

Rocky Mountain News

To print this page, select **File** then **Print** from your browser

URL: http://www.rockymountainnews.com/drmn/local/article/0,1299,DRMN_15_5097301,00.html

Resistant genes found in Colorado water

Mutating microbes raise health flags, CSU researchers say

By **Bill Scanlon**, Rocky Mountain News

October 27, 2006

FORT COLLINS - Microbes in the waters of northern Colorado are carrying genes resistant to antibiotics, a problem scientists and health professionals need to take seriously, a researcher says.

Amy Pruden, an environmental engineering professor at Colorado State University, found the antibiotic-resistant genes in the Cache la Poudre River, as well as in treated water and wastewater.

The genes are resistant to tetracycline and sulfonamide, antibiotics commonly used in people and animals.

Even if, for example, chlorine is used to kill the microbes, the resistant genes will live on inside the DNA in each cell, she noted. And then other microbes can pick up that still vibrant DNA in the water.

The genes in the microbes occur naturally, but the proliferation of antibiotics used on humans and livestock in recent decades has given an evolutionary advantage to resistant genes, which probably have multiplied by a factor of 1,000, Pruden said.

"This is a new class of contaminant that can have a measurable impact on human and environmental health," she said. "I want to know how they're spread and develop models and find out how to treat them."

More than 2 million Americans are infected each year by pathogens resistant to antibiotics, and 14,000 of them die, according to the World Health Organization.

People should take antibiotics only when they need them and doctors should resist pressure to prescribe antibiotics when they're not likely to do any good, Pruden said, echoing recommendations from state and federal health officials.

It's also essential that people take the antibiotics until the bottle is empty, she said.

Antibiotics are used to keep animals healthy and promote weight gain, but there is still a lot scientists don't know about them, she said.

"We're putting antibiotics into the environment at much higher levels than would occur naturally," Pruden said. The genes and microbes that are resistant to antibiotics "are the ones that survive and grow."

The research findings will appear in an upcoming issue of the American Chemical Society's *Environmental Science and Technology* journal.

Pruden co-authored the paper with Ken Carlson, a civil engineering professor at CSU, and two graduate students, Ruoting Pei and Heather Storteboom, using a five-year, \$400,000 grant from the National Science Foundation and U.S. Department of Agriculture.

It is highly likely that further testing will find genes that are resistant to more than just the two antibiotics identified so far, Pruden said.

And the timing isn't good. The rate of discovery of new antibiotics is declining, while resistance to current antibiotics "is occurring at a rapid pace," she said.

Pruden's next step is to follow the path of the genes through the watershed and more closely identify the sources. She'll also look at some basic changes in water treatment as a way to destroy the genes' DNA.

If her team finds out that most of the antibiotic-resistant microbes are a result of agricultural activity, it can propose solutions such as treating the water in waste lagoons to minimize the impact.

"With environmental problems, it's often when you reach a point of no return that people start thinking about doing something," she said. "We're hoping to avoid that."

Pruden is teaching a course in molecular biology for engineers this semester. The aim is to equip future engineers with the knowledge to tackle complex problems that overlap biology and the environment.

Pruden and Carlson also are working on an early warning system for city utilities officials so they are notified of major pollutants in their water supplies as soon as possible.

The monitoring system, built by ST-Infonox of California, is being tested at CSU, and may be tested soon in Loveland and Fort Collins.

scanlon@RockyMountainNews.com or 303-442-8729

Copyright 2006, Rocky Mountain News. All Rights Reserved.