodulatory chemokines in the development of atherosclerosis and their potential for specific targeting, as well as novel modalities addressing immune checkpoints, such as CD40-CD40L. In addition, I will discuss a new role of ApoE is a direct checkpoint inhibitor of unresolvable inflammation involving the complement cascade and a role of neuro-immune interfaces in atherosclerosis.