

<http://www.baltimoresun.com/news/local/bal-te.md.pharmaceutical16oct16,1,2844765.story?coll=bal-home-headlines>

Drug traces found in water pose problem for wildlife

Pharmaceuticals passing unaltered from humans into nation's waterways

By Tom Pelton
sun reporter

October 16, 2005

Over the last two years, scientists working on the Potomac River have netted 111 smallmouth bass with bizarre sexual traits. The fish were males but had eggs growing inside their testes.

Researchers found many of these gender-bending bass downstream from sewage treatment plants in water tinged with a chemical called ethinylestradiol - the active ingredient in birth control pills.

More studies are necessary, biologists say, but evidence is mounting that trace levels of prescription drugs in rivers and streams may be harming fish, tadpoles, frogs, mussels and oysters. The pharmaceuticals are passing unaltered through people's bodies and sewage plants into waterways.

In Georgia and Mississippi, scientists recently discovered that the antidepressant Prozac, in water downstream from sewage plants, can kill tadpoles, stunt the growth of others and befuddle the survivors so they swim in circles and can't flee from predators.

In Pennsylvania, a biologist reported that small amounts of Prozac may cause mussels and clams to discharge their sperm and eggs prematurely, dooming their offspring. And in Texas, a researcher found that the sexual organs of male minnows shrank when they were lowered into a river tainted with birth control drugs.

"We might just be seeing the tip of the iceberg in terms of the cumulative impact of all this," said Dr. Thomas Burke, associate chairman of health policy at the Johns Hopkins School of Public Health.

Pollution concerns

He said concerns about pharmaceutical pollution are likely to become more urgent as a growing human population consumes a multiplying number of medications.

"This is an important area we have to study more," Burke said.

The U.S. Environmental Protection Agency is working with other federal offices to investigate whether the government should require better sewage filtration systems to remove drugs before water is discharged, according to the agency.

Pharmaceuticals are not regulated as pollutants, and most sewage plants are not designed to break them all down.

One stumbling block to adding better filtration systems is the cost, which could reach \$100 million to install advanced technology on each large sewage treatment plant, said Shane Snyder, research manager at the Southern Nevada Water Authority.

"The water industry has no problem spending the public's money to put in new [filter] technology," Snyder said. "But the cost might mean that fewer schools can be built or fewer hospitals."

Vicki Blazer, a fish pathologist with the U.S. Geological Survey, began investigating smallmouth bass in the Potomac River a few years ago when fishermen reported that their catch was falling.

She worked with natural resources officials in Maryland and West Virginia, who used devices that fired electric shocks into the Potomac River to stun hundreds of fish in 2003 and 2004.

Blazer said she dissected 184 male bass, and found that 111 of them -- or about 60 percent -- had eggs growing inside their sexual organs. All nine male bass netted downstream from the Hagerstown sewage plant had this sexual abnormality. Fish like these almost never show up in clean rivers, she said.

Blazer is looking into the possibility that the birth control drugs caused the sexual confusion. She also found several other pollutants in the river, including triclosan, a disinfectant used in soap, and trifluralin, a farm pesticide. Any of these chemicals could be disrupting fish hormonal systems, she said.

In an effort to pin down which is causing the mutations, Blazer's colleagues have shocked an additional 100 fish during the last month at five places along the lower Potomac River in Maryland, including downstream from the Blue Plains sewage treatment plant near Washington.

The study is important, Blazer said, because fish with deformed sex organs might not reproduce as well. People also draw drinking water from the Potomac, and the same chemicals that could be harming fish populations might also be hurting humans, she said.

"We use the fish as indicators of ecosystem health, which eventually can translate into human health," she said. "Other researchers have raised concerns about declining sperm counts in human males and

increases in testicular cancer." (The purification process used by municipal water systems removes most of these drugs from drinking water, but not all of them, experts say.)

In the Baltimore area, Lynn Roberts, an environmental chemist at the [Johns Hopkins University](#), received a \$500,000 EPA grant to test for drugs in the water pouring out of the city's Back River sewage treatment plant, which leads into a tributary of the [Chesapeake Bay](#).

Working with doctoral students Kevin Bisceglia and Jim Yu, she found 39 of the 52 chemicals they tested for, including the painkillers Diclofenac and Naproxen; the anti-seizure drug Phenytoin; and Nonylphenol, a compound formed from the decay of spermicides and other products.

They also found caffeine and evidence of what might have been cocaine flowing into the river, she said.

"We are trying to predict what may be entering the environment, and we hope to know what could pose toxic consequences," Roberts said, standing on a pier in the Back River.

The concentrations are often extremely low, about .1 part per billion, the equivalent of plopping an aspirin into a tank holding 1.3 million gallons of water. But other scientists have found that some chemicals can affect the bodies of animals at even lower levels.

The Prozac factor

Marsha Black, a professor of environmental health at the University of Georgia, found that minuscule levels of Prozac in rivers - .05 parts per billion - can slow the growth of tadpoles.

The public's use of Prozac has been soaring in recent years, with 54 million people taking the drug today, a rise of more than 50 percent in the last four years, researchers said. A study by the U.S. Geological Survey in 2002 found Prozac in 28 of 44 streambeds tested nationally.

Black said she was inspired by this study to find whether frogs and tadpoles were being drugged. Amphibian populations have been plummeting over the last quarter century, with at least 34 species vanishing since 1980 and nearly a third of the 5,743 known varieties threatened with extinction, according to the National Wildlife Federation.

Black took fertilized frog eggs and dropped them in 75 plastic tanks in her lab. Then she added water, with half of the tanks infused with the same concentrations of Prozac's active ingredient, fluoxetine, found by a colleague in a river in Mississippi.

She watched the tadpoles grow over 166 days and found that 40 percent of those raised with the drug died, compared with 16 percent of the tadpoles without the medication, said Emily Rogers, a doctoral student who helped with the research.

The drugged tadpoles seemed dazed and confused, and grew to be about 40 percent smaller than those in clean water. "We had some funny swimmers," Black said, "some fellas who could not keep their orientation in the water and would swim around in circle."

In a different experiment, Bryan Brooks, a biologist at Baylor University, placed several dozen fathead minnows into cages and lowered them into Pecan Creek in Denton, Texas, down from a waste plant. The water tested positive for low levels of birth control medications, Brooks said.

After three months, Brooks said he noticed that the sexual organs of the male minnows shrank, the distinctive fat pads behind their heads melted away, and the strong vertical gray lines painting their sides vanished, making them look like females.

At Gettysburg College in Pennsylvania, biologist Peter Fong added low levels of Prozac to tanks of water holding clams and mussels. He said he discovered that the antidepressant spurred a premature discharge of sperm and eggs. Shellfish in the wild would doom their offspring if they spawned like this in the wrong season, Fong said.

"It's not a red flag yet for the environment," Fong said. "It's a pink flag - something worth watching carefully."

tom.pelton@baltsun.com

Copyright © 2005, [The Baltimore Sun](#) / [Get Sun home delivery](#)



- HOME
- MARYLAND
- NATION/WORLD
- BUSINESS
- SPORTS
- ARTS/LIFE
- OPINION

MARKETPLACEJOBSREAL ESTATESHOPPING

Search:

Site Web enhanced by Google

Services > site services

Please register or log in

The article you requested is available only to registered members. Registration is FREE.

Note: Member name is no longer used to log in to this site.

Already registered? Log in:

E-mail:

Password:

If you do not remember your password, [click here](#).

If you are not a registered baltimoresun.com user [click here to register](#).

Important note: The login for the mySun system is separate from any other on baltimoresun.com, including the Talk forums and the Archive back to 1990. If you have not registered a *free* mySun account, then please [click here to register](#).

mySun registration offers great benefits

E-mail newsletters

Sign up to receive any or all of the e-mail newsletters offered by baltimoresun.com.

Available newsletters include:

- Breaking news alerts
- Weekly update
- Sports alerts & weekly newsletter
- Arts & Entertainment monthly newsletter
- Food & Drink weekly newsletter
- Movies weekly newsletter
- Travel Unraveled weekly newsletter
- Weekend Watch newsletter

Access to the 2-week archive of articles, FREE of charge

Registered users can access the preceding two weeks of baltimoresun.com articles for free. Just use the search box at the top of every page, or go to our [search page](#).

mySun page

Create your own page by choosing from among our more than 80 predefined topics, or create your own topics based on keywords of your choice.

mySun help center

- FAQs
- Forget your password?
- Need to activate your account?
- Register
- Why register?
- Privacy Policy
- Member Services page
- Contact us

mySun services

- > E-mail newsletters
- > Login
- > Register
- > Help

Please be aware that your browser must accept cookies in order for you to successfully log in and for us to identify your account. By registering you agree to abide by our [Terms of Service](#).

Questions or problems?

If you have questions or problems registering, please visit our [mySun Help](#) section. If a problem persists, [let us know](#).

[Privacy Policy](#)

[baltimoresun.com > site services](#)

[back to top](#)

[Home](#) | [Maryland](#) | [Nation/World](#) | [Business](#) | [Sports](#) | [Arts/Life](#) | [Opinion](#)
[Marketplace](#) | [Jobs](#) | [Cars](#) | [Real Estate](#) | [Shopping](#)

Contact us: Submit feedback, send a letter to the editor, submit a news tip, get subscription info, or place an ad.

baltimoresun.com (TM) and sunspot.net (R) are copyright © 2005 by The [Baltimore Sun](#).
[Terms of Service](#) | [Privacy Policy](#)

[Maryland Weather](#)

Classified partners: [Jobs](#) | [Autos](#) | [Homes](#) | [Apartments](#)

[Become a mySun member](#) | [Login](#)

Search:

Site

Web

enhanced by 