Crystal Structures of Proteins Involved in Membrane Traffic

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Membrane traffic plays crucial roles in cell functions such as post-translational modification of newly synthesized proteins, exocytosis and endocytosis, receptor recycling, autophagy and lipid transport. Vesicle transport mediates many of these trafficking events using an intricate network of protein-protein interactions of coat proteins, adaptor proteins (AP), cargo receptors, SNARE complexes, small GTPases, ubiquitin and various accessory proteins. I will present our most recent structures of proteins involved in membrane trafficking of proteins and lipids between different organelles: the endoplasmic reticulum, the trans-Golgi Network, endosomes and lysosomes. First, double-sided recognition of ubiquitin molecules by several adaptor proteins will be presented as a recurring structural motif, from the examples of the ubiquitin interacting motif (UIM) of Hrs (hepatocyte growth factor-regulated tyrosine kinase substrate), and the GAT domain of GGA (Golgi-localizing, ã-adaptin ear domain homology, ARF-binding) and others. Second, structures of proteins involved in the first phase of vesicle budding from the ER; a guanine nucleotide exchange factor, small GTPases, and cargo receptors such as yeast Emp46p and Emp47p will be described using examples selected from yeast and plant proteins.

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