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Seminar I: Cecropin P1 transgenic rainbow trout: altered gene expression patterns of innate/adaptive immunity pathways

Abstract: Outbreak of disease infection frequently resulted in serious financial loss in aquaculture industry. Exploiting the natural microbe-defense (innate defense) mechanism, originally discovered in insects and subsequently found in many animal species, may lead to the development of a novel approach for protecting commercially important finfish and crustacean species from infection by microbial pathogens. To this end, we have been focusing our attention on assessing the potential of utilizing this genetic trait to protect commercially important finfish, e.g., rainbow trout, from infection by *Aeromonas salmonicida* and the infectious hematopoietic necrosis virus (IHNV) by transgenesis. By introducing cecropin P1 gene into rainbow trout by transgenesis, we have successfully produced 8 families of homozygous transgenic fish. These fish exhibited resistance to *A. salmonicida* and IHNV in repeated challenge studies conducted in offspring of different generations. Via DNA microarray quantitative real-time RT-PCR analyses, the expression of many genes in the innate/adaptive immunity pathways was up- or down-regulated. This is the first time that a true disease resistant fish is available for detail analysis of the differential expression of genes in the innate/adaptive immunity pathways. Results of this study can be applied in marker assisted selection of disease resistant fish strains.

Seminar II: Molecular Aquatic Toxicology: an molecular/cell biology approach

Abstract: The widespread use of polyhalogenated and/or polyaromatic hydrocarbons and other organic compounds for various industrial purposes in the past has resulted in serious accumulation of these compounds or their metabolites in aquatic ecosystems. While many of these compounds possess endocrine disrupting activities to birds, fish, lower mammals and humans, others exert acute toxicity or geno-toxicity. Although there are methods available for detecting the presence of these toxic pollutants in the aquatic environment, these methods are unsuitable for assessing the earliest biological effects caused by these chemical pollutants at sub-lethal levels. Therefore, there is an urgent need to establish rapid, reliable and sensitive bioassays for detecting the adverse effects of these pollutants in the aquatic environments at sub-lethal levels. In this seminar, I will discuss current studies, including those of ours, directed toward addressing this important issue.



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