

Viral life cycle of malignant catarrhal fever explained

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The mysterious life cycle of a sheep virus that causes malignant catarrhal fever (MCF) has been discovered by Agricultural Research Service (ARS) scientists and their university collaborators—the first step in developing a vaccine against the disease.

Microbiologist Hong Li and veterinary medical officer Naomi Taus at the ARS Animal Diseases Research Unit in Pullman, Wash., collaborated on the research with Lindsay Oaks at Washington State University and Donal O'Toole at the University of Wyoming.

MCF, a viral infection that is a leading cause of disease in American bison, is usually transmitted from sheep to bison and cattle. Vaccine development has been stymied because the virus won't grow in cell culture.

The ARS scientists and their university colleagues have shown that the virus undergoes several changes inside the animal's body, targeting specific cell types at different stages of its own life cycle. This process is called "cell tropism switching."

The [viral replication](#) in sheep can be divided into three stages: entry, maintenance, and shedding. The virus enters the sheep through its nasal passages and reaches the lungs, where it replicates. Replication in the [sheep](#) lung is required for the virus to change its cell tropism for the next stage: the infection of lymphocytes, a type of immune cell.

During this maintenance stage, the virus stays in the lymphocytes that circulate through the whole body, with little replication. This type of infection is referred to as a "latent infection." During the shedding stage, the virus reactivates from the infected lymphocytes and targets specific cells in the nasal area to complete its replication. The virus is then shed through the sheep's nasal secretions.

Now that they understand these viral changes, scientists can begin to find the right cell types to grow the virus in cell culture, according to Li.

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