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Record: 1**Title:** Genes as Pollutants.**Authors:** Cunningham, A.**Source:** Science News; 9/9/2006, Vol. 170 Issue 11, p163-164, 2p**Document Type:** Article**Subject Terms:**

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- *ANIMAL nutrition -- Genetic aspects
- *DRUG resistance
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People: PRUDEN, Amy**Abstract:** The article states that antibiotic-resistance genes are present in the environment and can be viewed as pollutants. A study was undertaken by environmental engineer Amy Pruden to track the spread of antibiotic-resistance genes through the environment at five locations along the Cache la Poudre River in Colorado. Microbial resistance has increased due to the overprescribing and widespread application of antibiotics to farm animals; the resistance can then spread to people.**Full Text Word Count:** 459**ISSN:** 0036-8423**Accession Number:** 22448533**Persistent link to this record:** <http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=22448533&site=ehost-live>**Cut and Paste:** Genes as Pollutants.

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Section: SCIENCE NEWS This Week
Genes as Pollutants**Tracking drug-resistant DNA in the environment**

A study that traces antibiotic-resistance genes in the environment indicates that they are present even in treated drinking water. The researchers behind the work and other scientists assert that the genes should be considered environmental contaminants and advocate environmental-engineering approaches toward limiting the spread of drug resistance.

In recent decades, overprescribing of antibiotics and widespread application of the drugs to farm animals have increased microbial resistance. The resistant microbes spread through human and farm populations. The antibiotics end up in human and animal waste and can reach the environment, where resistance can also develop in soil- and water-dwelling bacteria. These bacteria might then transfer the resistance genes to microbes that affect people.

The genes that enable bacteria to resist antibiotics, for instance by expelling the drugs, can be exchanged between microbes in several ways. Amy Pruden, an environmental engineer at Colorado State University in Fort Collins, notes that bacteria may also pick up free DNA.

Pruden and her colleagues decided to track the spread of antibiotic-resistance genes through an environment. The team used a method that would detect specific DNA sequences, whether from bacterial cells or their surroundings.

The researchers took sediment samples at five locations along the Cache la Poudre River in Colorado, beginning at its origin in the Rocky Mountains and continuing east to downstream sites in agricultural and urban areas. They also sampled water from irrigation ditches and waste-collection lagoons on dairy farms near the river. All the samples were then tested for four genes known to make bacteria resistant to the antibiotics tetracycline or sulfonamide.

The highest concentrations of three of the genes turned up in dairy-lagoon water, followed by irrigation-ditch water and then river sediments near agricultural and urban areas. That pattern suggests a pathway of resistance genes moving from the lagoons, through the ditches, and into the river, say the researchers.

In separate tests, the team also found two genes that carry resistance to tetracycline in Colorado drinking water and recycled wastewater. Current methods of treating drinking water aren't getting rid of the genes, says Pruden.

"I think we need environmental scientists and engineers on board, looking at this problem," she says. "Maybe there are simple ways we can modify wastewater-treatment plants or simple things farmers can do with their lagoons."

The team reports its findings in an upcoming Environmental Science & Technology.

Pedro J. Alvarez, an environmental engineer at Rice University in Houston, calls the work "very important." The discovery of antibiotic-resistance genes in drinking water demonstrates the "ubiquitous nature of the problem," he says.

By viewing antibiotic-resistance genes as pollutants, "we can begin to consider environmental-engineering solutions," Alvarez adds.

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By A. Cunningham

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