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Chronic Wasting Disease in Deer

Investigator: Dr. Todd Cornish
University of Wyoming
Status: Year 1 of 2

Chronic wasting disease (CWD) causes central nervous system problems and emaciation leading to death. Dr. Todd Cornish is examining how CWD spreads as well as what role genetics play in the possibility that a deer acquires CWD. He is an associate professor and veterinary pathologist at the University of Wyoming and a diplomate of the American College of Veterinary Pathologists. He received his DVM from the University of California-Davis and his Ph.D. from the University of Georgia.



What is chronic wasting disease (CWD)?

Dr. Cornish: Chronic wasting disease (CWD) is one of a group of unusual neurological diseases of humans and animals known as transmissible spongiform encephalopathies (TSEs). All of the diseases in this group are thought to be caused by accumulations of abnormal forms of a normal cellular protein called a prion, with accumulation of this protein in the central nervous system contributing to the characteristic neurological signs observed with these diseases. The origin of CWD and specific means of transmission is unknown, but new research implicates both direct animal-to-animal transmission and transmission via environmental contamination by the abnormal prion protein. This protein is remarkably resistant to most disinfectants and environmental factors and may persist in contaminated environments for months or even years under optimal conditions.

Does CWD only affect white-tailed deer?

Dr. Cornish: Chronic wasting disease first was recognized as a clinical syndrome in captive mule deer at a research facility in Colorado in 1967. In the early 1980s, CWD was detected in captive mule deer at a research facility in Wyoming, followed shortly by detection in free-ranging deer and elk in north-central Colorado and southeast Wyoming. Since those early years, CWD has spread or been detected in captive (game-farmed) deer or elk or in free-ranging deer in 16 states and Canadian provinces, and the list of affected species now includes mule deer, white-tailed deer, Rocky Mountain elk and moose.

The disease has been observed in captive and free-ranging animals of all four species, although the disease is most common and most prevalent in deer and least common and apparently least prevalent in moose. Chronic wasting disease does not appear to affect domestic livestock (cattle, sheep, or goats) when exposed in natural settings, and also does not appear to affect other free-ranging wildlife species outside of the family

Cervidae, including pronghorn, Rocky Mountain bighorn sheep, mountain goats, or others.

How are you going to monitor the white-tailed deer? What are you going to be watching for?

Dr. Cornish: We have been monitoring white-tailed deer within the CWD endemic area of Wyoming for more than four years, and will continue to monitor our study population for at least two or three more years. We use a variety of tools to monitor the deer (both CWD-positive and CWD-negative), including traditional VHF radio collars and radio ear tags (for fawns) and newer GPS collars. By using GPS collars, we are able to collect much more accurate and frequent location data on the deer, and we also have the ability to collect activity patterns for each deer (i.e., are they active, resting, moving, demonstrating activity consistent with feeding, etc.). Using VHF and GPS collars also allows us to recapture the deer every year and retest them for CWD.

What do you hope to learn from your study?

Dr. Cornish: We hope to learn a variety of things that will help us better understand how this disease persists and spreads within deer populations, and also what effects this disease is having on deer populations. By extension, we hope this work also will have relevance to other wildlife species, including elk and moose. We are comparing CWD-positive and CWD-negative deer with regard to a variety of factors including survival, reproduction, migration, dispersal, activity patterns, home range and habitat selection, and, of course, we are following the transition from CWD-negative to CWD-positive status to try and determine when these differences in behavior and survival begin during the course of the disease. This work will entail mapping, spatial and temporal analysis, and some fairly complex mathematical modeling that should lead to some very powerful results that will be useful to wildlife managers and disease experts on the front line.

Results so far that you wish to share?

Dr. Cornish: We are just now beginning to collect enough data to start analyzing what effects CWD is having on the deer population in our study. We have learned a few things that are interesting or that seem to fly in the face of conventional wisdom. First of all, our data indicate this is not predominantly a disease of male deer as some colleagues have suspected in the past. At least in our study population, we have found that female deer become affected at rates that equal males, and in parts of our population, the does seem to survive longer and thus may contribute more to persistence and spread of the disease. We also have found more than a few fawns that are CWD-positive. And finally, we have found that our data seem to suggest that CWD may be affecting deer populations in several ways – both directly through mortality and indirectly by shifting population age structures so that there are more young deer and less older (mature and wise!) deer. We need to perform considerably more data analysis and quite likely a fair bit of modeling to further explore these latter paradigms.

Why should the average animal lover care about your study?

Dr. Cornish: A wide variety of people have expressed interest in our study. We receive questions about the study almost daily, and we are very excited to talk to people about our work and about this disease. Certainly sportspeople and wildlife enthusiasts (including photographers, nature watchers, backpackers, and conservationists) care very much about deer, elk, and moose, and are very concerned about what CWD is doing to these species and populations. We work in an area not too distant from such international

treasures as Yellowstone National Park and Grand Teton National Park, and there is a lot of concern about what will happen when and if CWD reaches these locations and affects wildlife within the parks. There also is a definite interest in the livestock community about CWD and related diseases, and the more information we have about CWD the more we can inform livestock producers and other stakeholders about wildlife species sharing their land and potentially interacting with their cattle, sheep, goats, and other domestic species. And finally, there is an awful lot of interest from the general public and school-aged children in particular about this disease, its effects on wildlife, and any risks to human health, and we often have opportunities to talk about this and other wildlife diseases in larger contexts when questions about our study arise.