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New study shows probiotics help fish grow up faster and healthier

BALTIMORE, MD (December 3, 2012)— Probiotics like those found in yogurt are not only good for people--they are also good for fish. A new study by scientists at the Institute of Marine and Environmental Technology found that feeding probiotics to baby zebrafish accelerated their development and increased their chances of survival into adulthood.

This research could help increase the success of raising rare ornamental fish to adulthood. It also has implications for aquaculture, since accelerating the development of fish larvae--the toughest time for survival--could mean a more efficient and safe system for bringing fish to the dinner table.

Tiny zebrafish are often used in genetic research because scientists can easily track changes in their development and the fish grow quickly. They also share many of the same genes as humans and can be used for studying cellular and physiological processes and their impact on human disease.

"This is really exciting," said Jacques Ravel, a leading genomic scientist studying the role of the human microbiome in health and disease at the University of Maryland School of Medicine Institute for Genome Sciences. "Knowing you can colonize the gut of a zebrafish with a probiotic strain and improve its development becomes an interesting model for us to study the beneficial effect of probiotics in children and adults." He and his colleagues are currently looking into the effect of *Lactobacillus rhamnosus* probiotics on the gut development of premature infants.

In the zebrafish experiment, researchers added *Lactobacillus rhamnosus*, a probiotic strain sometimes used in yogurt, to the zebrafish water. The fish drank the probiotic through their gills, and it landed in their gastrointestinal tract, preventing bad bacteria from taking over and promoting growth, including advancing the development of bone, vertebrae, and gonads.

"If you have increased growth and survival from each batch of hundreds of thousands of eggs, that is a huge benefit," said study co-author Dr. Allen Place of the Institute of Marine and Environmental Technology.

Probiotics helped the zebrafish get through the touch-and-go time when their gastrointestinal tract is maturing. They are still living off yolk with which they are born, and it is during this weaning period when most mortality occurs. Adding probiotics to the water increases the survival rate of zebra fish larvae from 70% to 90%.

"We did not anticipate the enhancement in maturation," said Place. "When you look at various molecular markers of stress, the overall stress in the fish that were treated with the probiotic were lower--which may be the reason for the development."

The study*, Lactobacillus rhamnosus Accelerates Zebrafish Backbone Calcification and Gonadal Differentiation through Effects on the GnRH and IGF Systems*, was published in the September issue of PLOS ONE. Researchers include Matteo Avella and Oliana Carnevali from the Polytechnic University of Marche in Italy; Allen Place, Shao-Jun Du, Yonathan Zohar and Ernest Williams of the Institute of Marine and Environmental Technology in Baltimore, Maryland; Stefania Silvi of the University of Camerino in Italy.

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