Characterization of a tonoplastic transporter

Proteins from the superfamily of major intrinsic proteins (MIPs) are represented in all kingdoms of life where they transport water and other polar molecules through different membranes [1]. In the model plant Arabidopsis thaliana the MIP superfamily composes four subfamilies, namely plasma membrane intrinsic proteins (PIPs), tonoplast intrinsic proteins (TIPs), Nod26-like intrinsic proteins (NIPs) and small and basic intrinsic proteins (SIPs) [1]. Where PIPs facilitate the passive transport of water through the cell membrane, TIPs transport water and ammonia [2] into the vacuole and vice versa. Ammonium transporter deficient yeast complementation assays proofed the capability of AtTIP2;1 and 2;3 to transport NH$_3$ [3]. Where some TIPs have already been associated to cell elongation and desiccation [4][5], microarray- [4][5] and GFP-fusion-studies [6] have elucidated their expression pattern. But little has been said about its role in nitrogen metabolism. The possible function of NH$_4^+$-storage in the vacuole is strongly dependent on its (dynamic) cytosolic concentration, pHs, the permeability of the tonoplast and its TIPs.

This work represents an early functional and structural characterization of AtTIP2;1 in vitro. The protein was heterologously overexpressed and purified to analyze its transport kinetics by Stopped-Flow.

Andreas Kirscht, Per Kjellbom and Urban Johanson

Biochemistry and Structural Biology, Lund University, Sweden (e-mail: Andreas.Kirscht@biochemistry.lu.se)