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Structural properties of oxidized LDL receptor LOX-1 as a therapeutic target for atherosclerosis and cancers – significance of LOX-1 structure and dynamics in terms of drug design and drug delivery

Shin-Ichi Tate
Hiroshima University, Japan

Atherosclerosis is a chronic inflammatory disease of the arterial wall which causes cardiac morbidity and mortality. Atherogenesis is ignited by oxidized LDL (OxLDL) stimulation to the endothelial cells through the binding to OxLDL receptors on the cells. Lectin-like OxLDL receptor-1 (LOX-1) is the major OxLDL expressed on the endothelial cells. The basic level of LOX-1 expression is low in the normal cells. In the early stage of atherogenesis, OxLDL binding to LOX-1 elevates the LOX-1 expression to progress the cell dysfunction further, which eventually ends in the atheromatous plaque formation. LOX-1 is revealed to engage in the angiogenesis among the cancerous cells. LOX-1 is, therefore, quite a promising therapeutic target for the two major diseases including cardiovascular diseases and cancers. My group has been working on the structural characterization of LOX-1, starting from structure determination of the LOX-1 ligand binding domain, structure dynamics of the LOX-1 extracellular domain and the modes of the ligand recognition on the cell surface that provides the basic ideas for drug delivery exclusively to the dysfunctioned cells in the atherosclerotic lesions. In this presentation, I am going to summarize the structure and dynamics of LOX-1 and show how such structural properties can be applied to the therapeutical purposes.

Speaker Biography

Shin-Ichi Tate has completed his PhD from the University of Tokyo, Japan. He has been working on protein structure and dynamics primarily using NMR. His current interest is in the intrinsically disordered proteins, but he continues the researches on the disease relating proteins like LOX-1. He has 144 publications that have been cited over 1,400 times.

e: tate@hiroshima-u.ac.jp

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