

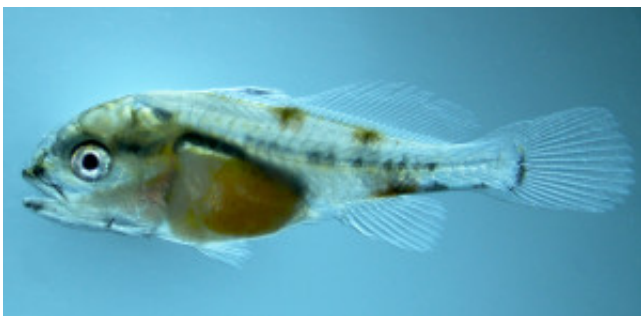
Maternal diet alters offspring metabolism and performance

Researchers have discovered that the DHA content of a female red drum's diet alters the DHA content of her eggs which, in turn, affects the ability of her offspring to accumulate DHA from their own diet.

Scientists at The University of Texas Marine Science Institute in Port Aransas have discovered that in fish, just like in humans, the nutrients that are passed from a mother to her offspring can change the way her offspring develop and make a big difference in how well they do in life.

This phenomenon in which prenatal nutrition can permanently alter the metabolism of offspring – called metabolic programming – has been studied almost exclusively in mammals and is believed to be a cause of important medical disorders in humans including hypertension, obesity, and heart disease. Never before have scientists considered what metabolic programming might mean in nature.

In a study released this week in the prestigious science journal *Proceedings of the Royal Society B*, Dr. Lee Fuiman and co-author Dr. Kestrel Perez presented their work on red drum, a fish popular among anglers and chefs. The scientists found that the amount of a specific nutrient, the omega-3 fatty acid DHA, that a female fish puts into the yolk in her eggs controls how much DHA her offspring can obtain from their own diet several weeks after they hatch. They also demonstrated that the amount of DHA young fishes get from their diet plays a big role in how well they can swim, grow, and escape from predators.



Metabolic programming of offspring metabolism through the maternal diet alters the growth, survival, and swimming performance of offspring.

Adult red drum get most of the DHA that is passed on to their offspring from shrimp and crabs. Decreases in these two food sources, caused by environmental conditions or commercial harvest, is likely to have an impact on the ability of young fish to survive at a time in life when they are small and especially susceptible to predators and starvation.

The research also points to a way to use metabolic programming to benefit fish populations. Several states have stocking programs in which they breed red drum in hatcheries and release millions of young fish into the wild to supplement natural populations. This new research suggests that those hatcheries may be able to improve the survival of the fish they release through close attention to the nutrition of the adult fish and the quality of eggs they produce.

Lee A. Fuiman

*University of Texas at Austin
Marine Science Institute
Port Aransas, Texas*

Publication

[Metabolic programming mediated by an essential fatty acid alters body composition and survival skills of a marine fish.](#)

Fuiman LA, Perez KO

Proceedings of the Royal Society B. 2015