

Veterinary researchers study poultry virus as human cancer treatment

Researchers on the Blacksburg and College Park, Md., campuses of the Virginia-Maryland College of Veterinary Medicine have been awarded a major new grant from the National Institutes of Health to support innovative work that seeks to develop a treatment for cancer from a common avian virus.

The National Institutes of Health \$430,000 R21 grant will allow Drs. Elankumaran Subbiah; assistant professor in the Department of Biomedical Sciences and Pathobiology at Virginia Tech; and Siba Samal, associate dean of the college's University of Maryland campus, to build upon existing work that is focused on the use of reverse genetics to alter the Newcastle Disease virus to treat prostate cancer.

Reverse genetics is the process of generating a recombinant virus from cloned complimentary DNA or cDNA copy, explains Subbiah. Through the reverse genetics system, recombinant viruses can be designed to have specific properties that make them attractive as biotechnological tools, live vaccines, and cancer therapies. The change is achieved through the introduction of the desired changes in the cDNA, which are then transferred faithfully to the recombinant virus.

“This differs from the previous work in that the recombinant [Newcastle Disease virus] will be targeted against different types of proteases,” said Subbiah. “Different types of cancer cells secrete different types of proteases. We are tailoring the virus to match the type of protease secreted by the cancer cells.”

Normal, healthy cells have an interferon antiviral system that activates upon infection with the virus, thereby preventing replication of the virus, explains Subbiah. Cancer cells, however, have defective interferon antiviral systems, he said. [Newcastle] utilizes these defects to replicate specifically in the diseased cells. The replication of the virus generates apoptosis—also known as programmed cell death or cell suicide—in the diseased cell.

According to Subbiah, the use of poultry viruses as cancer therapy poses no threat to humans and several other oncolytic viruses are currently being explored to treat cancer. However, Subbiah's work is the first to alter the Newcastle disease virus through a reverse genetic system for selective protease targeting. Oncolytic virus therapy has gained much attention recently as a result of the progress in understanding virus-host interactions and because currently available chemotherapy is not entirely satisfactory for several reasons, including the possibility of an individual's development of resistance to drugs.

“We are excited about the endless possibilities that Newcastle disease virus offers to treat cancer,” said Subbiah.

This is the second major grant awarded to the researchers for the work aiming to create a cancer therapy from genetically altered Newcastle Disease virus.

Source: Virginia Tech

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