SI-1-3

GENES AND ENZYMES INVOLVED IN THE SYNTHESIS OF RIBOFLAVIN IN BIOLUMINESCENT MARINE BACTERIA

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The light emitting reaction in bacteria involves the oxidation of reduced riboflavin 5'-phosphate ($FMNH_2$) as well as long chain fatty aldehyde and resulting in the emission of blue-green light. Despite the important physiological role of riboflavin as a precursor of FMN and FAD, its synthetic pathway has not been completely determined. Enzymatic and genetic studies have shown that GTP is converted to 5-amino-6-ribitylamino-2,4-pyrimidinedione which condenses with 3,4-dihydroxy-2-butanone 4-phosphate to form 6,7-dimethyl-8-ribityllumazine (Lum). The final step of riboflavin synthesis is the dismutation of Lum with the transfer of four carbon units. There is growing evidence that the genes in the luminescent system of marine bacteria, especially in *Photobacterium* and *Vibrio* species, are linked to genes involved in the synthesis of riboflavin. As reduced riboflavin 5'-phosphate ($FMNH_2$) is a substrate in light emitting reaction, studies on regulation of the expression of riboflavin synthesis genes will be important in understanding the emission of light by bioluminescent bacteria.

SI-2-1

MECHANISMS OF PATHOGEN-DERIVED RESISTANCE AND CONTROL OF VIRUSES IN TRANSGENIC PLANTS

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To understand the resistance mechanism in plants by viral infection, we took several approaches. CMV-Kor and PVY-VN isolated in Korea were analyzed. We focused analysis of CMV-Kor movement protein. The movement protein of virus is required for cell to cell movement of viral RNA through plant intercellular connection, the plasmodesmata. A series of deletion mutants of CMV-Kor movement protein gene were created to identify the functional domains. The mutated movement proteins were produced as an inclusion body in *E. coli*, purified and renatured. Polyclonal antibody was made using the movement protein expressed in *E. coli*. The ability of the truncated proteins to bind to ssRNA was assayed using UV cross-linking and gel retardation. The results indicated that the domain between amino acids 118 and 160 of movement protein was essential for ssRNA binding. Yeast two hybrid system was set up to find genes interacting with CMV movement protein. mRNA differential display between transgenic and nontransformed tobacco plants is in progress in a hope to dissect the resistance given by PVY-VN coat protein gene.