

New technique used to discover new viruses in poultry

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ARS researchers have discovered a new virus called "phiCA82" in turkeys that potentially could be used as an alternative to antibiotics to fight multi-drug-resistant pathogens in poultry. Credit: Scott Bauer

In a search to find better ways to control viral enteric diseases in birds, U.S. Department of Agriculture (USDA) scientists have unearthed a treasure trove of previously known and unknown viruses in poultry by using a powerful new molecular tool called metagenomics.

Each year, disorders like poult enteritis mortality syndrome, poult



enteritis complex, and runting-stunting syndrome cause diarrhea in turkeys and chickens, resulting in decreased weight, mortality and increased production costs. Several viruses have been associated with enteric or <u>intestinal diseases</u>, but no single causative agent has been found.

Unlike traditional sequencing that characterizes genes in a single organism, metagenomics detects the nucleic acid of thousands of organisms in an entire community. Using this technique, Laszlo Zsak, researcher leader of the Endemic Poultry <u>Viral Diseases</u> Research Unit at the Agricultural Research Service (ARS) Southeast Poultry Research Laboratory in Athens, Ga., discovered a new virus that might have future antimicrobial applications.

ARS is the chief intramural scientific research agency of USDA.

Zsak and ARS microbiologist Michael Day, also at Athens, found a short DNA sequence of the newly discovered virus and designed a technique to sequence its entire genome. The virus, called "phiCA82," is the type of virus that naturally kills bacteria and belongs to a group known as "microphages" or phages, which can potentially be used as alternatives to antibiotics and as tools to fight multi-drug-resistant pathogens.

In the study, the scientists extracted and analyzed nucleic acid from poultry intestine samples gathered from U.S. commercial <u>poultry flocks</u> infected with enteric diseases. In addition to the novel phage, common avian viruses like astrovirus, reovirus and rotavirus, and <u>RNA viruses</u> belonging to the Picornaviridae family were detected. However, the scientists were surprised to discover previously unknown turkey viruses like picobirnavirus, a virus implicated in enteric disease in other agricultural animals, and a calicivirus, a type of virus often associated with human enteric diseases.



In earlier studies, Zsak and Day used metagenomics to identify and analyze for the first time the complete genome of a novel chicken parvovirus. They also developed a PCR-polymerase chain reaction-assay that is highly sensitive and specific in detecting viruses in birds.

More information: April 2012 issue of <u>Agricultural Research</u> magazine

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