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Extended Abstract

Lectin-like oxidized low-density lipoprotein receptor-1 (LOX-1) and soluble LOX-1 (sLOX-1): implications in atherosclerosis-related diseases

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Abstract

The development of atherosclerosis is a multifactorial process, but oxidized low-density lipoprotein (oxLDL) has been recognized as a critical player in the pathogenesis of the disease. The lectin-like oxLDL receptor-1 (LOX-1) has recently been identified as the primary scavenger receptor of oxLDL, which mediates their detrimental biological effects in endothelial cells. Subsequent studies have revealed that LOX-1 is also expressed by other cells highly implicated in atherosclerosis, such as monocytes/macrophages, vascular smooth muscle cells, cardiomyocytes and platelets. On one hand interaction of oxLDL with LOX-1 promotes oxidative stress and transcription of pro-inflammatory molecules, and on the other hand increases the expression of LOX-1 as a result of the vicious cycle, activated by the atherogens. Thus, LOX-1 has been suggested as a key molecule in vascular inflammation and in atherosclerotic plaque formation, destabilization, erosion and rupture.

LOX-1 expressed on the cell surface can be proteolytically cleaved at its membrane proximal extracellular domain and released as a soluble form (sLOX-1). The serum sLOX-1 has emerged as a novel independent marker for acute coronary syndrome with a diagnostic potential superior than this of high-sensitivity C-reactive protein and troponin-T. In addition, increased sLOX-1 concentrations have been associated with the presence and severity of coronary artery disease (CAD) as well as with arterial stiffness. In stable CAD patients, higher sLOX-1 levels predict an increased risk of coronary in-stent restenosis, periprocedural myocardial infarction after elective percutaneous coronary intervention and all major adverse cardiovascular events. Several lines of evidence have demonstrated that elevated sLOX-1 is also observed in acute ischemic stroke. Moreover, increased sLOX-1 concentrations have been detected in patients with obesity, metabolic syndrome and type 2 diabetes mellitus which are other well-known atherosclerotic risk factors.

The aim of this review is to summarize the current knowledge of the role of LOX-1 and sLOX-1 in atherosclerosis-related diseases.