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Is There Something Fishy About GM Pets?

The zebrafish (*Brachydanio rerio*)—the black- and silver-striped workhorse of developmental genetics—has been causing a great deal of commotion lately. In early January, Austin-based Yorktown Technologies intends to start selling GloFish, a genetically modified (GM) strain of zebrafish that glows red under ultraviolet or black-light. If all goes according to the company's plans, this will be the first GM species sold as pets in the United States—which is now causing opponents to cry foul.

A research team at the National University of Singapore first developed these glowing critters by injecting the gene for red fluorescent protein, which had been isolated from the sea anemone, into fertilized zebrafish eggs. These fish were originally intended for use in detection of environmental pollutants.

Yorktown is not the first company to test the waters with regard to selling GM fish to private owners. Beginning in the summer of 2003, Taikong International, a Taiwanese company, has been selling similar genetically engineered zebrafish under the name 'Night Pearl'—hailed by *Time* magazine as one of 2003's 'Coolest Inventions'—in a number of Asian countries. In that strain, developed by a group at the National Taiwan University that was looking for a way to make the fish's organs easier to visualize, the transgene is the jellyfish green fluorescent protein gene.

Although Yorktown is providing data to back up their claims that these fish are safe, some environmentalists, public interest groups, and commercial fishermen are opposing their sale. Many of these opponents fear that despite claims that the fish are sterile and more temperature-sensitive than wild-type strains, they will eventually manage to make their way into the wild and crossbreed with naturally occurring populations, and they are calling on various government agencies to block the sale of these fish.

There are other concerns as well. Anyone familiar with the study of transgenic mice knows that genetic modification is not always a straightforward science, and that the addition of a gene can result in unexpected phenotypes by the disruption of endogenous genes, or by other mechanisms.

An even larger problem may be if this sets the precedent for the unregulated distribution of other GM animals as pets. For purposes of research and food production, the USDA and FDA oversee the use of GM models. However, since GloFish will be sold as pets, the USDA and FDA claim to have no jurisdiction. California, which is the only state with a ban on the release of GM animals, is blocking the sale of GloFish. In the rest of the country, however, there is a regulatory void with regard to such uses for GM species.

Who should control the release of transgenic species? What steps can be taken to fill this gap in the regulations? How serious is the potential threat posed by the sale of such animals, and should something be done before they reach the pet store shelves? It seems clear that the fuss over this 'cool' new fish could soon have significant repercussions in the research community, the marketplace, the environment, and the regulatory arena.