



18th Annual Meeting of the TSE EURL  
Torino, Italy  
12th-13th September 2019



# Chronic Wasting Disease: an update on bioassay experiments

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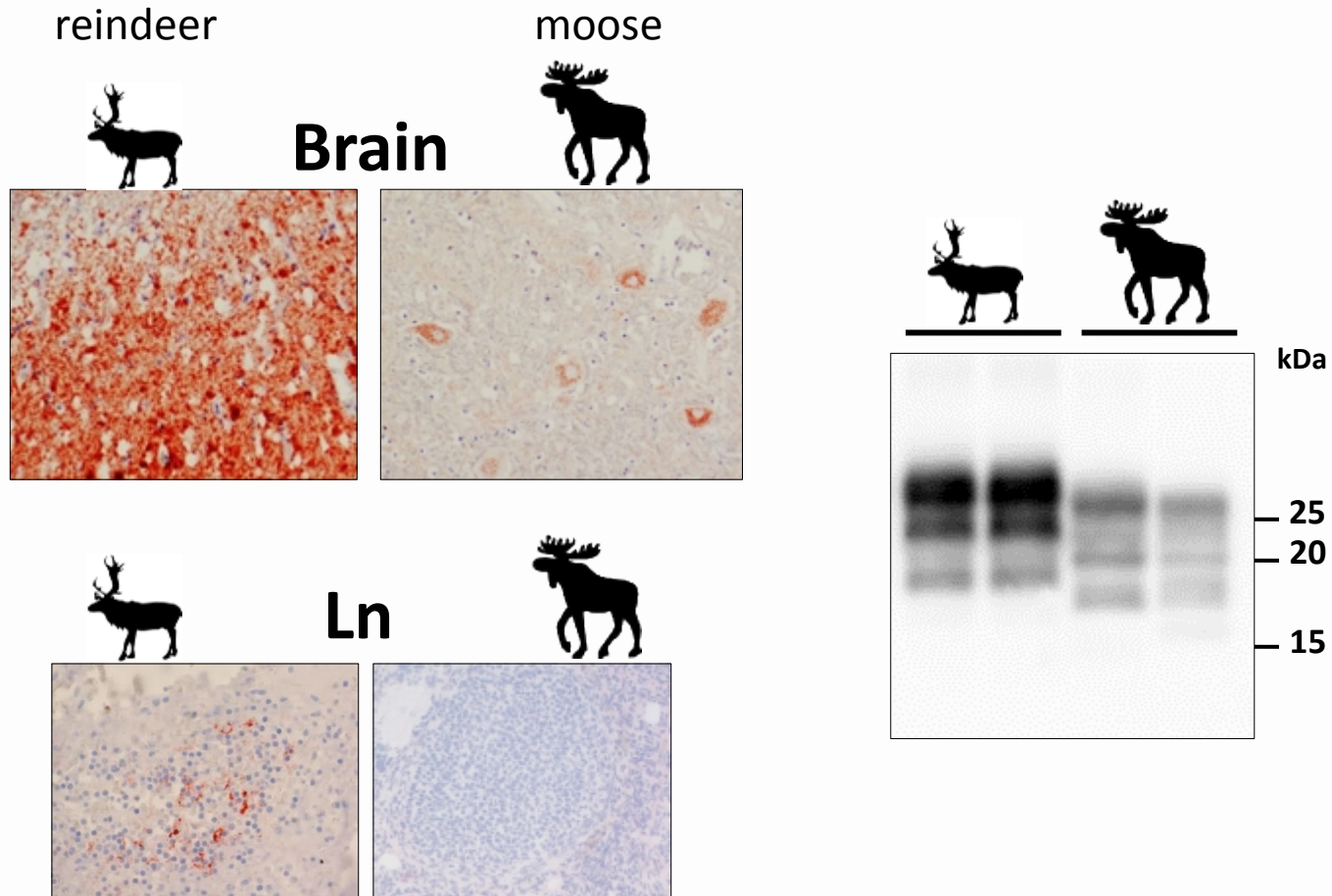
Discriminatory WB team:

Laura Pirisinu and Ilaria Vanni

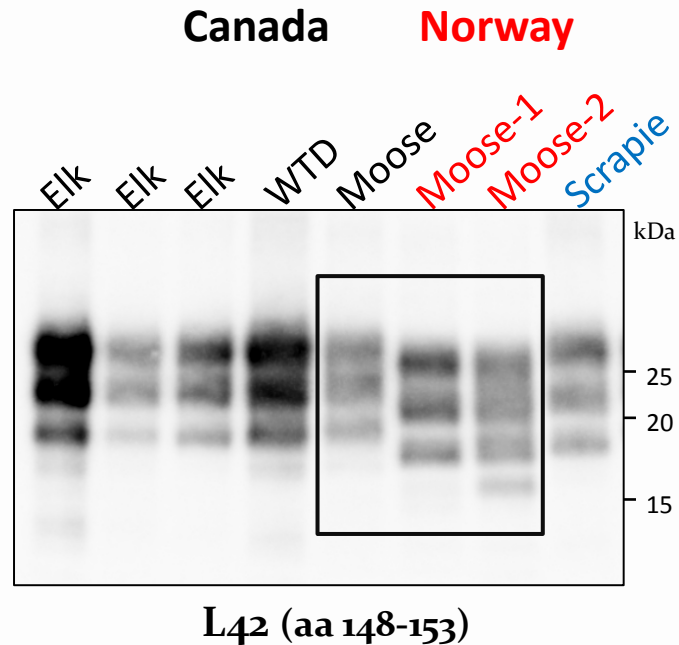
Bioassay team:

Romolo Nonno, Claudia D'Agostino, Michele Di Bari and Laura Pirisinu

# CWD in Norwegian cervids: reindeer vs moose



# A novel type of CWD in Norwegian moose

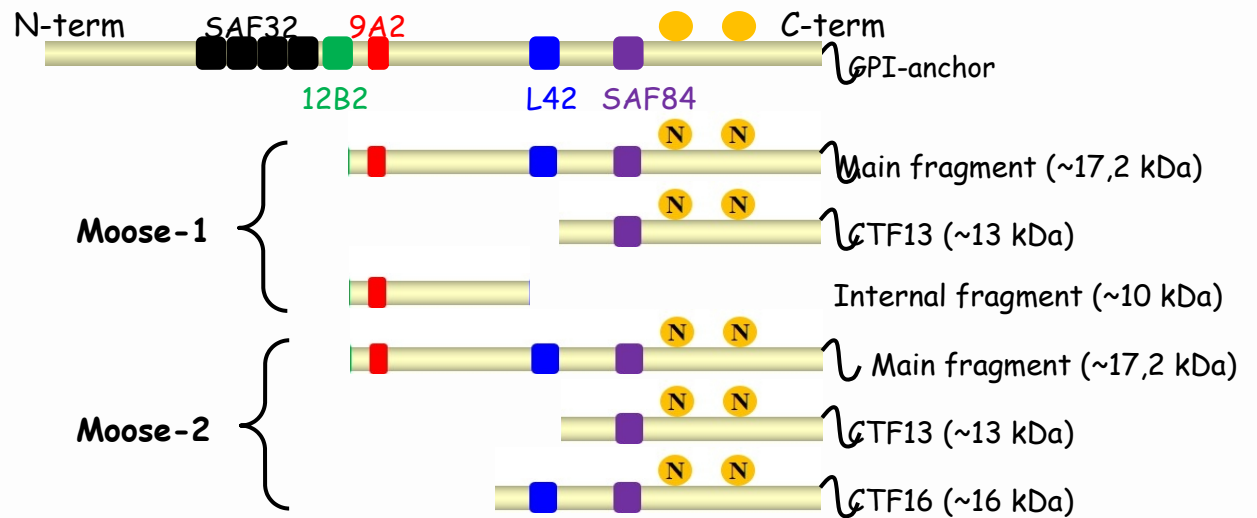
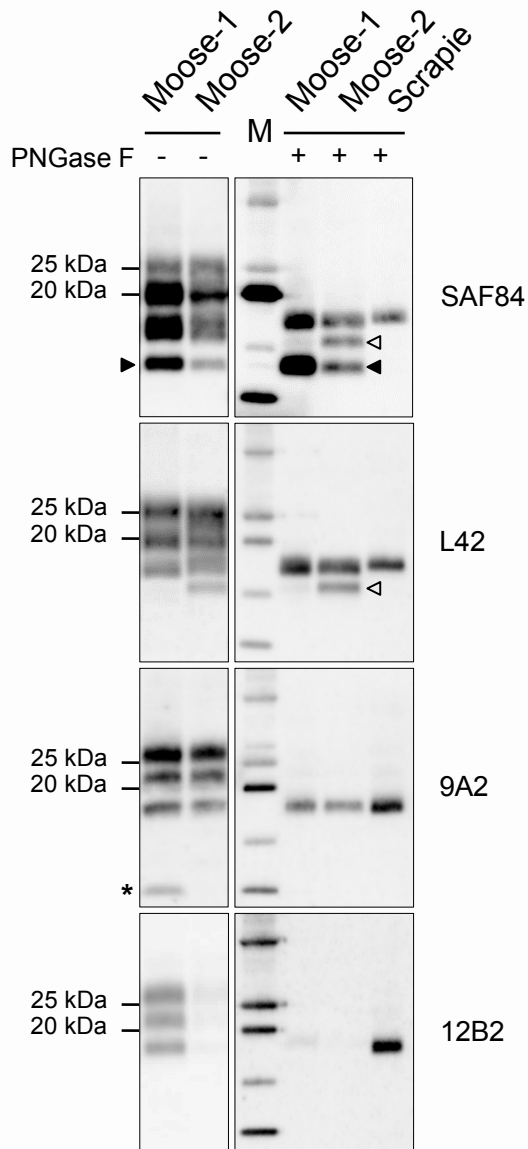


- The «deviant» phenotype in Norwegian moose is not an host effect

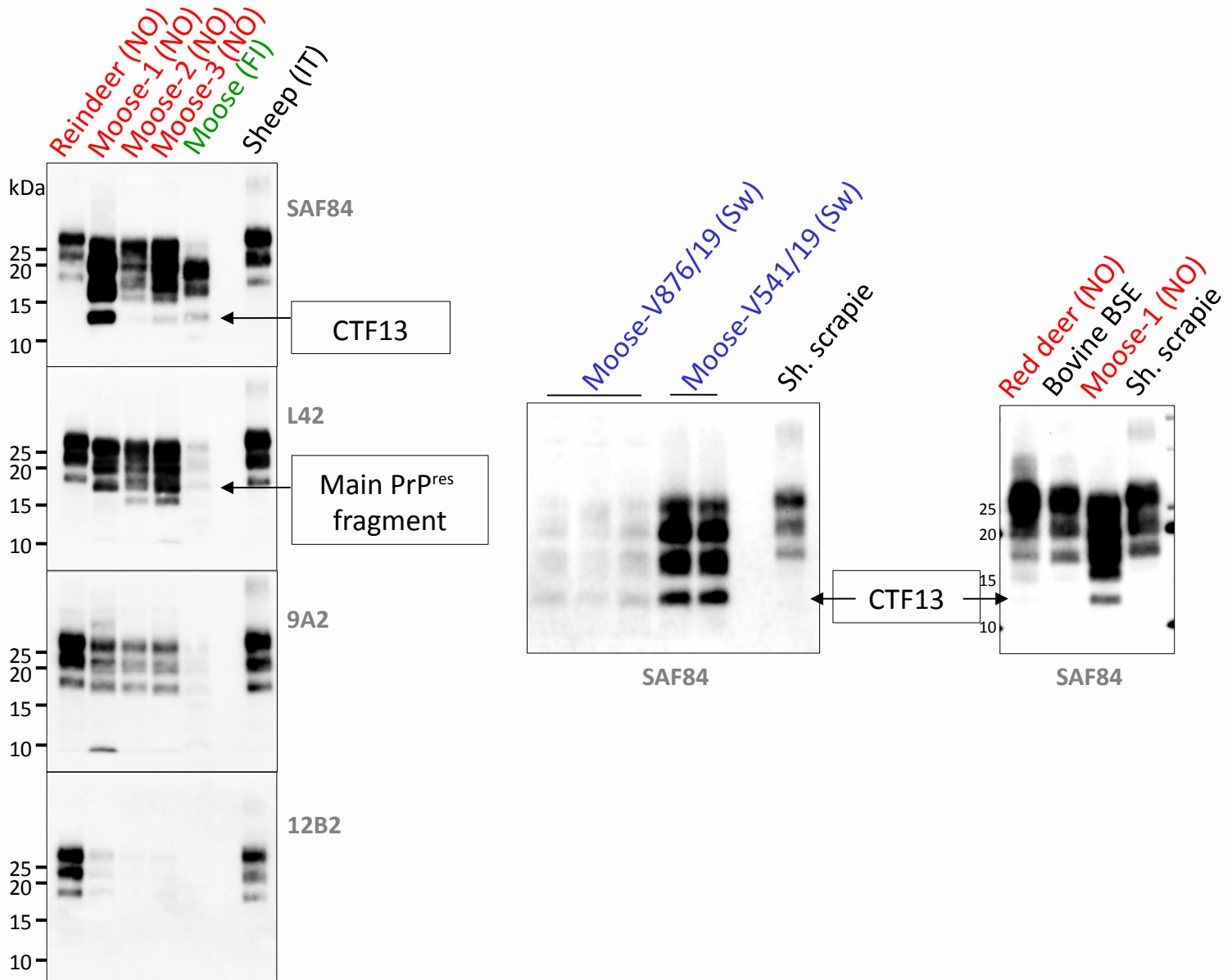
# CWD samples from Europe (for WB and bioassay)

Origin	Species	ID Sample	Tissue	Provider	Year received
Norway	Reindeer	16.04.V142	Brain	S. Benestad	2016
Norway	Moose	16.06.P138	Brain	S. Benestad	2016
Norway	Moose	16.60.P153	Brain	S. Benestad	2016
Norway	Reindeer	2017-04-CD 11087	Brain/LN	S. Benestad	2017
Norway	Moose	2017-04-CD 11399	Brain/LN	S. Benestad	2017
Norway	Red Deer	2017-04-CD 14051	Brain/LN	S. Benestad	2017
Finland	Moose	CW 109/18 FE 12/6/18	Brain	Sirrka-Liisa Korpenfelt/M. Hautaniemi	2018
Norway	Moose	18.04.CD 24724	Brain	S. Benestad	2019 (EURL)
Sweden	Moose	V876/19	Brain	M. Norenmark/D. Gavier-Widén	2019 (EURL)
Sweden	Moose	V541/19	Brain	M. Norenmark/D.Gavier-Widén	2019 (EURL)

# Discriminatory WB (epitope mapping)



# Discriminatory WB (epitope mapping)



# CWD samples from Europe - WB summary

Origin	Species	ID Sample	Main PrP <sup>res</sup>	CTF13	Internal	CTF16
Norway	Reindeer	16.04.V142	19 kDa			
Norway	Reindeer	2017-04-CD 11087	19 kDa			
Norway	Moose	16.06.P138	17 kDa	+	+	
Norway	Moose	16.60.P153	17 kDa	+		+
Norway	Moose	2017-04-CD 11399	17 kDa	+	+	+
Norway	Moose	18.04.CD 24724	Faint signal			
Finland	Moose	CW109/18 FE 12/6/18	17 kDa	+	?	?
Sweden	Moose	V876/19	17 kDa	+	?	?
Sweden	Moose	V541/19	17 kDa	+	?	?
Norway	Red Deer	2017-04-CD 14051	17 kDa			
Refer	Sheep	Scrapie	18 kDa			

# Bank Vole (*Myodes glareolus*)



cervids and bovine prions

Bioassay in bank voles allow to describe strain variability in different species and understand the putative links

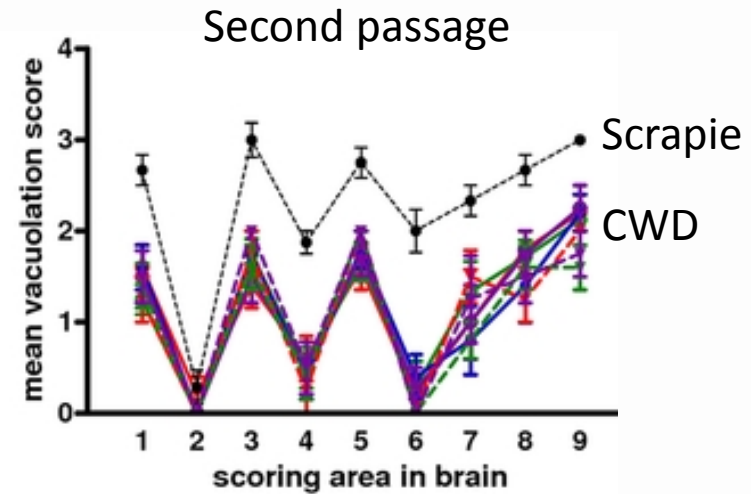
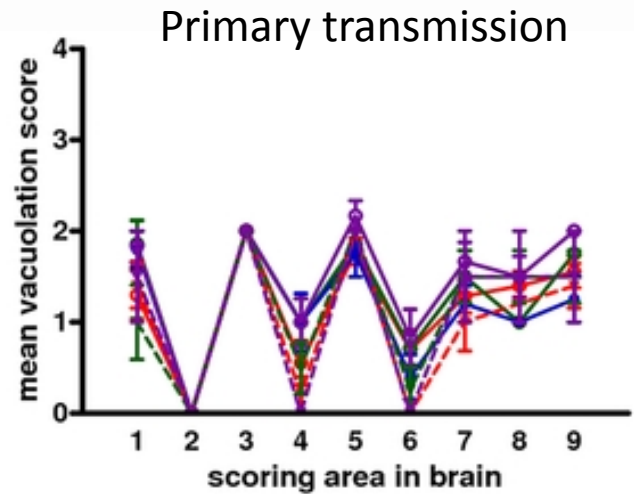


# Characterization of CWD isolates from US in Bank voles

Survival time in Bv109I  
 Primary transmission ~160-200 dpi  
**Second passage ~35-40 dpi**

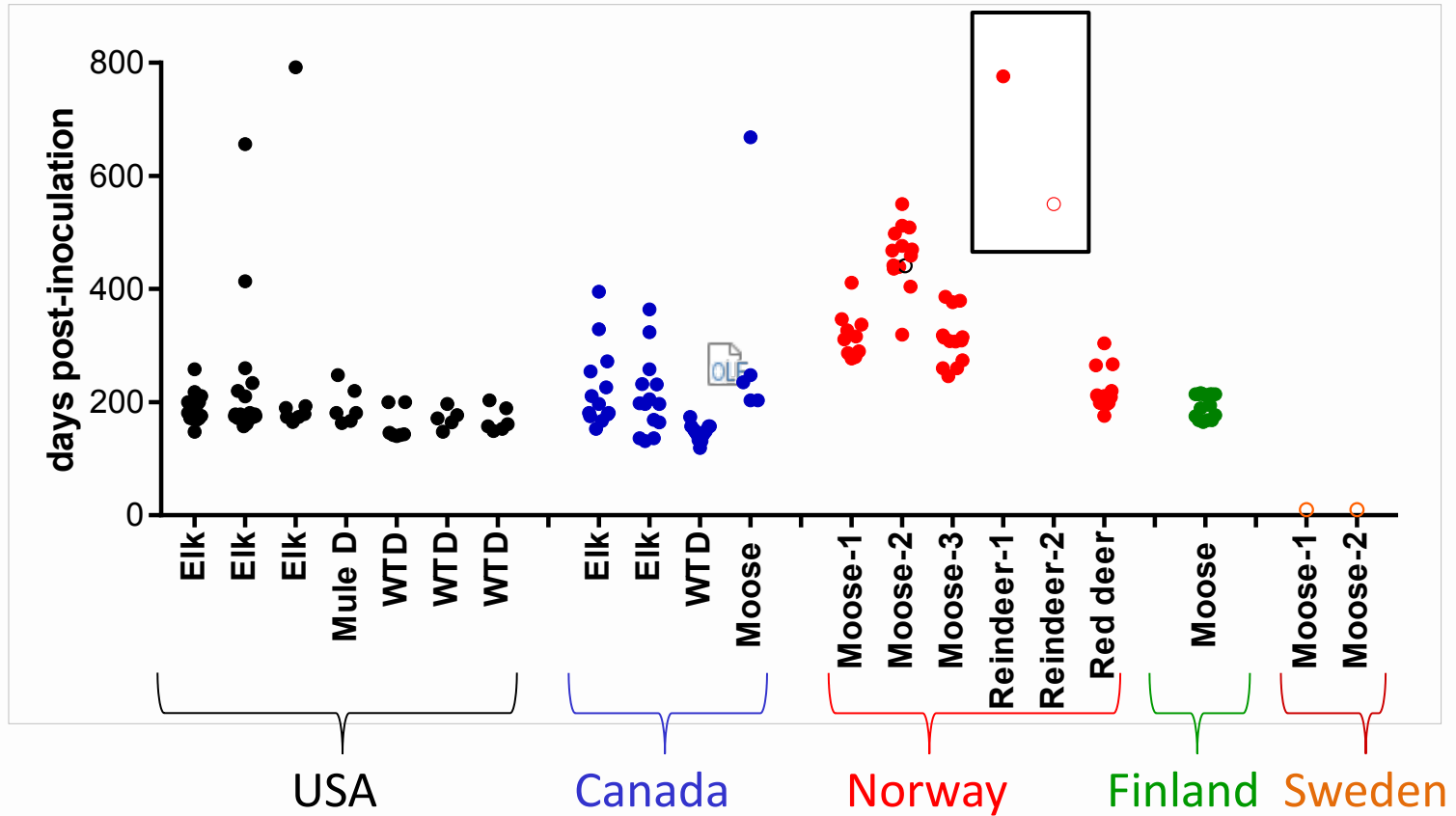
N

(lesion profiles)

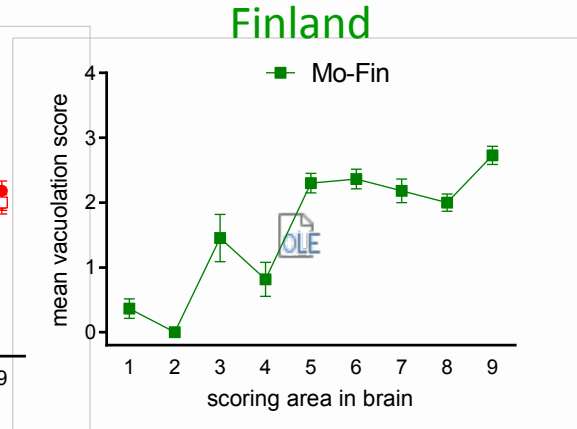
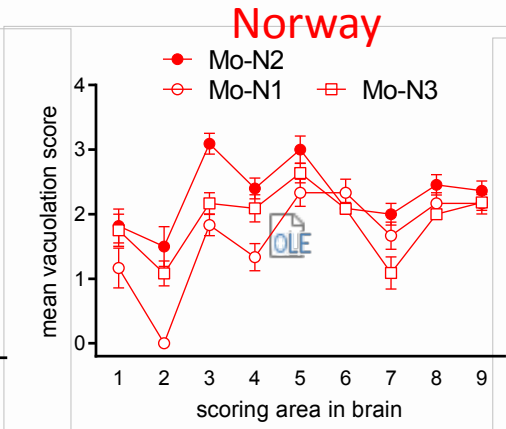
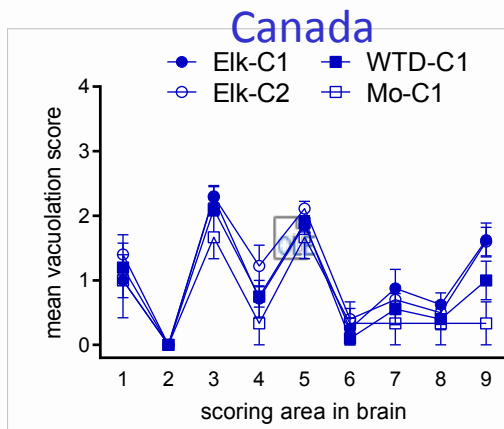
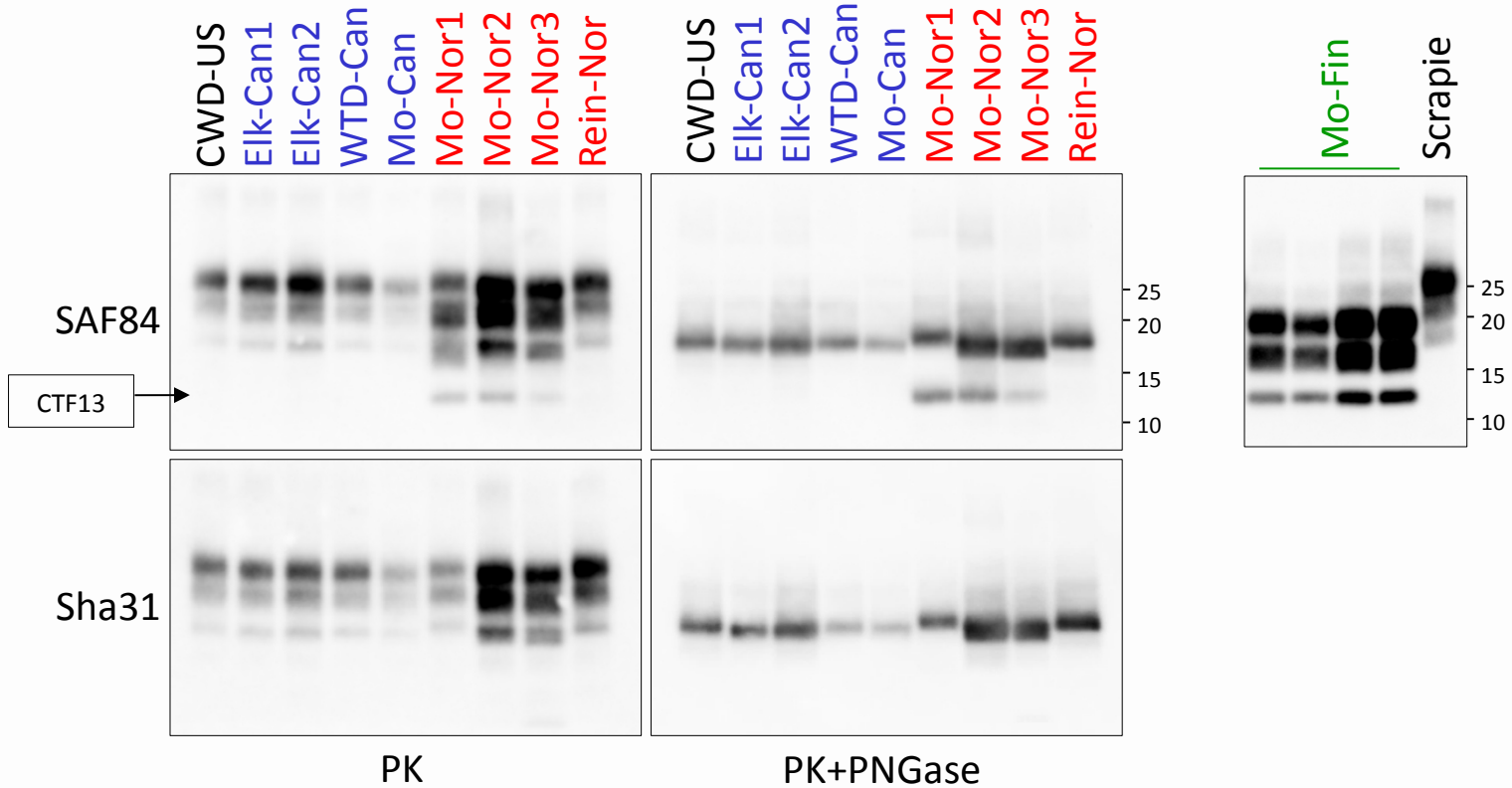


A single Bv-adapted CWD strain derived from different cervids from US

# Primary transmissions in Bv109I



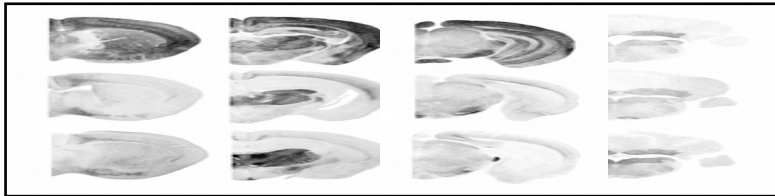
# WB and neuropathological patterns in voles



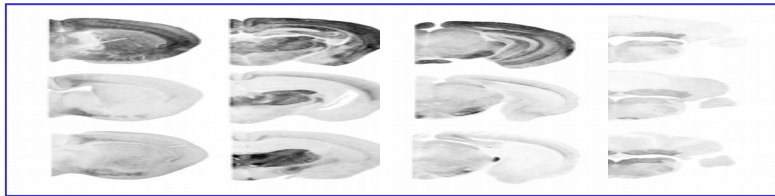
# IHC and PET-blot in vole-adapted CWD strains

PrP<sup>Sc</sup> distribution (PET blot)

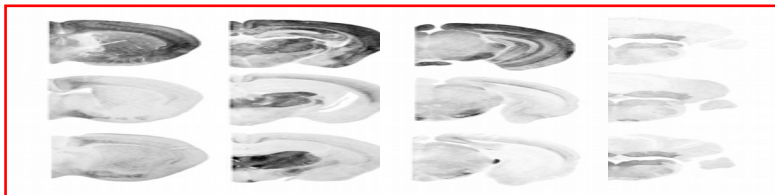
WTD  
(USA)



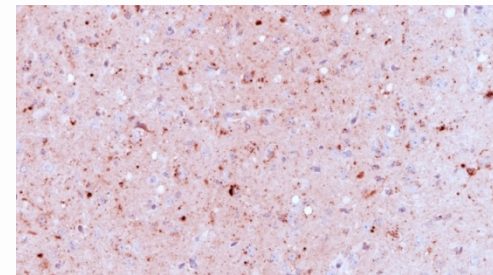
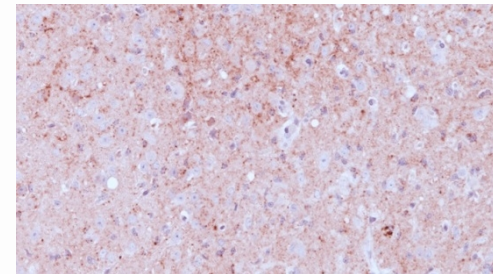
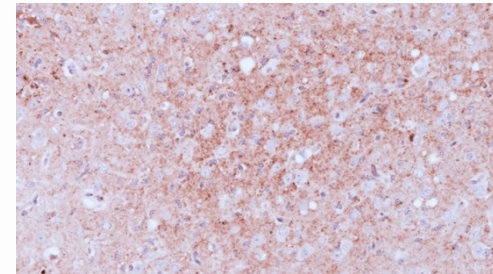
Moose  
(Canada)




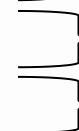
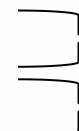
Moose-1  
(Norway)



Thalamus (IHC)  
*mAb SAF84*

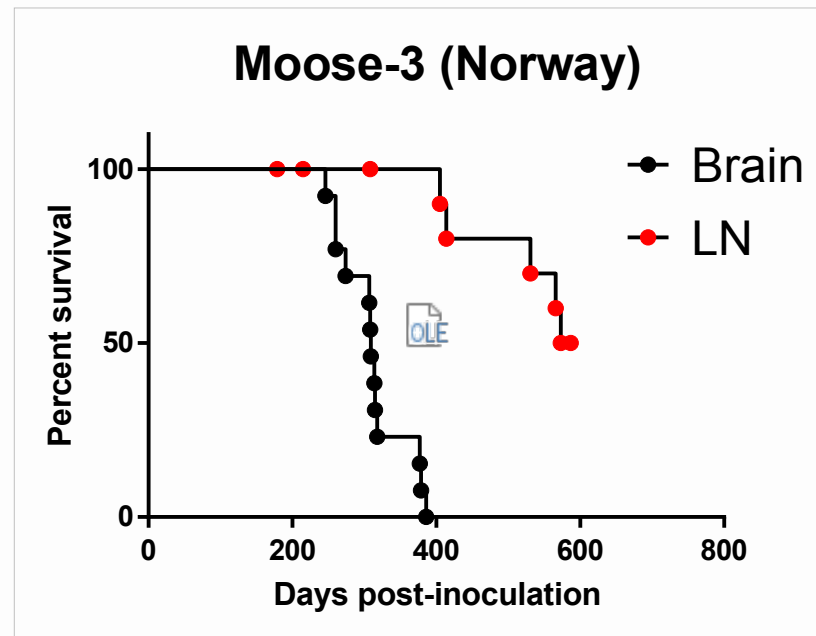


# Vole-adapted moose prion strains

Inoculum	Second passage		Third passage		Strain isolated
	Origin	Survival time	Survival time	Survival time	
Elk-1	USA	35±3	37±3		CWD-NA
Elk-2	USA	35±3	34±2		
Elk-3	USA	34±1	33±1		
Mule D	USA	40±1	32±2		
WTD-1	USA	40±3	34±0		
WTD-2	USA	42±3	33±2		
WTD-3	USA	44±3	34±3		
Elk-1	Canada	58±8	35±3		
Elk-2	Canada	37±3	nd		
WTD	Canada	53±13	nd		
Moose	Canada	41±5	32±3		CWD-EU-Mo1 CWD-EU-Mo2
Moose-1	Norway	78±4	76±3		
Moose-2	Norway	211±18	175±36		
Moose-3	Norway	>150	nd		CWD-EU-Rein CWD-EU-Red deer
Reindeer-1	Norway	113±4	105±9		
Red deer	Norway	90±4	89±7		
Moose	Finland	>150	nd		

# Infectivity in a Moose Retropharyngeal Lymphnode

17/01/2016



# Conclusions

- No common CWD strains between North America and Europe detected so far
- CWD strain variation among cervid species in Europe
- Implications for control and risk assessment of CWD in EU



# Acknowledgements



*Gordon Mitchel and Aru Balachandran*  
CFIA, Ottawa, Canada

*Sylvie Benestad and colleagues*  
NVI, Oslo, Norway

*Sirkka-Liisa Korpenfelt and Maria Hautaniemi*  
EVIRA, Helsinki, Finland

*Maria Norenmark and Dolores Gavier-Widén*  
SVA, Uppsala, Sweden

*Claudia D'Agostino, Michele Di Bari, Laura Pirisinu and colleagues*  
ISS, Rome, Italy