Household bleach inactivates chronic wasting disease prions

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Three healthy bull elk during the fall 2018 rut in central Montana Credit: Brent Race

A 5-minute soak in a 40% solution of household bleach decontaminated stainless steel wires coated with chronic wasting disease (CWD) prions, according to a new study by National Institutes of Health scientists. The scientists used the wires to model knives and saws that hunters and meat processors use when handling deer, elk and moose—all of which are susceptible to CWD. The research was conducted at Rocky Mountain Laboratories (RML) in Hamilton, Mont. RML is a component of the NIH's National Institute of Allergy and Infectious Diseases. The findings are published in the open-access journal *PLOS One*.

CWD is a brain-damaging and fatal prion disease in cervids, members of the deer family. To date CWD has never been found in people. However, other prion diseases can affect people, therefore scientists, wildlife managers and public health agencies have suggested handling CWD cervid tissues with caution. CWD is spreading in North America, increasing the potential for human exposure. The disease has been found in cervids in 26 states and three Canadian provinces, as well as in Norway, Finland and South Korea. Not all animals infected with CWD will show signs of disease, but those that do appear weak and thin.

Infectious prions—types of proteins found in mammals that when misfolded can cause disease—are extremely difficult to inactivate, which led the scientists to seek a practical, low-cost CWD decontamination method. Bleach has been proven as a decontaminant against other types of prions but had never been tested against CWD.

CWD prions adhere readily to stainless steel and can contaminate knives, saws and other equipment. For hunters and others who want to be cautious when handling potentially CWD-infected animals, the ability to decontaminate equipment is one approach to reducing potential exposure.

The researchers worked with CWD-infected brains from white-tailed

and mule deer. They tested various bleach concentrations and soak times to determine the most effective combination to eliminate prion seeding. Notably, the study failed to find an effective method to decontaminate CWD-infected solid tissue. Pieces of CWD-infected brain retained prion activity even after a 30-minute soak in 100% bleach. Investigators note that bleach fails to penetrate tissues and should be used only as a surface decontaminant.

The scientists hope that public health and wildlife agencies will consider this study when making formal recommendations for decontamination of CWD prions.

More information: Katie Williams et al, Inactivation of chronic wasting disease prions using sodium hypochlorite, *PLOS ONE* (2019). DOI: 10.1371/journal.pone.0223659

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