

Zebrafish help researchers learn about cancer treatment

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(Medical Xpress)—When Hatem Sabaawy began keeping tropical fish as a hobby several years ago, he bought a few zebrafish, like many who purchase their first aquarium. But compared with other exotic creatures in his tank, the small striped fish seemed a little dull.

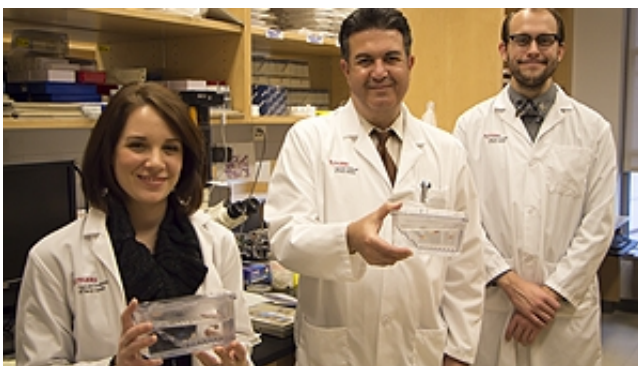
"I'll be honest with you, I was much more fascinated by the seahorses," he admits.

Little did he know that [zebrafish](#) would one day become an integral part of his research at Rutgers Cancer Institute of New Jersey, where up to 15,000 zebrafish are housed down the hall from his office.

The silver-and-black [fish](#), which come from the rivers of India, play an important role in treating cancer patients, says Sabaawy, an assistant professor of medicine and pharmacology at Robert Wood Johnson Medical School and a researcher at the cancer institute. After a patient's biopsy cells are injected into the fish, Sabaawy and other researchers can experiment with different treatments to see which is most effective, allowing treatment to be tailored to the individual.

The majority of the cancerous fish – including those that develop the disease independently – are cured, he says, and so far there's evidence that treatments that work for fish also work for humans, although researchers haven't completed their study. "We're helping the fish as well as figuring out how to help the patient," says Sabaawy.

For more than a decade, zebrafish have been used in cancer studies because they can develop tumors and abnormal cell growths similar to human cancers. Like humans, zebrafish are vertebrates, with many of the same biological systems and organs, including kidneys, a pancreas and a heart that pumps blood throughout the body.



Hatem Sabaawy, assistant professor of medicine and pharmacology, is flanked by two doctoral students Stephani Davis, left, and Eric Huselid.

The fish have been ranked by the National Institutes of Health as one of the top experimental organisms, beside rats and mice, and have been used in the U.S. and internationally for research on cancer and other diseases. But unlike mice, large numbers of zebrafish can be stored in very little space. And they multiply quickly. A pair of zebrafish can produce 200 embryos a day.

"If we had this many mice, it would take a whole warehouse to fit them all," Sabaawy says.

Over the years, he has discovered that zebrafish aren't as boring as he once thought. "They're actually very affectionate," he says. "When they see you coming toward the tank to feed them, they move close to the wall and come right up to you when you give them food."

Their embryos are transparent, allowing researchers to trace the development of cancer cells through the injection of a fluorescent dye. And because their genomes are already sequenced, scientists can use them to study genetic links to cancer.

At the institute, the zebrafish swim in small but uncrowded plastic tanks lining a room filled with the sound of bubbling filters. They range in size from weeks-old specks to full-grown fish about a half-inch long. To ensure they're healthy for experiments and observation, they require a lot of upkeep. Conditions in their habitat must be uniform because variations can make research results less reliable, says Rutgers marine biologist Katie Flaherty, who is their caretaker.

Their water is stringently monitored for cleanliness and pH imbalances, and twice a day they are fed a diet of brine shrimp. Embryos awaiting analysis and experimentation are stored in a temperature and light controlled incubator.

Although they might seem high-maintenance, the fish are very hardy, says Flaherty, and comparatively easy to work with. "I've dealt with oysters and flounder, and they're much more difficult," she explains.

Since Flaherty went on maternity leave in November, rotating crews of students involved in various types of research at the institute have taken on her role. Before Flaherty left, she made a detailed checklist for care and feeding of the fish, which totals 25 items, including "harvest morning brine shrimp" and "check fish health and record any incidents in book."

Eric Huselid, a doctoral student in cellular and molecular pharmacology, had to take care of the fish on Thanksgiving Day and might be back during winter break. But the responsibility has been a good experience. "I've learned about animal husbandry," he says.

Although patients at the center don't get to meet the particular fish that was used to help develop their treatment, some do visit the institute's zebrafish during special event tours.

"They're fascinated by them," says Sabaawy, "and grateful."

Provided by Rutgers University

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