

# Chronic Wasting Disease (CWD)

Extended version

**Classic case:** Abnormal behavior, neuro signs, weight loss, and often **aspiration pneumonia**

## Presentation:

- Wild or captive cervids
- Deer - White-tailed, Black-tailed, Mule, Red, Sika
- Rocky Mtn. Elk (wapiti); less susceptible than deer
- Moose - recently identified in Canada
- >16 months of age; most 2-7 yrs
  - Older in endemic herds

### Clinical signs

- |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Weight loss</li> <li>• Bruxism</li> <li>• Hypersalivation</li> <li>• Esophageal dilation</li> <li>• Regurgitation</li> <li>• <b>Aspiration pneumonia</b></li> </ul> | <ul style="list-style-type: none"> <li>• Neurologic signs                             <ul style="list-style-type: none"> <li>▪ Ataxia</li> <li>▪ Head tremor</li> <li>▪ Low head carriage</li> <li>▪ Persistent pacing</li> <li>▪ Episodic somnolence</li> </ul> </li> </ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Deer with CWD; image by Dr. T Kreeger; courtesy WY Fish & Game Dept, & CWD Alliance website

## DDX:

Starvation	Brain abscess	Parelaphostrongylus tenuis	Blue tongue
Dental attrition	Meningitis	Epizootic hemorrhagic ds	Encephalitis
Nutritional deficiency	Traumatic injury	Locoweed intoxication (elk)	Arthritis
Peritonitis	Pneumonia		

**Test of choice:** must identify prion protein

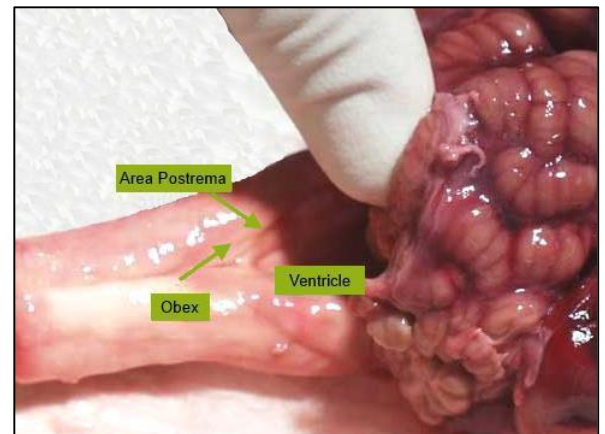
Detection of prions in CNS (obex) or lymphoid tissues

- Screening - ELISA
- Confirmation – Immunohistochemistry  
Western blot (in autolyzed tissue)

White-tailed deer, Mule deer

- Deer more likely to have prions in lymph tissue
  - Always submit retropharyngeal lymph node (RLN) & CNS (Obex)
- Prion accumulates in lymph tissue of deer *before* CNS
  - Biopsy of tonsil – **antemortem** test, but rarely performed

Rocky Mtn. Elk - The **OBEX** from the brain, and lymphoid tissues



The **Obex** – where 4<sup>th</sup> ventricle becomes central canal of spinal cord; image courtesy, CDC

# Chronic Wasting Disease (CWD)

Extended version

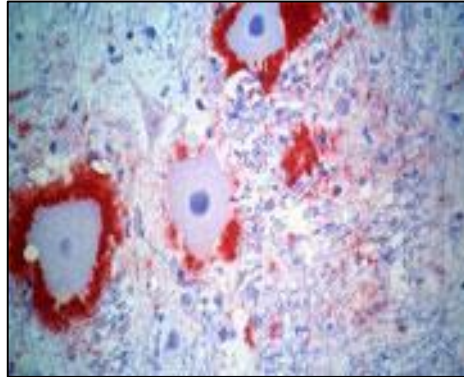
## Rx of choice:

No treatment

## Prognosis:

Grave, fatal disease

## Prevention:



CWD prions in Obex;  
Wy Game & Fish



Elk with CWD; Image by Dr. E. Williams;  
Image courtesy U of WY, CWD Alliance website

Captive or Farmed animals:	Free range herds - Very difficult
<ul style="list-style-type: none"> <li>Maintain a closed herd</li> <li>Test all animals that die</li> <li>Limit new additions to herd</li> <li>Minimum 5 years of monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Vigilant surveillance                             <ul style="list-style-type: none"> <li>Test and remove positive animals</li> </ul> </li> <li>Population reduction</li> </ul>
<ul style="list-style-type: none"> <li>Quarantine required all positive herds; Control programs designed for each herd</li> <li>Voluntary herd certification programs offered by APHIS</li> </ul>	
<b>Hygiene</b> <ul style="list-style-type: none"> <li>Disinfect - 50% bleach, other approved products</li> <li>Dispose of carcasses promptly</li> <li>Incineration, alkaline digestion</li> <li>Municipal landfills</li> </ul>	
Take GREAT care - handling or transporting tissues	

Hunters beware: **Cooking DOES NOT destroy PrP<sup>CWD</sup> in tissues !!**

Test carcasses in endemic areas before consuming

## Pearls:

**CWD is a transmissible spongiform encephalopathy (TSE)**

First identified in late 1960's

Etiology – abnormal, 'misfolded' protein, called a **Prion** – **PrP; PrP<sup>CWD</sup>** specific for CWD

PrP binds to normal prion proteins in cells – induces misfolding in normal PrPs

Abnormal PrP's accumulate – cellular dysfunction

Horizontal transmission

- Direct contact with infected animals or contaminated environments
- Incubation time at least 16 months, usually 2-4 yrs

Prevalence

- Captive herds - may reach 100%
- In wild – variable, <1-30%

CWD - difficult to control - transmitted readily between deer species; Prions found in muscle; Zoonotic? Not yet identified....



# Chronic Wasting Disease (CWD)

Extended version

CWD is a **reportable disease** in many states of the US

Prion diseases are Transmissible Spongiform Encephalopathies (TSE)

BSE	Bovine	Mad Cow Disease	Humans	
	Sheep/Goats	Scrapie	CJD	Creutzfeldt-Jacob Ds
CWD	Cervids, elk, moose	Chronic wasting disease	Variant CJD	BSE in people
USE	Ungulates		Kuru	Ritual cannibalism by the
FSE	Feline			Fore Tribe of New Guinea
MSE	Mink	Transmissible mink enc.		

**Refs:** Large Animal Neurology, Mayhew, 2<sup>nd</sup> ed. pp. 259-260, Merck Manual, 10<sup>th</sup> ed (online): Chronic Wasting Disease, USDA (APHIS): Chronic Wasting Disease, The Center for Food Security & Public Health and Iowa State University College Vet Med: Chronic Wasting Disease;

★ CWD Alliance, CWD.CC\_- excellent websites with information, news, and images

Lee J, Kim SY, Hwang KJ, Ju YR, Woo HJ. Prion Diseases as Transmissible Zoonotic Diseases. Osong Public Health and Research Perspectives 2013; 4(1):57-66, available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3747681/>

## My Notes: