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Flu can bide time in icy limbo before re-emerging, biologist states

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It sounds like the stuff of a campy '50s horror movie ("It Came from the Ice!"), but a Bowling Green State University biologist believes it's a very real possibility. Dr. Scott Rogers is talking about the potential for long-dormant strains of influenza, packed in ice in remote global outposts, to be unleashed by melting and migratory birds.

“We’ve found viral RNA in the ice in Siberia, and it’s along the major flight paths of migrating waterfowl,” whose pathways take them to North America, Asia and Australia, and interconnect with other migratory paths to Europe and Africa, explains Rogers.

Viruses, he says, can be preserved in ice over long periods of time, then released decades later when humans may no longer be immune to them. For instance, survivors of the worldwide flu pandemic of 1918 had immunity to the responsible strain—called H1N1—but that immunity has died with them, meaning a recurrence “could take hold as an epidemic.”

H1, the first of 16 versions of the protein heamagglutinin, is what Rogers and his Russian and Israeli colleagues sought in their research, which will be published in the December issue of the *Journal of Virology*. The BGSU professor and biology department chair believes it to be the first time anyone has found, and maybe even looked for, the viral RNA in ice.

The information could be used to help develop inoculation strategies for

the future, according to Rogers, who also collaborates with Gang Zhang, a doctoral student who has performed the laboratory work at BGSU.

He points out that the World Health Organization annually considers what flu strains are emerging in hopes of tailoring vaccines accordingly. “Sometimes they’re wrong,” he says. “We thought that by looking at what’s melting and what birds are picking up,” better guesses for the next year might be possible.

The researchers are looking to expand their examination to Canadian and Alaskan lakes, along with those in Greenland, Antarctica and Siberia that they’ve already tested. In the study being reported in the virology journal, three lakes in northeast Siberia were sampled in 2001-02, with the virus found in the one that had attracted the most geese, Rogers notes.

In the summer, his colleagues from the Russian Academy of Sciences collected water and froze it, and in the winter, they cut ice samples out of the lakes with a sterilized saw. The samples were placed in bags and the ice was allowed to melt, after which the water was put in sterile bottles, which were then frozen and sent to Bowling Green.

It’s getting “more and more difficult to ship water and ice on airplanes,” even more so now than right after Sept. 11, 2001, Rogers adds. “There are more delays for customs just to look at the samples,” which are packed in dry ice in plastic foam containers but nonetheless start melting after two or three days.

The H1 that he and his collaborators have found is closest to a strain that circulated from 1933-38 and again in the ‘60s.

“These certain strains come back from time to time,” he says. “People have studied the biotic (transmission) cycle over the years, but it’s been

clear that some of the virus should be mutating faster. But some of the strains come back, and they haven't mutated.

"We're at a really basic level right now," Rogers adds, pointing out that it remains to be demonstrated that the frozen viruses are still alive. But "we think they can survive a long time" in ice, he reiterates, saying that tomato mosaic virus has been found in 140,000-year-old ice in Greenland.

Now in the middle of a two-year, $139,000 grant from the National Institutes of Health's National Institute of Allergy and Infectious Disease, he presented a poster on the research at the 11th International Conference on Emerging Infectious Diseases in the Pacific Rim, held Nov. 16-18 in Singapore.

Source: Bowling Green State University