



Chronic Wasting Disease (CWD) in CERVIDS





What is a **Cervid**?



Cervid



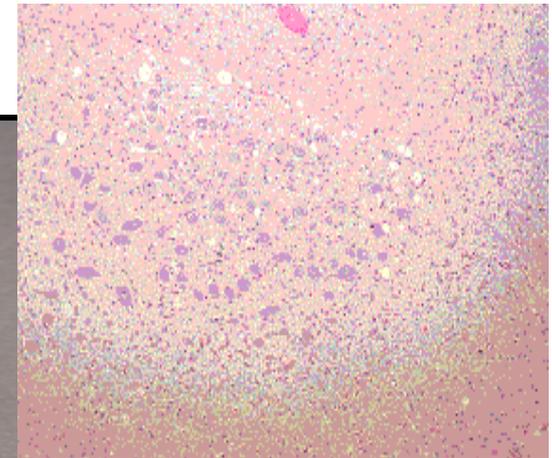
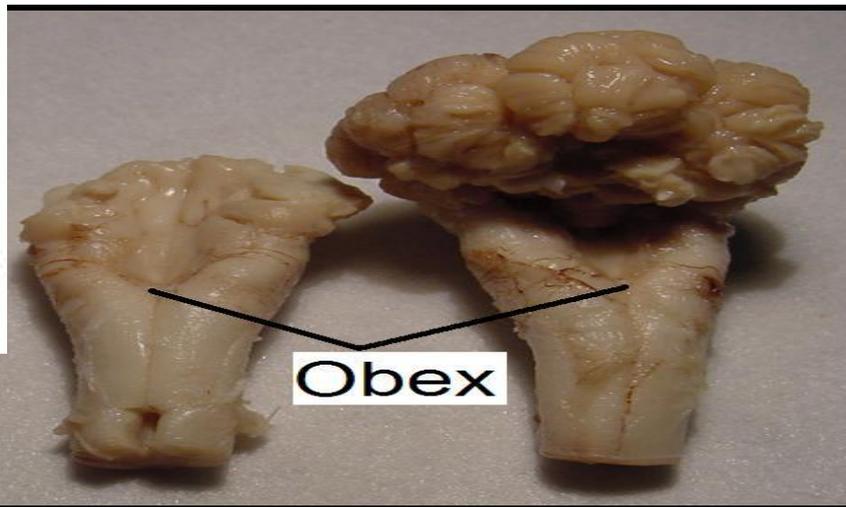
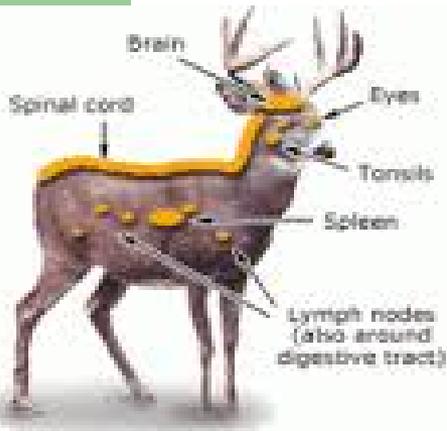
- any member of the deer family, *Cervidae*, comprising deer, reindeer caribou, elk, and moose, characterized by the bearing of antlers in the male or in both sexes.

What is “Chronic Wasting Disease” (CWD)

- * **Prion:** protein infectious agent
- * Smaller than the smallest known virus
- * Body has minimal reaction to unlike bacteria or virus
- * Resistant to most disinfectants and treatments

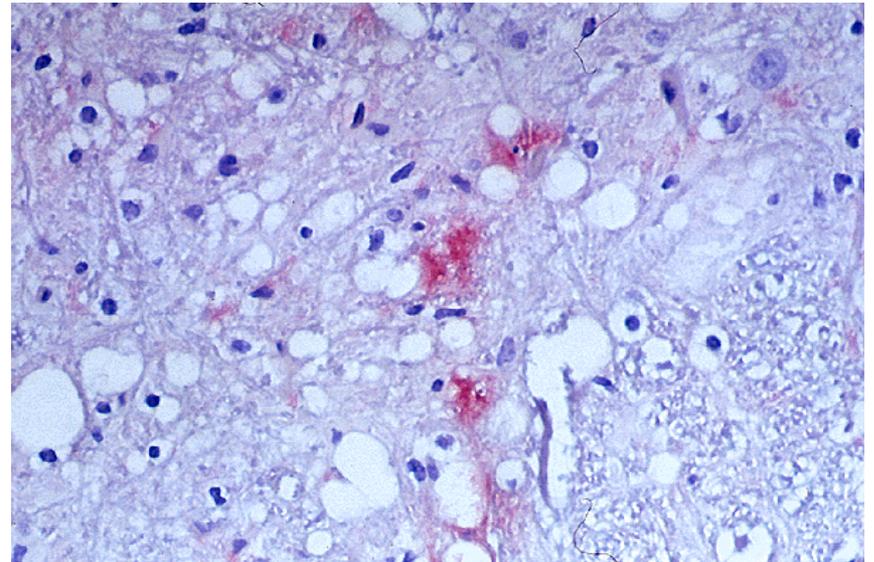
What is “Chronic Wasting Disease” (CWD)

- A “transmissible spongiform encephalopathy” “TSE” that effects the brain/spinal tissue of cervids



Transmissible Spongiform Encephalopathies

- **CWD** is classified as a **TSEs** similar to Scrapie, Creutzfeldt-Jakob disease (CJD), kuru, transmissible mink encephalopathy, bovine spongiform encephalopathy (BSE)



Transmissible Spongiform Encephalopathies



BSE and vCJD



Scrapie



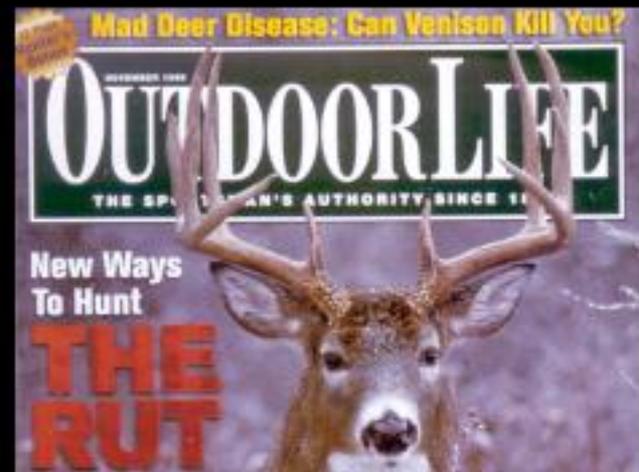
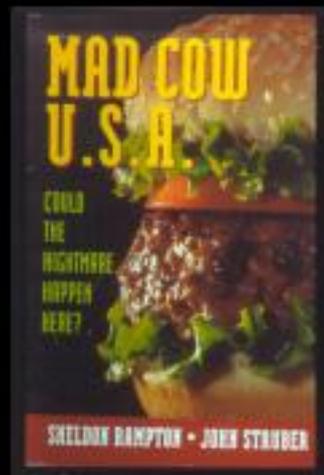
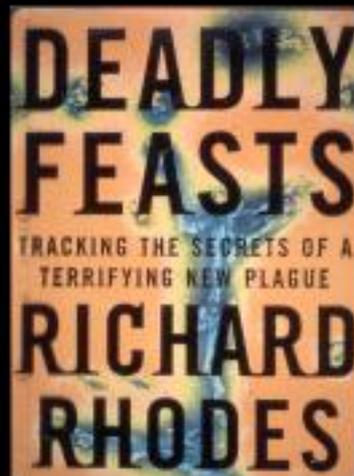
Kuru and
CJD



CWD

MAD DEER **DISEASE**
CAN VENISON KILL YOU?

Media Attention to the TSEs



Causes of CWD

- Caused by a **prion (PrP)** that is **abnormal in structure, resists breakdown, accumulates**
- Protein prions are found in all mammals

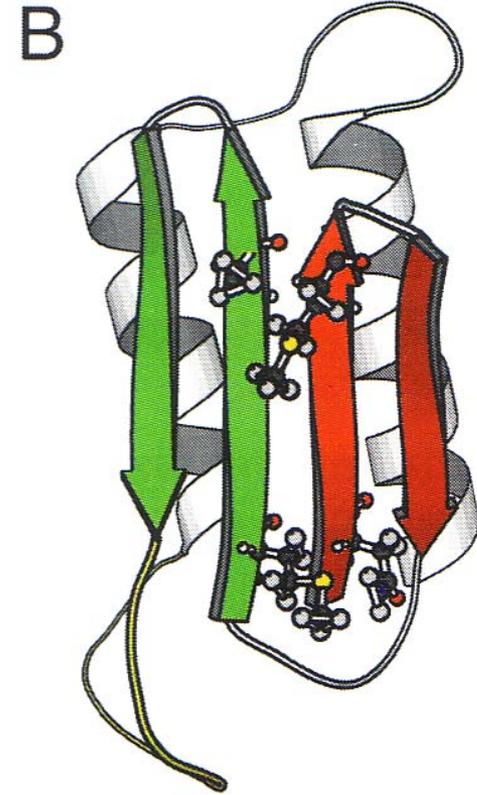


Normal PrP^C has been reported to play important roles in cell-cell adhesion and intracellular signaling *in vivo*, and may therefore be involved in cell-cell communication in the brain





PrP^C

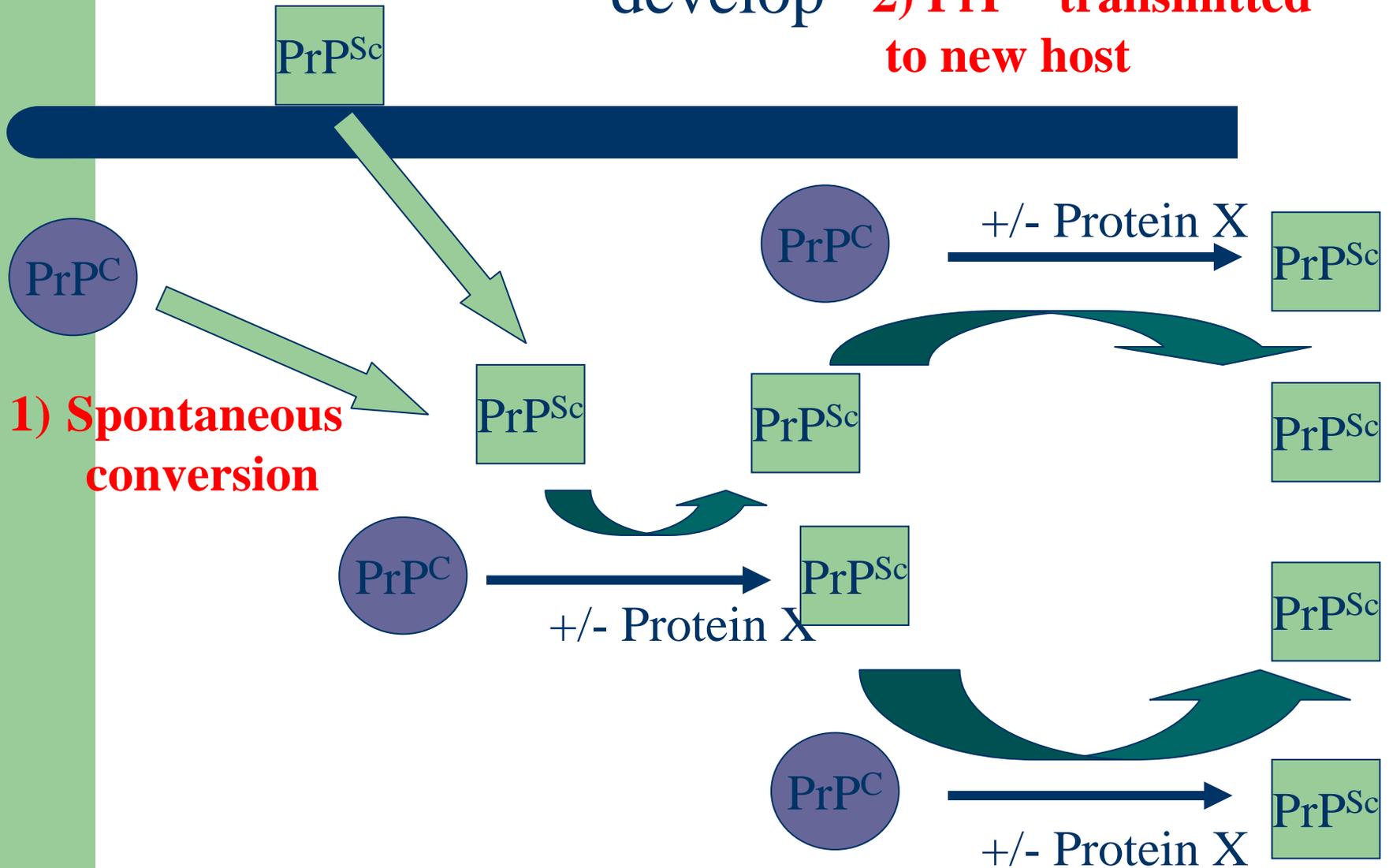


PrP^{Sc}

Prusiner, S. B. 1999. An introduction to prion biology and diseases. Pages 1-66 in S. B. Prusiner, editor. Prion Biology and Diseases. Cold Springs Harbor Laboratory Press, Cold Springs Harbor, New York.

Two ways in which spongiform encephalopathies develop

2) PrP^{Sc} transmitted to new host

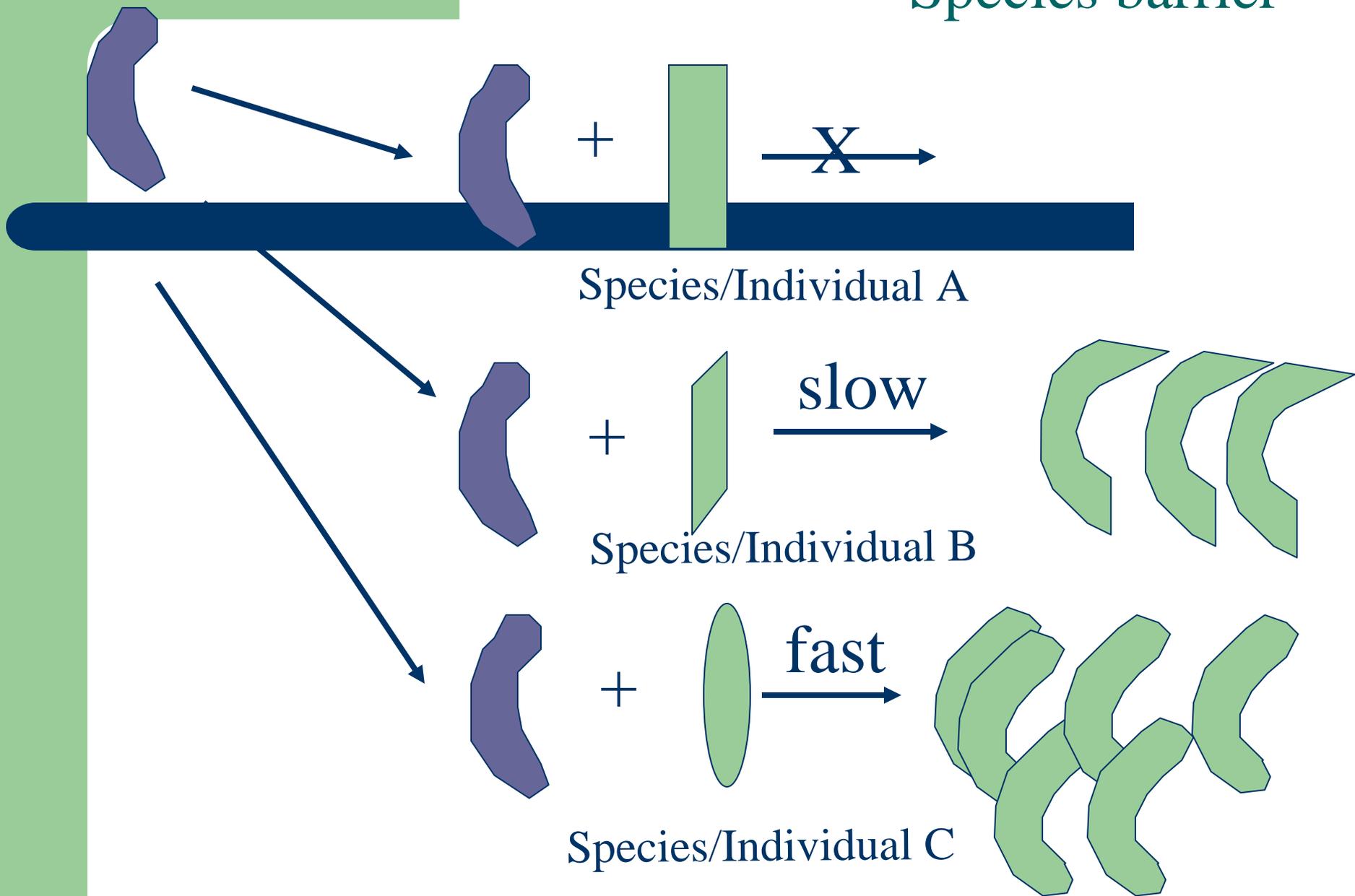


PrP^{Sc}

PrP^{Sc}

PrP^C

“Species barrier”



TRANSMISSION of CWD

- Direct inoculation
 - Experimental exposure
 - Iatrogenic exposure of humans to CJD
 - Vaccine for “louping ill” in sheep contaminated with scrapie prion
- Ingestion
 - Experimental exposure
 - BSE: sheep scrapie to cattle and then cattle to cattle
 - Kuru in humans
 - vCJD in humans
- Direct animal to animal spread
 - Scrapie in sheep
 - CWD in deer and elk

CHRONIC WASTING DISEASE

Transmission



Symptoms of CWD

- Behavioral changes
- Increased drinking, urination, salivation
- Pneumonia
- In coordination



Symptoms of CWD

- Animal is disorientated
- Chronic Weight loss- poor doer
- Animals lose control of basic bodily functions
- Finally death occurs
- Animal's brain tissue is riddled with holes



CHRONIC WASTING DISEASE

Clinical Features



Adults: 17 months to
>15 years

most 3-5 years

Sex: males, females

No strict seasonality

Clinical duration:

days to >1 year

usually months

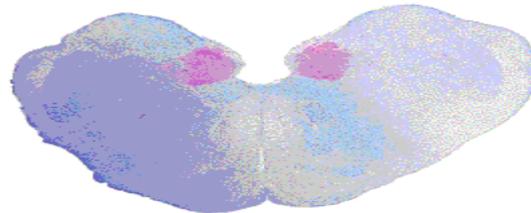
Incubation period

min: ~ 17 months

max: unknown

Diagnosis of CWD

- Look for the **PRIONS**
- There are **NO** approved tests for **LIVE** animals-
Working on Tonsil/Rectal Biopsy
- Due to the slow -growing nature of the disease, currently animals over 16 months are tested
- On **deceased** animals, the brain stem is removed and a staining test is used on tissue samples.



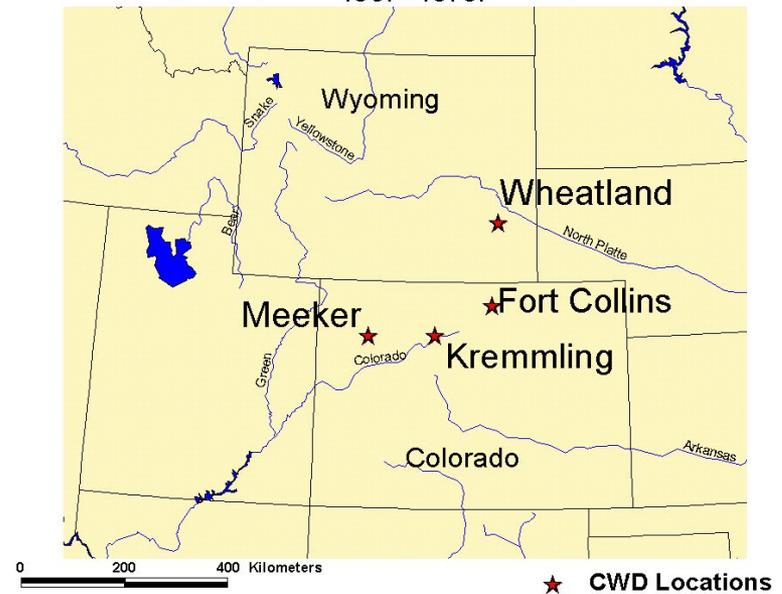
Treatment of CWD

- There is **NO** treatment.
- There is **NO** vaccine for prevention yet-
scientists are working on it.
- **100% FATAL** once infected.

History of CWD

- First recognized as a clinical entity in the late 1960s in captive mule deer and elk in Colorado and Wyoming; confirmed as a TSE in late 1970s

Locations Where CWD was First Diagnosed in Captive Cervids, 1967 -1979.





A BRIEF HISTORY OF CWD

Late 1960s: CWD recognized as a syndrome

1977-78: Recognized as a SE

1981: Recognized in free-ranging cervids

1996: Recognized in farmed elk

2001: Recognized in free-ranging deer in Canada

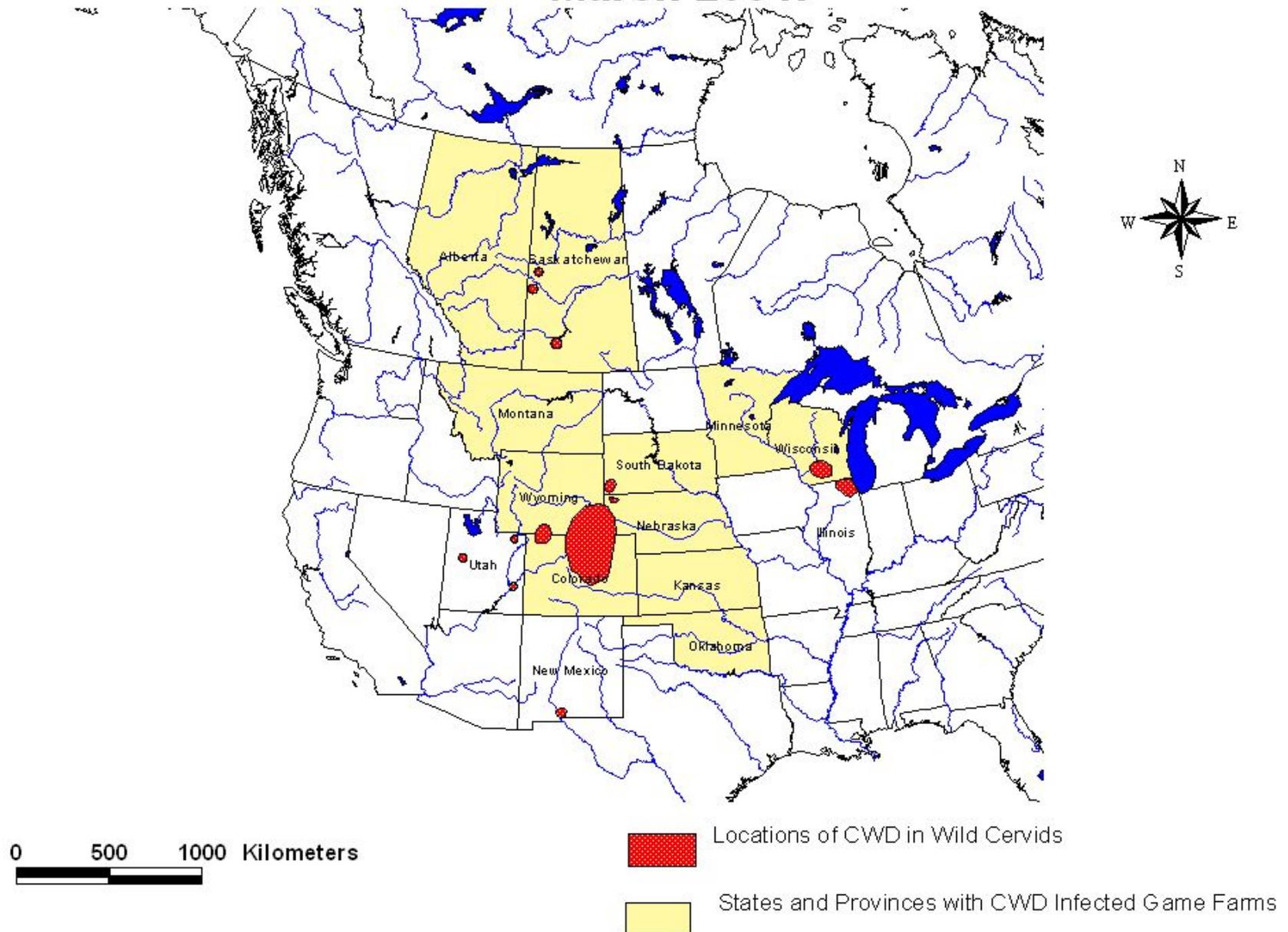
2001: Recognized in farmed elk in Korea

2002: Diagnosed in free-ranging white-tails in WI

LOCATIONS of CWD- Captive and Wild Populations

- Several USA States
- 2 Canadian Provinces
- Korea

Locations of Wild and Game Farm Infected Cervids March 2004.

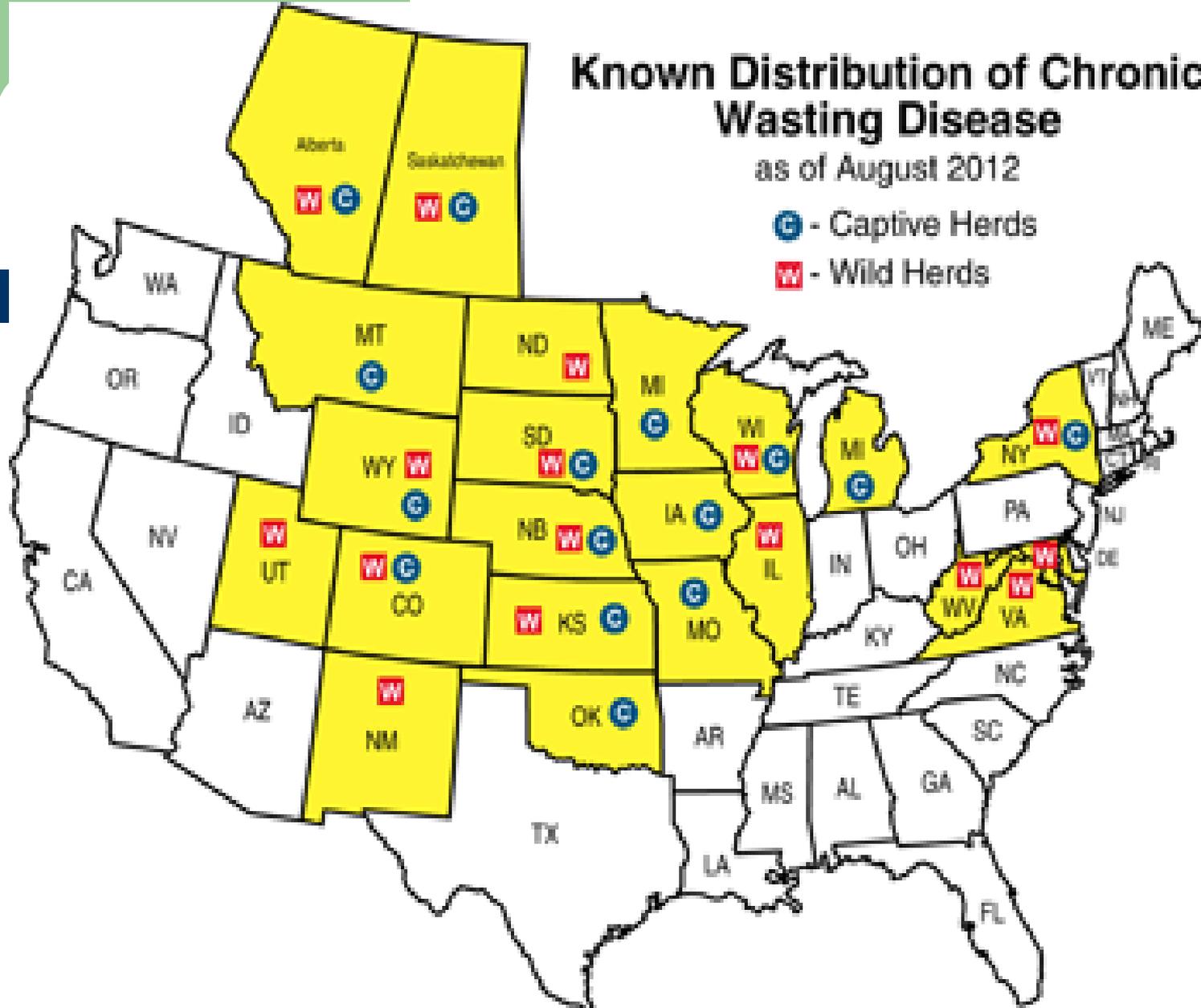


Known Distribution of Chronic Wasting Disease

as of August 2012

C - Captive Herds

W - Wild Herds



CHRONIC WASTING DISEASE

The Big Question: How do we control CWD?

Captive Cervids:

surveillance and herd certification

moratoriums on movement

quarantine

depopulation/indemnity

**environmental contamination and use of
premises**

Prevention of CWD:

- The only prevention for this disease is to make sure if you raise captive cervids that they are in a clean biosecure environment and that they are all well fed from known sources
- Follow sanitary practices while hunting and processing game
- Follow the Federal and State Regulations



CWD RULE State and Federal Regs:



Animal and
Plant Health
Inspection
Service
**Veterinary
Services**

Chronic Wasting Disease Program Standards

July 2012



CWD RULE State and Federal Regs: New Federal CWD Rule 2012

- CWD Captive Herd Certification Program – **Alaska Department of Environmental Conservation** * At this time Reindeer **ARE NOT** included in the Rule.
 - *Administrative Procedures
 - *Participation
 - *Registration, Identification, Recordkeeping
 - *Fencing
 - *Surveillance and Sampling

CWD RULE State and Federal Regulations: continued

- *Diagnostics
- *National Reports
- *Interstate Movement
- *Herd Plans
- *Carcass Disposal
- *Sanitary Precautions/Biosecurity

CWD RULE State and Federal Regulations:

- *WILDLIFE* is much harder to manage
 - Alaska Department of Fish and Game
 - * Website
 - * CWD Testing-Hunter Harvest- since 9/2003
- “To date, CWD has NOT been detected in any Alaskan wildlife, however Alaska is a state of concern and the disease is being closely monitored”**

HELP!

- CWD has not been detected in Alaskan wildlife yet but ADF&G needs your **help** monitoring! Please report sick deer, elk, moose or caribou to dfg.dwc.vet@alaska.gov

Other Organizations

Chronic Wasting Disease Alliance

- <http://www.cwd-info.org/>

Hunting- General Disease Recommendations

- Harvest Healthy Animals
- Wear latex/rubber gloves
- Do not EAT Brain, spinal Cord, Eyes, Lymphoid Tissue
- DEBONE meat when processing
- USE good Sanitation
- Cook meat thoroughly

Summary of CWD



- CWD is **similar** to “mad cow” disease (BSE), Scrapie
- Scientists and biologists have known about the disease for 40 years. Known about “Scrapie” in sheep for 250 years
- The first case of CWD was in a captive mule deer in Wyoming.
- The World Health Organization and the US Food and Drug Administration have been studying the disease and have found no evidence that CWD is transmissible to humans. **“Prudence in the Face of Uncertainty”**

Summary of CWD



- Certain cervid species seem to be more resistant- Reindeer/Caribou- **Species Barrier**
- Natural case **NOT** found to date in reindeer even with potential overlap of habitat with CWD infected elk or deer herds
- Recent article 2012 “ Experimental Oral Transmission of CWD to Reindeer”- Were able to transmit the disease Experimentally ORALLY.

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Why is **CWD** Important ?

- Human Health Questions?
- Animal Health Questions?
- Wildlife Population Questions?



“Prudence in the Face of Uncertainty”



USDA

APHIS



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