第 25 回岩手大学 COE フォーラム

岩手大学 21 世紀 COE プログラム「熱ー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セミナーを開催しています。今回は、植物の CDPK（Calcium-Dependent Protein Kinase）と MAPK（Mitogen-Activated Protein Kinase）に関して、世界をリードする研究をされている Romeis 教授をお招きしてお話を伺うことにしました（講演は英語でなされます）。CDPK と MAPK は信号伝達系において重要な働きをすることが知られており、今回のお話はその中でも植物の防御システム発現に関する部分のお話です。

なお、今回は、都合によりインターネットを利用した同時配信を行いませんので、興味のある方は、会場にお越し下さるようお願い申し上げます。

第 25 回担当・岩手生物工学研究所
寺内 良平（terauchi@ibrc.or.jp）

****

日時：2006 年 2 月 8 日（水）18:00～19:30
場所：岩手大学農学部 7 号館 1 階セミナー室

Prof. Tina Romeis

(Department of Plant Biochemistry, Free University Berlin, Berlin, Germany)

CDPK-dependent signal transduction in the plant-defense response

When studying early responses after race-specific elicitation of plants carrying the Cf-9 disease resistance gene from tomato with the Avr9 peptide derived from the phytogenic fungus *Cladosporium fulvum* we identified a calcium-dependent protein kinase, NtCDPK2, that became rapidly biochemically activated. In loss-of-function experiments, silencing of NtCDPK2 and related homologues by VIGS yielded plants that show a delayed hypersensitive cell death defense responses in the Cf-9/Avr9 gene-for-gene interaction (Romeis *et al.*, 2000, 2001).

To investigate the CDPK in vivo activation mechanism and to characterize CDPK-dependent downstream signaling processes we used an *A. tumefaciens*-mediated transient expression system in *N. benthamiana*. Epitope-tagged full-length NtCDPK2 or truncated variants lacking its regulatory domains or carrying site specific mutations were assessed for the induction of various defense responses before and after application of external stress factors (Witte *et al.*, 2004). In these gain-of-function experiments, prolonged CDPK signaling triggered a stimulus-dependent propagating hypersensitive cell death upon a mild abiotic stress stimulus even in absence of a pathogen signal. This suggested that biotic and abiotic stress pathways are interlinked at NtCDPK2 as a shared component. The induction of cell death was accompanied by plant defense responses such as changes in hydrogen peroxide production, PR gene expression, and jasmonic acid and ethylene phytohormone concentrations (Ludwig *et al.*, 2005). Furthermore, we obtained evidence for ethylene-dependent cross-communication between stress-induced CDPK and MAPK signaling cascades. A potential exploitation of the CDPK biochemical activation mechanism and downstream signaling for future biotechnological approaches will be discussed.