UNIVERSITÄT BONN

Die Pflanzenwissenschaftlichen Institute

Einladung zum Pflanzenwissenschaftlichen Kolloquium

Freitag, den 29. September, 16 c.t.

Katzenburgweg 5, Hörsaal 1. OG

– Außerplanmäßiger Vortrag –

Referent: Prof. Dr. Junpei Takano

Laboratory of Plant Nutrition, Osaka Metropolitan University, Japan

Thema: ***„Mechanisms controlling polar localization and boron-dependent degradation of boric acid/borate transport proteins.“***

Boron (B) deficiency and toxicity are agricultural problems impeding crop production worldwide. Due to relatively high solubility of B as boric acid (B[OH]3), B deficiency often occurs in high rain fall areas, while B toxicity occurs in arid and semi-arid areas.
Boron is essential for plant growth and survival due to its function in cross-liking pectin at the rhamnogalacturonan II (RG-II). Under low-B conditions, a boric acid channel NIP5;1 and a borate [B(OH)4–] exporter BOR1 play key roles in B uptake and translocation in Arabidopsis thaliana. In root cells including epidermal and endodermal cells, NIP5;1 and BOR1 are localized to the plasma membrane in polar manners toward the soil- and stele-side, to support directional transport of B toward the root stele. The polar localization of NIP5;1 and BOR1 is mediated not by a static retention mechanism, but by constitutive endocytosis and exocytosis dependent on phosphorylation in N/C-terminal regions. It is likely that different modes of transcytosis are operating for the polar localization toward the soil- and stele-side cell domains. When the B concentration in soil fluctuates, plants have to control activities of these transport proteins. Upon sufficient-B supply, BOR1 undergoes polyubiquitination and is transported from the plasma membrane to the vacuole for degradation, to avoid overaccumulation of B. Our forward genetic screen identified that amino acid residues located in vicinity of the substrate-binding pocket of BOR1 are essential for the vacuolar sorting. BOR1 variants that lack B-transport activity showed a significant reduction of polyubiquitination and subsequent vacuolar sorting. Our study on BOR1 and other studies on yeast amino acid transporters suggest that ubiquitination of these transporters relies on its conformational transition during the transport cycle. We will present our current attempts to prove the transport-coupled ubiquitination model for auto-regulation of transporters.

Diskussionsleitung: : Prof. Dr. Gabriel Schaaf, INRES - Institut für Nutzpflanzenwissenschaften und Ressourcenschutz, Bereich Pflanzenernährung, Universität Bonn

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