lesions on the leaf in detached-leaf assay. Finally, 9 isolates were isolated from strain R-34, and these isolates produced non or very few symptoms on seedlings of citrus in greenhouse pathogenicity test. And it's very interesting that some isolates produced melanose-like symptom on very young leaves which it was not typical symptom and somtimes produced on only expanded leaf.

### 1-11. Functional Analysis of PepRSH (Pepper *relA/spoT* homolog) cloned from *Capsicum annuum* showing Systemic Acquired Resistance against *Phytophthora capsici*

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RSH (relA/spoT homolog) has been known to determine the level of guanosine tetraphosphate (ppGpp) and guanosine pentaphosphate (pppGpp), which are the effector nucleotide of the prokaryotic stringent response and also play a role in antibiotic production and differentiation in *Streptomyces* species but not a little in eukaryotic organism, especially in plant. Salicylic acid (SA), a critical signal molecule of establishing systemic acquired resistance (SAR), could induce SAR in Pepper (*Capcicum annuum*) against *Phytophthora capsici*. And the extent of SAR induction was in proportion to the dosage of SA (or BTH). Suppression subtractive hybridization (SSH), a PCR-based method for cDNA subtraction, was carried out between SA-treated and non-SA-treated pepper leaves to isolate genes which may be responsible for defense signaling against pathogens. Early upregulated gene was selected from reverse northern and kinetics of SSH-genes transcripts in SA-treated pepper leaves upon SA treatment. Full-length cDNA of the gene (PepRSH ; Pepper *RelA* / *SpoT* homolog) had an open reading frame (ORF) of 2166 bp encoding a protein of 722 amino acids and a significant homology with (p)ppGpp phosphohydrolase or synthetase. Genomic DNA gel blot analysis showed that pepper genome has at least single copy of PepRSH. PepRSH transcripts was very low in untreated pepper leaves but strongly induced by SA and methyljasmonic acid (MeJA), indicating that PepRSH may share common SA and MeJA-mediated signal transduction pathway. Functional analysis in *E. coli* showed PepRSH confers phenotypes associated with (p)ppGpp synthesis through a complementation using active site mutagenesis.

### 1-12. EVALUATION OF DISEASE RESISTANCE AND SUSCEPTIBILITY TO CHESTNUT BLIGHT FUNGUS, CRYPHONECTRIA PARASITICA, OF CHESTNUT VARIETIES IN KOREA

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For the selection and breeding of chestnut varieties resistant to the chestnut blight fungus Cryphonectria parasitica, disease resistance and susceptibility of 28 varieties widely planted and growing in Korea were evaluated by artificial inoculation of a pathogenic fungus. For this

experiment, a typical virulent strain (KCPC-19) was selected. Artificial inoculation was conducted into all varieties by using two different materials and methods, i.e., bark and wood tissue sections in the laboratory and living trees in the field. In the bark and wood tissue section method, the size of necrotic area and canker development on chestnut varieties were examined and compared 4 days after inoculation. There were wide variations of chestnut varieties in disease resistance and susceptibility against chestnut blight fungus, but 3 varieties, Daebo! , Ishizuchi, and Sandae, were shown to be relatively resistant to the disease with the necrotic area of 0.95-1.03 cm2, while Arima was the most susceptible with the size of 2.0 cm2. In the living tree inoculation examined 5 weeks after inoculation, 3 varieties, Daebo, Ishizuchi, and Riheiguri, showed the higher resistance, but Tono 2 did the highest susceptibility among tested varieties.

### 1-13. Developing screening system for resistance to anthracnose in grapes by using culture filtrates from *Elsinoe ampelina*.

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It was investigated whether culture filtrates produced by *X. fastiduosa* could be used to determine varietal susceptibility in grape cultivars to anthracnose as a substitute for pathogen inoculation or field screening. Bioassay of grape leaves with culture filtrates showed that their phytotoxicities were active and host-selective. Ethyl acetate extracts from those also showed the toxicities and host selectivity among grape cultivars. The sensitive range of plants to culture filtrates and their ethyl acetate extracts was consistent with the host range to the pathogen. Susceptible cultivars were sensitive to even highly diluted culture filtrates but resistant cultivars were not affected even at original culture filtrates. Susceptible cultivars were sensitive to the undiluted culture filtrates than highly diluted culture filtrates and the younger leaves were the more sensitive to the culture filtrates and their ethyl acetate extracts in grapes.

### 1-14. Evaluating the resistance to crown gall in grape rootstocks.

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To evaluate the resistance to crown gall in grape rootstocks, cuttings from twenty seven grape rootstocks were inoculated with *Agrobacterium vitis* Cheonan 493 and size of galls from grapevines was measured in a greenhouse. Tumors were formed in all varieties of grape rootstocks tested in this study and no grape rootstock variety was immune to crown gall. Tumors were found on the stems of all plants tested in '196-17' and '41B'. Based on measuring size and weight of galls formed on the stem of grape rootstocks, '779P' was extremely susceptible to crown gall. Some varieties such as 'Gloire', '140R', '101-14M', '3309C', and '333EM' found to be resistant, while '99R', '1447P', 'Rupestris du lot', '110R', 'Freedom', and '41B' were susceptible and '1103P', '5C', '420A', 'Golia', and '5BB' were moderately susceptible to crown gall.