Crystal Structure of Leukocyte Ig-like Receptor 9 (LIR9/ILT11 /CD85f)

Mitsunori Shiroishi, Kimiko Kuroki, Toyoyuki Ose, Daisuke Kohda, Katsumi Maenaka, *Medical Institute of Bioregulation, Kyushu University, Fukuoka, Japan.* E-mail: shiro@bioreg.kyushu-u.ac.jp

Leukocyte Immunoglobulin(Ig)-like receptors (LIRs) are human Ig-like receptors that have activating and inhibitory function in leukocytes. LIRs can be subdivided into three groups: inhibitory, activating and secreted molecules. LIR9 is mainly expressed on monocytes and neutrophils as both membrane bound and secreted forms. The membrane bound LIR9 is an activating receptor with arginine residue in its transmembrane region, and the cross-linking of LIR9 induces activation of monocytes. Whereas LIR1 and LIR2, the inhibitory receptors of LIR family, are known to bind to a broad range of human MHC class I molecules (MHCIs), the binding property of LIR9 is unknown. LIR9 shows less homology with LIR1/2/6 recognizing MHCIs (less than 60% amino acid identity with LIR1/2/6). Here we demonstrated that LIR9 had no or very weak affinities to MHCIs by biosensor analysis. Furthermore, we determined the crystal structure of extracellular domain of LIR9 at 1.9 Å resolution by MAD method. The structure showed large structural differences in the region corresponding to the MHCI binding site of LIR1, resulting in the disability of LIR9 to bind to MHCIs. These results raised the possibility that LIR9 recognizes a non-MHCI ligand.

Keywords: immune regulation, immunoglobulin-like receptor, structural immunology