



第51回岩手大学 COEフォーラム

(共催：東北農業研究センター)

岩手大学21世紀COEプログラム「熱-生命システム相関学拠点創成」では、関連分野において国内外で活発に研究をされている方をお招きしてフォーラム(セミナー)を開催しています。今回は、第5回国際アクアポリン会議出席のため来日されるフランス国立科学研究センター(CNRS)・C. Maurel博士をお招きし、水チャンネルタンパク質・アクアポリンの機能とその活性制御機構に関する最先端の研究を紹介していただきます。

お忙しいとは思いますが、万障繰り合わせの上、ぜひご参加いただきますようお願い申し上げます。

第51回担当・農学部附属寒冷バイオシステム研究センター
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日時：2007年7月17日(火) 11:00~12:30

場所：岩手大学図書館 生涯学習・多目的学習室(2階)

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Role and Multiple Controls of Aquaporins in Roots and Leaves

A combination of pharmacological and reverse genetic approaches was developed in *Arabidopsis* to show that aquaporins are crucial for plant water relations and contribute to water transport throughout the whole plant body. In particular, transgenic plants that over-express or are disrupted in a single aquaporin gene were used to dissect the role of individual plasma membrane aquaporin isoforms in roots and inner leaf tissues. Roots provide a unique model system to investigate the variety of cellular and molecular mechanisms that can account for plant aquaporin regulation. Proteomic analyses revealed that plasma membrane aquaporins carry multiple post-translational modifications including phosphorylation and methylation. Exposure of roots to salt induces aquaporin dephosphorylation, and changes in aquaporin expression and subcellular localization at multiple levels, which may act in concert to regulate root water transport. By contrast, inhibition of root water uptake by anoxia is linked to cytosol acidosis, which inhibits all plasma membrane aquaporins by a direct gating mechanism. Hydrogen peroxide (H_2O_2) and/or derived reactive oxygen species, which accumulate in roots under stress, are also potent inhibitors of water transport in *Arabidopsis* roots. We will describe how H_2O_2 acts on calcium signalling cascades and on a membrane internalisation mechanism which down-regulate plasma membrane aquaporin function.

References: *Annu Rev Pl Biol Pl Mol Biol* 48:399-429, 1997; *Plant Physiol* 125:135-138, 2001;
Nature 425:393-397, 2003; *FEBS Lett* 581: 2227-2236, 2007.

Key words: aquaporin, water transport, abiotic stress, root