Plant development and defense signal network research

Kyung-Hee Paek

School of Life Sciences and Biotechnology/Plant Signaling Network Research Center, KoreaUniversity, 1,5 ga, Anam?dong, Sungbuk?gu, Seoul 136-701, Korea

Abstract. **The Plant Signaling Network Research Center (SigNet) is a government-funded (by Korea's Ministry of Science and Technology (MOST)/ Korea Science and Engineering Foundation (KOSEF)) research center established at the School of Life Sciences and Biotechnology of Korea University in 2003. The SigNet conducts plant biological studies, especially in the field of developmental and defense biology. The research purpose of SigNet is dissection and analysis of plant development and defense signaling network through multiscientific approaches. Knowledge acquired from SigNet research scientists will provide new integrated view of understanding and potential application of plant development and defense mechanism. The other important mission of the SigNet is nurturing Center of Excellence for future outstanding research scientists of Korea. The SigNet will continue to expend every effort to achieve the goals for the future. Through passionate research endeavor of each laboratory and partnerships within inside and outside laboratories, we will continue to develop world-leading plant research group and to educate new generations of innovative researchers. As the SigNet looks toward the future, the SigNet will try to achieve its mission of research, education and service to the community. And the defense response research of our lab will be presented at later part.**

The research area of the SigNet can be divided into two units and currently each unit consists of six individual projects covering various topics and dealt with various aspects but cooperative and unified manner. The whole program runs 9-year-base and is evaluated every three years. Currently the SigNet is at the 3rd year of 1st stage. The followings are major research activities of the two units.

(1) Developmental signaling network research unit

The major research interest of this unit is to uncover and focus on how plant development and differentiation signal is transmitted and regulated in the cell and through the cell. Transition between determinacy and indeterminacy in the meristematic tissue, hormone signaling mechanism, flower development, determination of cell fate, and signal transduction cascade of cell death are currently investigated.

(2) Defense signaling network research unit

The main research interest of this unit is to find how plant fights and/or adapts to various biotic and abiotic environmental factors, including plant pathogens and environmental stresses. This unit especially deals with the signal transduction mechanism of plant defense against biotic/abiotic assault, by concentrating on cross-talk mechanism of candidate genes and signal transduction pathways.

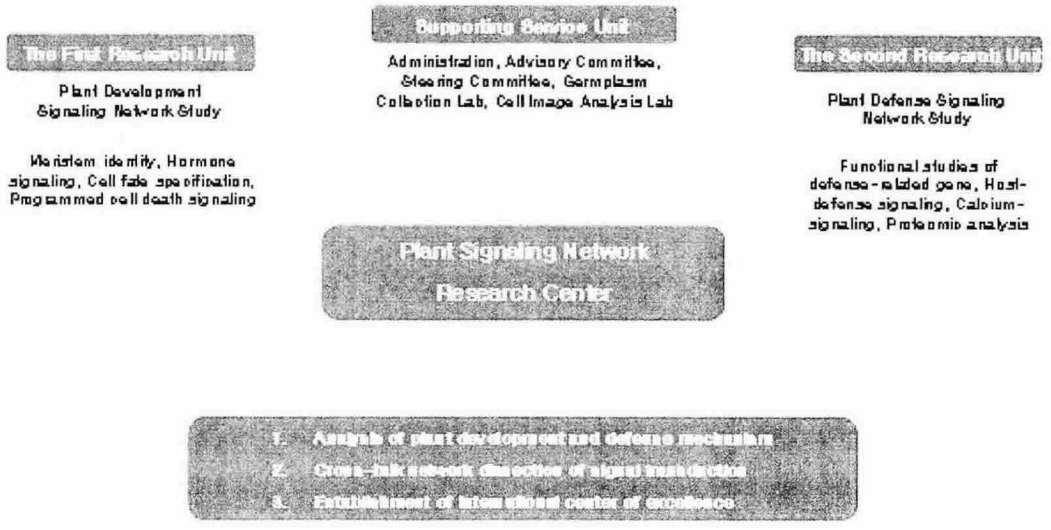

Figure 1. Objectives and Organization of the SigNet

Kyung-Hee Paek

Present Address: School of Life Sciences and Biotechnology/Plant Signaling Network Research Center, Korea University, 1,5 ga, Anam?dong, Sungbuk?gu, Seoul 136?701, Korea

E-mail: khpaek95@korea..ac..kr

Education

Ph.D. 1986	Massachusettes Institute of Technology (MIT), USA (Molecular Biology)
B.Sc. 1979	Seoul National University (Microbiology)

Professional Experience

1995-present	Professor, School of Life Sciences and Biotechnology, Korea University
2003-present	Director, Plant Signaling Network Research Center
1990-1995	Senior Research Scientist, Korea Research Institute of Bioscience andBiotechnology (KRIBB)
1986-1989	Postdoctoral Fellow, Molecular Biology Department, Harvard Medical School

Publications

1. MJ Kim, BK Ham, HR Kim, IJ Lee, YJ Kim, KH Ryu, YI Park and KH Paek (2005) *In vitro* and *in planta* interaction evidence between Nicotiana tabacum thaumatin-like protein 1 (TLP1) and *Cucumber mosaic virus* proteins, Plant Mol Biol, in press
2. CJ Park, KJ Kim, R Shin, JM Park, KH Paek (2004) Pathogenesis-related protein 10 isolated from hot pepper functions as a ribonuclease in an antiviral pathway. Plant J 37:186-198.
3. R Shin, JM An, CJ Park, YJ Kim, S Joo, WT Kim, KH Paek (2004) CaTin1 (Capsicum annuum TMV-induced clone 1) expression perturbation alters the plant's response to ethylene and interferes with redox homeostasis. Plant Physiol 135:561-573.
4. CJ Park, JM An, YC Shin, KJ Kim, BJ Lee, KH Paek (2004) The molecular characterization of pepper germin-like protein as the novel PR-16 family of pathogenesis-related proteins isolated during the resistance response to viral and bacterial infection. Planta 219:797-806.
5. TH Yoo, CJ Park, BK Ham, KJ Kim, KH Paek (2004) *Ornithine decarboxylase* (*CaODC1*)gene is specifically induced during TMV-mediated but salicylate-independent resistant response in hot pepper. Plant Cell Physiol 45:1537-1542.
6. R Shin, CJ Park, JM Ahn, KH Paek (2003) A novel TMV-induced hot pepper cell wall protein gene (CaTin2) is associated with virus-specific hypersensitive response pathway. Plant Mol Biol 51:687-701.
7. R Shin, MJ Kim, KH Paek (2003) The CaTin1 (Capsicum annuum TMV-induced clone 1) and CaTin1-2genesare linked head-to-head and share a bidirectional promoter. Plant Cell Physiol 44:549-554.
8. CJ Park, R Shin, JM Park, GJ Lee, JS You, KH Paek (2002) Induction of pepper cDNA encoding a lipid transfer protein during the resistance response to tobacco mosaic virus. Plant Mol Biol 48:243-254.
9. R Shin, JM Park, JM An, KH Paek (2002) Ectopic expression of Tsi1 in transgenic hot pepper plants enhances host resistance to viral, bacterial and oomycete pathogens. MPMI 15:983-989.
10. JM Park, CJ Park, SB Lee, BK Ham, R Shin, KH Paek (2001) Overexpression of the tobacco tsi1 gene encoding an EREBP/AP2-type transcription factor enhances resistance against pathogen attack and osmotic stress in tobacco. The Plant Cell 13:1035-1046.