The occurrence of chronic wasting disease in animals

Environment, Animals

With hunting season just around the corner and coming from a family full of hunters and gatherers, I started thinking about the safety of the food we're ingesting from these successful outings. This came on the heels of a discussion I had with one of the local game wardens who was discussing the occurrence of Chronic Wasting Disease (CWD) among the population of cervids, hoofed mammals whose males typically have horns, within our province. I began looking further into the disease to educate myself and determine what potential impacts this disease can have on my family.

What I found was slightly unnerving. CWD is a prion disease that primarily impacts mule deer, white-tailed deer, elk and moose. In addition to being spread throughout the United States, it has also been found in AB and SK in both natural habitat and on elk farms. Prion diseases, which also include mad cow disease (bovine spongiform encephalopathy-BSE), belong to a family referred to as transmissible spongiform encephalopathies (TSEs). These are unique in that they elicit no immune response within the host, which typically results in a delayed onset of outward symptoms. This abnormal prion protein accumulates in the host's brain leading to a myriad of symptoms ranging from weight loss, stupor and tremors, to extremes such as poor coordination, delirium, paralysis and death.

The disease is always fatal and although vaccines are currently in trial, there is currently no effective vaccine for this disease that is spreading at exponential capacity. The concern within the general public is whether this prion has the ability to cross between species and impact humans in the same capacity as BSE. In-vitro studies have shown that there is potential for

conversion of human prion proteins when exposed to the lethal CWD prions, however, the data has not been conclusively replicated or observed outside of the lab5. Although CWD seems like a disease that only impacts wildlife and is, therefore, far removed from the realm of human concern, there is still a considerable amount unknown about the disease. CWD transmission is not fully understood, the true mechanism from which it elicits brain damage is still unclear, and the potential for public health risks has yet to be fully determined. Because of this uncertainty, the CDC (Centers for Disease Control and Prevention) as well as the World Health Organization both recommend against eating any meat that may have come from an exposed cervid6.

Although avoiding the consumption of contaminated meat is recommended, the symptoms of CWD take months to years to develop in infected animals, so hunters and their families may consume these meats unknowingly because the animal appears asymptomatic at the time of the hunt. These are also the animals that are more likely to be killed during hunting season due to the stupor and lethargy that accompany the early stages of symptom onset making them an easy target for the avid hunter. Another frightening twist is that unlike many other proteins that become denatured with heat, prions are extremely resilient and can withstand the high temperatures of cooking and still remain intact. Scientists believe transmission of CWD to other animals is through saliva, urine, feces and blood. This is, unfortunately, not the only modality of transmission.

In addition, the prion proves its resiliency once again as it can survive outside of its host remaining active in the soil for years. It is then later passed along to animals that eat the grass growing in the contaminated dirt. These are some of the characteristics that have wildlife officials concerned that there is no way to effectively eradicate or contain the disease8. To date, there is no concrete evidence that the disease can transverse the species' barrier and infect humans. However, because CWD belongs to the same family as BSE, which we know has been linked to fatalities in humans, further research is required. The CDC confirmed, in 2013 that studies are still ongoing trying to identify human prion disease in those that had potentially consumed CWD-infected deer and elk to either substantiate or dismiss a potential link between the two3. Unfortunately, due to the lengthy duration between exposure to CWD and subsequent symptom onset, the research must span many years to determine if the disease can have the same impact on humans as seen with BSE5. It is, therefore, imperative that additional research and surveillance be continued to monitor the prevalence of CWD in Canada.