

My Valley

Antibiotics in water pose SERIOUS HAZARD

The following is a Q&A by Terry Platz of the Beacon Institute for Rivers and Estuaries of Clarkson University and Shane Rogers, an assistant professor in civil and environmental engineering at Clarkson and a member of the faculty for RiverU, a Beacon Institute/Clarkson undergraduate program that will run June 9-27 in Beacon. Rogers teaches courses in water and waste treatment processes, water resources, environmental design and biological processes. Rogers earned his Ph.D. in environmental engineering from Iowa State University and serves as a special government employee for the National Risk Management Laboratory of the EPA.

Question: Antibiotics are widely used as an agent to accelerate animal growth in concentrated animal feeding operations causing public health concerns. Assuming that runoff from these facilities ultimately affects our water resources, how effective are water treatment plants in filtering out these chemicals?

Rogers: Not only do antibiotics and antibiotic-resistant bacteria make their way into the environment from livestock and other farming operations, wastewater treatment plants are not designed specifically to remove antibiotics before discharge into the environment. Common sources of antibiotics in wastewater include those excreted by people undergoing treatment or flushed directly down drains in residences and hospitals.

Approximately 10 years ago, the U.S. Geological Survey issued a study that identified pharmaceuticals, including antibiotics, in 80 percent of the 139 streams that they sampled across 30 states. Similarly, several studies including our own have demonstrated high prevalence of antibiotic-resistant bacteria and their resistance genes in rivers and streams near large-scale animal feeding operations. The U.S. EPA has linked the phenomenon of elevated antibiotic-resistant bacteria in rivers and streams to the discharge of animal manures and wastewater

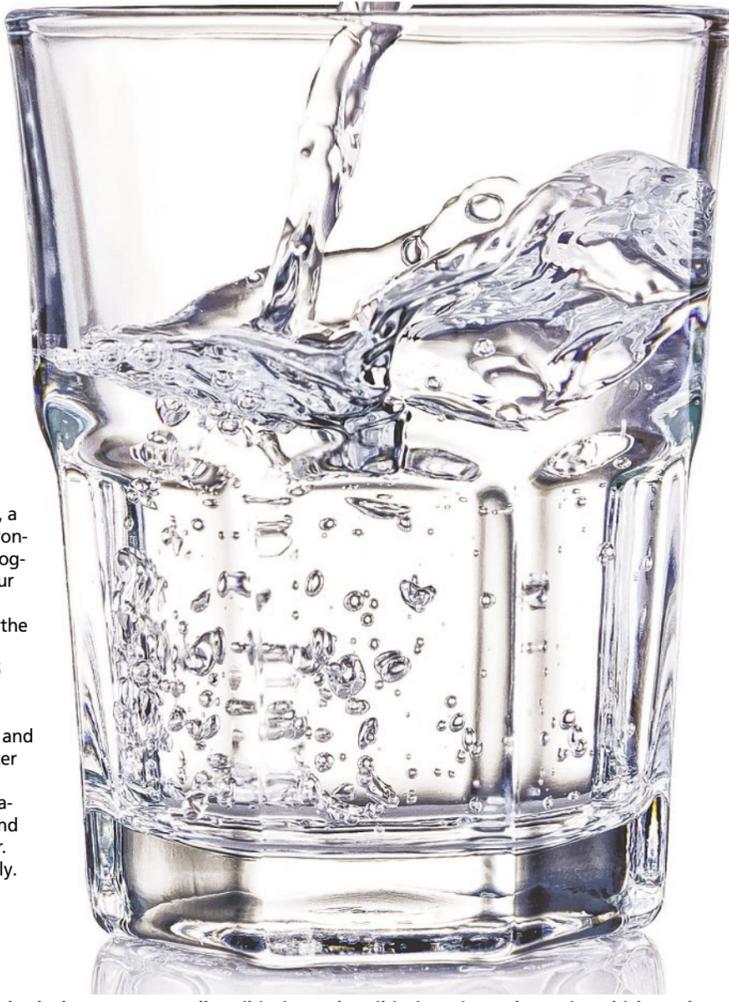
IF YOU GO

What: Clarkson University's RiverU, a six-credit summer program in environmental science and policy. Shane Rogers, Ph.D., will teach the course "Our Water Future: Sustainable Water Resource Management" as part of the program. Participants can earn six Clarkson University credits. Only 25 students will be selected.

When: June 9-27.

Where: Beacon Institute for Rivers and Estuaries, Clarkson University, Center for Environmental Innovation and Education at Denning's Point in Beacon. RiverU includes a career day and three days on the Sloop Clearwater.

Web: Visit www.RiverU.org to apply.



Conventional water-treatment methods do not remove all antibiotics and antibiotic-resistant bacteria, which can be a serious problem. GETTY IMAGES/ISTOCKPHOTO



Shane Rogers



Terry Platz

effluents into the environment. What are the consequences? Surface waters including rivers are the largest source of drinking water in the U.S. Certainly, antibiotics and antibiotic-resistant bacteria are reduced through conventional drinking water treatment; however, they are not completely removed, and this can be a significant problem.

In 2008, The Associated Press reported that pharmaceutical residues, including antibiotics, had been detected in the drinking water of 24 major metropolitan cities serving 41 million people. Researchers at the University of Michigan re-

ported in 2009 that every treated drinking water and tap water sample they took from four towns in Michigan and Ohio contained antibiotic-resistant bacteria. Levels of antibiotic-resistant bacteria were greater in tap water than immediately following treatment, indicating re-growth of bacteria in drinking water distribution systems. These researchers concluded that water treatment may increase levels of resistance in surviving bacteria, and that water distribution systems may serve as an important reservoir for the spread of antibiotic resistance to opportunistic pathogens that are then delivered to our taps.

The inability of conventional drinking water treatment and distribution systems to remove multiple drug-resistant bacteria has been known for more than 30 years. In a study conducted in Oregon in the late '70s and

COMING SUNDAY

A monitoring system aims to boost knowledge of the Hudson River.

NOTE TO READERS

The My Valley section now appears on Thursdays in addition to the Sunday G section and online at www.poughkeepsiejournal.com/myvalley. My Valley is a forum for experts and enthusiasts to share their thoughts on the environment. If you would like to contribute to the section or have a topic idea for a future story, contact Environment Editor Dugan Radwin at dradwin@poughkeepsiejournal.com or 845-437-4841. Follow @PJEnvironment on Twitter and Facebook.

early '80s, drinking water from seven communities was screened for multiple drug-resistant bacteria. Of 2,653 bacteria tested from treated drinking waters, 33.9 percent were resistant to more than one antibiotic. These researchers also noted increased multiple drug resistance occurring in water distribution systems following treatment.

There has been a clear failure on the part of our regulating bodies in prioritizing these important issues. New systems are

coming online capable of addressing, at least in part, the need for removal of antibiotics and antibiotic-resistant bacteria from our drinking water. Unfortunately, the most promising systems for removal of these pollutants are also the most energy intensive and expensive, such as reverse osmosis membrane treatment and advanced oxidation. These systems remain all but out of the reach of many medium to small community treatment systems.

Coming up

Lecture on Northern saw-whet owls — SUNY New Paltz, Lecture Hall 102, New Paltz. 7-8:30 p.m. Feb. 20. Glenn A. Proudfoot, visiting scholar at Vassar College and Mohonk Preserve research associate, will talk about "Northern Saw-whet Owls — Eastern Migration." Free.

New Snowshoes and Frozen Falls — Minne-waska State Park Preserve, Route 44/55, Gardiner. 10-11:30 a.m. and 1-2:30 p.m. Feb. 22. An introductory snowshoe outing. Learn how to put on snowshoes and maneuver in them, then go for a short excursion to the base of Awosting Falls. Along the way seek signs of wildlife left in the snow. Snowshoes may be rented from the park preserve office at the Peter's Kill Climbing Area for \$5 per person for this program. Early arrival is suggested for snowshoe rental. In the event of no snow, this outing will be changed to a hike and the destination may also be changed. Meet at the Awosting parking lot. Parking is \$8 per car. Pre-registration is required; call 845-255-0752.

Seek early migrants on the Rondout — Rosendale. A walk with the John Burroughs Natural History Society. Meet at 9 a.m. Feb. 22 in the Rosendale Shopping Center Parking Lot on Route 32. Contact Carol Weber at carolorganistin@gmail.com or 914-388-1569. Walk upstream to the High Falls area, noting early harbingers of spring. Visit www.jbnhs.org for a list of coming field trips.

Winter Tree ID Walk — Esopus Bend Nature Preserve, Saugerties. 9 a.m. Feb. 23. The Esopus Creek Conservancy and ecologist Spider Barbour will talk about identifying trees by bark and twigs during a leisurely walk through a variety of woodland habitats. Co-sponsored by the Esopus Creek Conservancy and John Burroughs Natural History Society. Meet in the Saugerties Village Beach parking lot on Route 9W, just north of the Esopus Creek bridge, at the foot of Partition Street in the Village of Saugerties. Bring binoculars and tree guides if you have them, and be prepared for cold winter conditions and/or wet, muddy trails. Contact Steve Chorvas at schorvas@verizon.net for additional information and directions. Free. Pre-registration recommended. www.esopuscreekconservancy.org

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