Carp grow potbellies to foil predatory fish

You're a little fish in a big pond filled with large, hungry fish. Everywhere you turn, a wide, gaping mouth tries to take a bite out of your tail end. What's a scared little fish to do?

Fatten up, suggests a new study of carp and carp-eating pike.

A nice, round potbelly may constitute a carp's best defense against predatory pike, report ecologists Christer Brönmark and Jeffrey G. Miner of the University of Lund in Sweden. The researchers have found that European carp blimp out over a period of several weeks in the presence of pike so they won't fit into the predators' mouths.

The discovery marks the first time scientists have demonstrated that vertebrates — animals with a backbone — can change their body dimensions over time in order to avoid predators. Ecologists had previously found the phenomenon only among bottom-dwelling invertebrates such as barnacles and sea snails and among microscopic aquatic creatures called zooplankton.

Some vertebrates, including blowfish and several species of birds, try to scare off potential predators by gulping air to inflate their bodies or throats. However, this temporary protective response lasts only minutes, and the animals must then revert back to their normal shapes.

To demonstrate the more permanent change effected by European carp, Brönmark and Miner used weighted plastic curtains to bisect two small, natural ponds containing carp. They placed wild pike into one half of each pond and confirmed that the pike began preying upon the carp.

Three months later, the researchers determined the body dimensions of several carp taken from each half of both ponds. They report in the Nov. 20 SCIENCE that the carp exposed to pike predation developed deeper bodies — as measured from backbone to belly — than the carp that lived without pike.

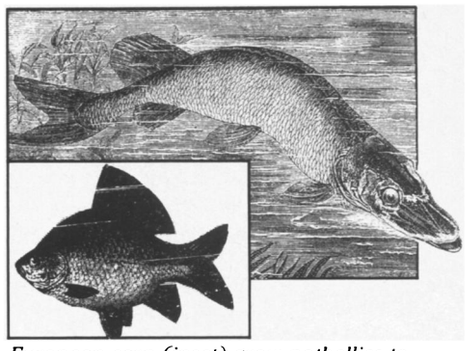
To rule out the possibility that the carp fattened up simply because each individual had more food after the pike reduced their numbers, Brönmark and Miner conducted a second experiment in the laboratory.

The researchers maintained wild-caught European carp in three different aquarium environments: one with a small amount of food, one with a large amount of food, and one with a small amount of food and several pike that were hand-fed three times a week to keep them from eating the carp.

After two months, Brönmark and Miner found that the two groups of carp maintained without pike grew at roughly the same rate, regardless of the difference in their access to food. However, the carp exposed to pike grew much larger bellies, the researchers discovered — despite the fact that the added bulk increased their drag through the water, requiring them to swim harder.

Brönmark and Miner conclude that European carp tailor their body shape according to their environment. While they usually stay lean and mean, the better to compete for resources with their peers, the carp grow bellies to put off pike.

Aquatic ecologist John E. Havel of Southwest Missouri State University in Springfield suggests the carp might be responding to a chemical secreted by pike. However, no one has yet identified such a substance. "There's a lot of speculation," he says, "but it's still a puzzle." — *C. Ezzell*



European carp (inset) grow potbellies to avoid predation by pike (top).

Opiate blocker boosts alcoholism treatment

A drug that diminishes the pleasure-inducing effects of the brain's naturally occurring opiates gives added punch to psychological treatments for alcoholism, at least over short periods of time, according to two separate studies.

The drug, naltrexone, may dampen the desire to continue drinking among alcoholics who slip up and consume an alcoholic beverage shortly after entering a treatment program, both research teams assert in the November ARCHIVES OF GENERAL PSYCHIATRY.

Investigators have thus far identified no drug that consistently helps prevent a return to heavy drinking, or relapse, among alcoholics seeking treatment. Disulfiram, a drug that causes unpleasant physical reactions to alcohol, helps only a minority of alcoholics.

"Naltrexone appears to be a safe and effective adjunct to the treatment of alcohol dependence," hold psychiatrist Joseph R. Volpicelli of the University of Pennsylvania in Philadelphia and his colleagues.

The team studied 70 men, mostly black and unemployed, who entered an outpatient treatment program following supervised alcohol withdrawal. The men reported an average of 20 years of heavy alcohol use. Each man spent one month attending daily six-hour sessions that included group therapy, individual counseling, exercise, and health education. They then attended group therapy two times a week for the next 11 months.

Half the men received naltrexone pills; the rest received placebo pills for the program's first three months.

At that point, one-quarter of the naltrexone group had returned to heavy drinking or alcohol binges, compared with one-half of the placebo group, the researchers report. Moreover, 19 of 20 placebo-treated men who reported taking a drink of alcohol after entering treatment experienced a relapse, compared with eight of the 16 naltrexone-treated men.

Two men taking naltrexone complained of nausea, and another cited increased pain from arthritis, the scientists note.

A second study, directed by psychologist Stephanie S. O'Malley of Yale University School of Medicine, suggests that naltrexone enhances alcohol abstinence rates when used in combination with psychotherapy. O'Malley's team recruited 104 people receiving treatment for alcohol dependence at an outpatient clinic. Most participants were employed white men, although women made up about one-quarter of the sample.

Volunteers in the three-month study randomly received either naltrexone or placebo pills and either weekly coping skills therapy (emphasizing strategies to handle stress and avoid relapse) or supportive therapy (offering general encouragement without teaching specific coping skills).

The two groups receiving naltrexone displayed about three times the rate of abstinence as the two placebo groups, the researchers contend. Among participants who sampled alcohol during the study, less than half of those receiving a combination of naltrexone and coping skills therapy had a relapse, compared with the vast majority of those in the other three groups.

Five volunteers dropped out of O'Malley's study due to naltrexone-induced nausea or dizziness.

Volpicelli theorizes that naltrexone blocks the rush of naturally occurring opiates in the brain provoked by a first drink of alcohol, thus helping break the cycle in which one drink fuels the desire for another.

Treatment that fosters new coping skills as a front-line defense against relapse may work best in conjunction with naltrexone, O'Malley adds. The safety and effectiveness of naltrexone when used for periods longer than three months remain unknown.

"It is unlikely that any single [medication] will be effective for all alcoholic patients," Volpicelli's group adds.

— *B. Bower*