

Creation of innovative food production technologies responding to future changes in climate and social demands

Acceleration of Fish Breeding with Genome Editing and Transplantation Technology

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Back ground: In these days, much attention has been paid for healthy food stuffs. And the population growth and improvement of dietary life in the developing countries demand much more supply of protein sources. In addition, overexploitation of fish in nature resources became a growing problem in aquatic ecosystem. Such situation is pushing up the production of aquaculture.

Current problems: As expanding the aquaculture, the supply of PUFAs, such as EPA and DHA, is the key to breed the fish because the PUFAs are essential for fish growth and mainly depends on natural fish resources. So, to secure PUFAs is a big issue in world wide aquaculture.

Solution: To solve this problem, we produce new fish traits which can produce EPA and DHA by itself. In this project, using genome editing technique the lacking desaturases (which are essential to synthesize EPA and DHA) are precisely knocked-in in the red sea bream genome to produce PUFAs by itself. And to promote the breeding speed, we try to develop the germ cells transplantation methods.

Future: PUFA-producing fish breed reduces the cost of production and contributes to conserve natural fish resources. And the germ cell transplantation methods accelerate to produce new fish breeds.

