[1] Prevention and Treatment of Diseases Caused By Fish Pathogens

aquaculture species. The generation of transgenic fish targeted on marine aquaculture species is still not popular due to the difficulties associated with handling small and fragile pelagic eggs. Recently, our group has developed a feasible and reproducible microinjection method for the pelagic eggs of marine fish and to establish stable transgenic strains in Nibe croaker, *Nibea mitsukurii* that could be a model species for the marine aquaculture fish species spawning pelagic eggs (Yamamoto et al, 2011). Accumulation of these techniques will realize the production of disease-resistant transgenic aquaculture species in near future.

3.2.4. Risks and Benefits of Transgenic Fish

Although, fish transgenesis has great advantages for the breeding of aquaculture species, there are several potential risks, particularly environmental and human health concerns. If transgenic fish escape into the natural environment, it would cause problems ecologically and genetically. Sterilization of transgenic strains with the polyploidy treatment and/or physical containment by the land-based marine aquaculture with the closed re-circulating system could be realistic way to solve this problem (Dunham, 2009). Another issue is human health concerns. To settle this issue, it is important to select the targeted gene, to conduct food safety trials securely and to keep consumers informed. Since it might be possible that transgenic fish with enhanced disease resistance may decrease or suppress the drug usage in aquaculture, this would improve the aquaculture production more safely from the standpoints of the drug residues and the emergence of antibiotic-resistant pathogens. Although it is essential to guarantee the safety of transgenic fish as genetically modified food, the disease-resistant transgenic fish could be of great help to improve the aquaculture.

Glossary

CMV: Cytomegalovirus

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Section 1.1. Prevention

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