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NEW RESEARCH SUPPORTS THEORY THAT INDIRECT TRANSMISSION OF WASTING DISEASE POSSIBLE IN MULE DEER

A team of Colorado and Wyoming researchers has reported that chronic wasting disease can be transmitted through environments contaminated by whole carcasses or excrement of animals infected with the fatal illness.

The research confirms long-held theories that CWD can be spread through indirect environmental sources. Previous published research that involved two of the authors of the new study has already shown that CWD was either directly or indirectly transmitted through interactions between infected and healthy mule deer.

Funded by the National Science Foundation and the National Institutes of Health, the research paper is published on-line in the journal *Emerging Infectious Diseases* http://www.cdc.gov/ncidod/eid/. The authors are Division of Wildlife (DOW) Veterinarians Michael Miller and Lisa Wolfe, Colorado State University Senior Research Scientist Tom Hobbs and University of Wyoming Professor Elizabeth S. Williams.

"Based on anecdotal observations over the years, we have long suspected that CWD could be transmitted when healthy deer were exposed to excreta and carcasses of mu le deer that had the disease," said Miller, the study's principal author. "Our findings show that environmental sources of infectivity may contribute to CWD epidemics and illustrate how potentially complex these epidemics may be in natural populations."

Williams, who recently received a grant to study CWD transmission mechanisms in greater detail, agreed.

"We've had a great deal of circumstantial evidence suggesting that indirect transmission occurs," Williams said. "The experimental findings show that we need to consider several potential exposure routes when attempting to control this disease."

Hobbs, who works in CSU's Natural Resource Ecology Laboratory in Fort Collins, said the research could be important in helping to slow the spread of CWD.

"Ultimately, we want to develop models that predict the behavior of the disease," Hobbs explained. "For example, we would like to predict how prevalence changes over time in different areas of Colorado."

Hobbs said previous disease models have been based on anima l-to-animal contact as the sole source of infection and that disease prevalence was expected to decline as the number infected animals is reduced.

"Our findings that contaminated environments can cause transmission means that these declines in infection rates may be much slower than would be predicted by models that only consider animals -to-animal transmission."

Miller said that while the research shows environmental contamination is possible in a captive setting, the impacts in the wild are still unknown.

"We really can't estimate the relative importance of these different routes of infection from our experiment, but each could play a role in sustaining natural epidemics," Miller said. "Although confinement likely exaggerated transmission probabilities, the conditions we simulated by this experiment do arise in the wild."

The research confined healthy deer in three sets of separate paddocks. In the first set, healthy deer were exposed to another deer already infected with CWD; in the second set, deer were exposed to carcasses of deer that had died of CWD; in the third set, deer were confined in paddocks where infected deer had previously been kept.

A few of the healthy deer contracted CWD under all three exposure scenarios over the course of one year.

Chronic wasting disease is a fatal neurological ailment of elk, white-tailed deer and mule deer. Most researchers believe the disease is caused by an aberrant prion protein that misfolds in the brain, destroying brain tissues as it progresses. Clinical signs include lethargy, excessive salivation, loss of

wariness of predators and slowly deteriorating body condition. The disease is always fatal and there is no known cure or treatment to prevent CWD.

Federal and state health officials have found no connection between CWD and human health. As a precaution, health officials and the DOW recommend that the meat of animals infected with CWD should not be eaten. The Division offers a testing program that allows hunters to have deer, elk and moose check for CWD. More than 45,000 animals have been tested in this way in the past two years in Colorado.

DOW managers have used selective culling to remove animals infected or exposed to CWD in areas where prevalence is highest. The goal is to slow the spread and reduce prevalence to 1 percent or less in each deer and elk data analysis unit in Colorado.

"Although live deer and elk still seem the most likely way for CWD to spread geographically, our data show that environmental sources could contribute to maintaining and prolonging local epidemics, even when all infected animals are eliminated," Miller said. He said the appropriateness of various culling strategies may depend on how quickly the CWD agent is added to or lost from the environment.

"The dynamics of various transmission mechanisms and their implications for disease management need to be more completely understood," Miller said. "We hope our findings bring us one step closer to that complete understanding."