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The involvement of lysosomal phospholipase A2 in ocular disease

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Abstract

The transparency of aqueous humor (AH) is essential to maintain good vision and normal aqueous outflow in eyes. In the anterior chamber, defective cells and cell particles which contain insoluble glycerophospholipids must be eliminated from the AH by a certain mechanism or system within the AH circulatory tracts. Various lysosomal enzymes have been found in the AH. Lysosomal phospholipase A2 (LPLA2) is a major enzyme for glycerophospholipid degradation in the cell and is released into extracellular space by stimulants such as zymosan. These data suggest that the LPLA2 in the AH is associated with the removal of the insoluble materials provided from the aqueous flow system. First, we focused on the LPLA2 in pig eyes. The LPLA2 activity in the AH was twice higher than that in the serum. In addition, the trabecular meshwork showed the highest activity in the ocular tissues. In the clinical AH specimens, glaucoma and uveitis groups showed higher activity of LPLA2 than other ocular disease groups. Furthermore, we examined the LPLA2 activity using endotoxin-induced uveitis (EIU) rats. The LPLA2 activity in rat AH was significantly increased by EIU induction and was correlated to the extent of inflammation in the anterior chamber. By contrast, the LPLA2 activity in the serum was not influenced by EIU induction. In immunohistochemical analysis, LPLA2 was found in infiltrated cells in the anterior chamber of the EIU rat. Taken together, we propose that LPLA2 plays a critical role in a clearance system of undesirable materials containing glycerophospholipids in the anterior chamber.

Biography

Miki Hiraoka completed Medical Doctor's degree at Nippon Medical School (1990). She was a postdoctoral fellow at Oakland University in Michigan (USA, 1998-2000), working under professor Shastry, BS on genetic analysis of ocular diseases. Then she expanded her scientific career at University of Michigan (2000-2004), working under professor Shayman, JA on LPLA2. She was awarded the degree of PhD from Nippon Medical School (2006). She has more than 20 publications in reputed journals. She is currently assistant professor of Department of Ophthalmology at Sapporo Medical University. Her recent interest is the uveitis and lipid metabolism in ocular disease.