disease resistance (R) proteins in a specific manner, referred as gene-for-gene interaction, and activating defense responses. The interaction between blast pathogen and rice follows the "gene-for-gene" theory in which r genes interacts a corresponding avr gene, and induces defense responses. The presence of *avr-pita*, an avirulence gene originated from *M. grisea*, was analyzed for the 80 strains of *M. grisea*, which were collected nationwide in 2003. Using the same strains, pathogenicity tests were carried out on a monogenic rice cultivar, IRBLta-K1, which carried the corresponding resistance (R) gene, *pita*. All strains, except 2, carried the *avr-pita* gene, however, lots of strains showed virulence and brought about disease symptoms, such as formation of typical disease lesions. Expression level of *avr-pita* gene was analyzed for the virulent and avirulent strains using RT-PCR.

F-65 Functional characterization of SA- and JA- inducible OsWRKY. Jae-Soon Seo, Ji-Young Lee, Jee-Eun Kim, Seok-Cheol Suh, Duk-Ju Hwang. National Institute of Agricultural Biotechnology, Suweon, 441-707, Korea.

Plants have the ability to defend themselves against pathogens by activating a series of defense responses. The activation of a series of plant defense responses is known to be through varieties of transcription factors. WRKY proteins are known to regulate defense response in plants. WRKY proteins are defined by the presence of highly conserved WRKY domain characterized by the hallmark heptapeptide WRKYGQK and a zinc-finger structure distinct from other known zinc finger-type motif. The WRKY domain binds to the W box ((T)TGAC(C/T)) in the promoter of wound- and pathogen-responsive genes. In this study we have isolated an OsWRKY gene from rice plants. This OsWRKY belongs to group III member that contains a C_2-HC motif instead of a C_2-H_2 pattern. The OsWRKY was induced by salicylic acid (SA) and jasmonic acid (JA) highly at 24hr respectively, suggesting that this OsWRKY might be involved in plant defense response. To determine whether this OsWRKY act as transcriptional activator, a transactivation assay of OsWRKY in yeast were carried out. It reveals that OsWRKY acts a transcriptional activator in yeast. Whether OsWRKY regulate defense signaling in rice will be discussed in detail.

F-66 Disruption of *hrp*-related genes by homologous recombination in *Xanthomonas oryzae* pathovar *oryzae*. Cho, Hee Jung, Young Jing Park, Eun-Sung Song, Dong-Hee Lee[1] and Byoung-Moo Lee. National Institute of Agricultural Biotechnology, R.D.A., Suwon, 441-707, Korea, [1]Department of Life Science, Ewha Womans University, Seoul, 120-420, Korea

Xanthomonas oryzae pv. *oryzae* (Xoo) is a bacterium that causes bacterial blight in rice, especially in Asia. The *hrp* (hypersensitive reaction and pathogenicity) genes are involved in pathogenicity and the induction of hypersensitive response (HR) in nonhost plants. *Hrp* cluster, known as pathogenicity islands (PAIs), is consist of twenty-four *hrp*-related genes and the size is 31.3kb in Xoo KACC10331. In this study, we disrupted *hrcQ* by Tn insertional mutagenesis and marker exchange. PCR amplification and Southern blot was carried out to confirm the *hrcQ* disruption. Furthermore, We are in progress the gene disruption of the all *hrp*-related genes (24 genes) for pathogenicity assay and functional study.

F-67 Volatile organic compounds of rhizobacteria elicit plant growth promotion and induce systemic resistance in tobacco. Choong-Min Ryu[1,2,4], Li Kang[2], Mohamed A Farag[2,3], Kirankumar S. Mysore[2], Paul W Paré[3], Joseph W Kloepper[4], and Seung-Hwang Park[1] [1]Labortory of Microbial Genomics, Korea Research Institute of Bioscience and Biotechnology, Daejeon 305-600, S. Korea, [2]Plant Biology Division, The Samuel Robert Noble Foundation, Ardmore, OK, USA, [3]Department of Chemistry and Biochemistry, Texas Tech University, Lubbock, TX, USA, [4]Department of Entomology and Plant Pathology, Auburn University, Auburn AL, USA.

Plant growth-promoting rhizobacteria (PGPR) are a wide range of root-colonizing bacteria with the capacity to enhance plant growth and control plant pathogens. We recently reported that some PGPR strains release a blend of volatile organic compounds (VOCs) that promote growth in Arabidopsis seedlings and induce resistance against *Erwinia carotovora* subsp. carotovora (PNAS 100:4927-4932; Plant Physiology 134:1017-1026). In particular, the volatile components 2,3-butanediol and acetoin were released exclusively from two PGPR strains that trigger the greatest level of growth promotion and induced systemic resistance. In the current study we extend these findings to show that the same PGPR strains and their VOCs elicit growth promotion and ISR in tobacco. For practical application of bacterial VOC, exogenous application of racemic 2,3-butanediol or acetoin was done directly to soil by drenching, resulting in elicitation of growth promotion and ISR of *Nicotiana benthamiana* seedlings. These results suggest that bacterial VOCs can be applied directly during crop cultivation for enhancing productivity and disease resistance. To assess involvement of cytokinin signaling as previously shown in Arabidopsis, cre1-orthologue of *N. benthamaina* was silenced using by Tobacco rattle virus-based virus-induced gene silencing. Our data confirm that cytokinin signaling plays an important role in bacterial VOC-elicited growth promotion and ISR in tobacco.