Crystal Structures of the Carbohydrate Recognition Domain of Emp46p and Emp47p

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Emp46p and Emp47p are type-I membrane proteins that cycle between the endoplasmic reticulum (ER) and the Golgi apparatus in vesicles coated with coat protein complex II (COPII). They are considered to function in pairs as cargo receptors for exporting soluble *N*-linked glycoproteins from the ER. To investigate the structural basis for the glycoprotein transport by Emp46p and Emp47p, we have determined crystal structures of the carbohydrate recognition domains (CRD) of Emp46p and Emp47p, in the absence and presence of metal ions. Both proteins fold as a beta-sandwich, and resemble that of the mammalian ortholog, p58/ERGIC-53. However, the nature of metal binding is different from that of Ca²⁺-dependent p58/ERGIC-53. The CRD of Emp46p does not bind Ca^{2+} but instead contains K⁺ near the putative ligand binding site. To our surprise, the CRD of Emp47p binds no metal ions at all. We suggest that the carbohydrate recognition by the hetero oligomeric complex of Emp46p and Emp47p is different from that of Ca^{2+} -dependent p58/ERGIC-53. Details of binding assay using surface plasmon resonance will be presented and compared with the crystallographic results.

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