Madelaine Brooks

Writing 122

Cooper

5-15-2025

Origin of Chronic Wasting Disease

Chronic wasting disease, or CWD, is a neurological degenerative disease that affects the world's cervid population (U.S. Geological Survey). This is a disease that causes the local populations of elk, deer, reindeer, and moose to die slowly over a few years. This disease appeared in 1967 and has only since then raised a multitude of questions. Researchers and biologists have determined what causes this disease; however, where it came from is unknown. Despite this, one possible determination of CWD may be that it evolved from a preexisting disease. One such possibility that researchers know of is called transmissible spongiform encephalopathy (Emerging). It shares similar ways of affecting the brain and killing animals - specifically livestock including sheep and goats. This disease, which ranchers often label as TSE, or "scrapie" is similar enough to CWD to where they have determined it is the best possible origin (Merck). Due to the disease's relatedness in transmission, effects, and symptoms, it is the most likely origin of chronic wasting disease through the evolution of the virus.

TSE is a disease transmitted in the same or similar ways when compared to CWD. These diseases can be transmitted in three ways: through bodily fluids, contaminated environmental factors (such as water or food), and infected carcasses (U.S. Geological Survey). An example of how this may work is infected livestock leaving waste behind in a pasture and deer passing through that pasture and being exposed (U.S. Geological Survey). Once one wild animal has

become infected, it can easily be passed to others which will continue to spread through a population and infect more individuals throughout the following generations.

Alongside the many ways that TSE could have been transmitted to cervid populations, the way it affects sheep and goat species makes it clear that it has commonalities with CWD (3). Both diseases have been diagnosed as misfolded proteins in the brain (Merck). These proteins are known as prions, which are often produced by mammals for common cellular functions and then recycled or degraded. This abnormal folding of proteins causes the cells to cease being broken down and to instead collect in the brain (Merck). This leads to neurological damage and eventual death by eliminating brain cells (Emerging). Prions are resistant to heat, cold, and chemicals which makes them difficult to eliminate in different environments (Emerging). Their resistance to natural disease elimination methods may have contributed to the spread of chronic wasting disease among deer populations.

Having the same cause between differing diseases can create similarities between how symptoms of a disease act (Emerging). Symptoms that are commonly held between TSE and chronic wasting disease include behavioral changes, excessive drooling, weight loss, hair pulling, and incoordination (Merck & Chronic). Related symptoms not only show that the two are related in the ways that they infect, but also in some of the ways of development and patterns of their decline in health (Chronic). Similarities in symptomatology lead to the same path from differing disease origin.

Due to transmission, cause, and symptomatic similarities, researchers have theorized that chronic wasting disease evolved and adapted to wild cervid habitats from a livestock virus known as TSE. The easy transmission of infectious prions through contaminated environmental factors, carcasses and bodily fluids from livestock made a large contribution to how it spread

onto wild populations. Similarities between the symptoms further support the connection between the two diseases. These factor together, suggesting a strong evolutionary link between them.

Works Cited

"Chronic Wasting Disease in Animals." *Chronic Wasting Disease*, 13 May 2024

"Scrapie - Nervous System - Merck Veterinary Manual." *Merck Veterinary Manual*, 9 Aug. 2022

"Scrapie Versus Chronic Wasting Disease in White-Tailed Deer." *Emerging Infectious Diseases Journal*, 20 July 2024

"What is Chronic Wasting Disease? | U.S. Geological Survey." *USGS.gov | Science for a Changing World*