

This article was downloaded by: [138.102.135.242]

On: 12 March 2015, At: 06:44

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Prion

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/kprn20>

## Prion Diseases in Animals

Published online: 01 Apr 2014.



[Click for updates](#)

To cite this article: (2014) Prion Diseases in Animals, Prion, 8:sup1, 59-109, DOI: [10.4161/pri.29370](https://doi.org/10.4161/pri.29370)

To link to this article: <http://dx.doi.org/10.4161/pri.29370>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Versions of published Taylor & Francis and Routledge Open articles and Taylor & Francis and Routledge Open Select articles posted to institutional or subject repositories or any other third-party website are without warranty from Taylor & Francis of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. Any opinions and views expressed in this article are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor & Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

It is essential that you check the license status of any given Open and Open Select article to confirm conditions of access and use.

central nervous system. Although multiple events, including ER stress caused by the accumulation of PrP<sup>Sc</sup> aggregates, activated astrocytes and/or microglia or synaptic and dendritic alterations, have been suggested to be involved in neurodegeneration, its molecular mechanism is not fully understood yet. Neuronal cell lines used for analyses of the cellular mechanism of prion propagation have so far shown little cytopathic effect. Thus, a novel *ex vivo* experiment system, in which the generation of PrP<sup>Sc</sup> in neurons and neurodegeneration can be reproduced, is required. Thus we analyzed prion infection in primary cortical neurons.

**Materials and Methods.** Mouse primary cortical neurons were obtained from 15-day mouse embryo. Four different prion strains, 22L, Chandler, Obihiro, and BSE-KUS, were used. PrP<sup>Sc</sup>-specific staining was carried out using mAb132.

**Results and Discussion.** All the four prion strains could effectively produce PrP<sup>Sc</sup> in primary cortical neurons, confirming the prion infection. Interestingly, the shape of PrP<sup>Sc</sup>-staining observed confocal microscopy differed with strains; string shape staining was pronounced in cortical neurons infected with 22L or Chandler strains, whereas granular staining was mainly observed in Obihiro and BSE-KUS strain infection. A slight decrease in cell viability and in the expression of synaptic proteins such as PSD95 and N-cadherin was observed; however, double staining of PrP<sup>Sc</sup> with tunnel-staining and cleaved caspase-3 did not reveal apoptosis of primary cortical neurons infected with prions. Efficient PrP<sup>Sc</sup> generation in cortical neurons without neuronal cell death suggests that certain causes other than neurons, such as factors produced from activated astrocytes and/or microglia play a critical role in the neurodegeneration caused by prion infection. Analyses of neuron-glia interaction using prion-infected primary cortical neurons co-cultured with astrocytes or microglia may provide a clue to elucidate the neurodegenerative mechanisms of prion diseases.

### P.131: Transmission of sheep-bovine spongiform encephalopathy in pigs

Carlos Hedman,<sup>1</sup> Belén Marín,<sup>1</sup> Fabian Corbière,<sup>3</sup>  
Hicham Filali,<sup>1</sup> Francisco Vázquez, José Luis Pitarch,<sup>1</sup>  
William Jirón,<sup>1</sup> Rodrigo S Hernandez,<sup>1</sup> Bernardino Moreno,<sup>1</sup>  
Martí Pumarola,<sup>2</sup> Olivier Andréoletti,<sup>3</sup> Juan José Badiola,<sup>1</sup>  
and Rosa Bolea<sup>1</sup>

<sup>1</sup>University of Zaragoza; Zaragoza, Spain; <sup>2</sup>University of Barcelona; Barcelona, Spain;  
<sup>3</sup>Institut National de la Recherche (INRA); Toulouse, France

**Introduction.** The transmissible spongiform encephalopathies (TSE) don't occur in swine in natural conditions. However, the bovine spongiform encephalopathy (BSE) agent, inoculated by 3 simultaneous routes in pigs, is able to reproduce a neurological disease in these animals. On the other hand, the BSE agent after passage in sheep under experimental conditions (sheep-BSE) exhibits altered pathobiologic properties. This new agent is able to cross the cattle-pig transmission barrier more efficiently than BSE. The potential propagation of TSE in animals from the

human food chain, including pigs, needs to be assessed regarding the risk for human infection by animals other than TSE-infected ruminants. The aim of this work was to determine the susceptibility of pigs to the Sheep-BSE agent and describe the pathological findings and PrP<sup>Sc</sup> deposition in different tissues.

**Material and Methods.** Seven minipigs were challenged intracerebrally with sheep-BSE agent. Clinical observation and post-mortem histopathology, immunohistochemistry (antibody 2G11) and Western blotting were performed on central nervous system (CNS), peripheral nervous system (PNS) and other tissues.

**Results.** One pig was culled in an early incubation stage, and remaining six were culled at the presence of clinical signs. Pigs developed a clinical disease with locomotor disorders in an average time of 23 months post inoculation, showing clinical findings in most of them earlier than those described in the BSE in pigs experimental infection. TSE wasn't confirmed in the preclinical pig. In clinical pigs, the entire cerebral cortex showed severe neuropil vacuolation, extensive and severe vacuolar changes affecting the thalamus, hippocampus and cerebellum. PrP<sup>Sc</sup> was found in CNS of all clinical pigs (6/6). Intracellular (intraneuronal and intragial) and neuropil-associated PrP<sup>Sc</sup> deposition was consistently observed in the brainstem, thalamus, and deeper layers of the cerebral cortex. Also, PrP<sup>Sc</sup> was observed in PNS, mainly in the myenteric plexus and also in nerves belonging to the skeleton muscle. Moreover, the glycosylation profile showed a 3 band pattern with a predominant monoglycosylated band in positive pig samples. This features concern on the potential risk of utilization of meat and bound meal of small ruminants in feeding pigs.

### P.132: Full-length PrP<sup>C</sup> but not PrP-C1 is depleted in autolytic brainstem samples of cattle

Fabienne Serra,<sup>1,2</sup> Sandra McCutcheon,<sup>3</sup>  
and Torsten Seuberlich<sup>1</sup>

<sup>1</sup>NeuroCenter, Division of Neurological Sciences; DCR-VPH, Vetsuisse Faculty; University of Berne; Berne, Switzerland; <sup>2</sup>Graduate school for Cellular and Biomedical Sciences; University of Berne; Berne, Switzerland; <sup>3</sup>Neurobiology Division; The Roslin Institute and R(D)SVS; The University of Edinburgh; Edinburgh, UK

**Introduction.** In summers 2011 to 2013 in Switzerland, several brainstem samples from cattle in a severely autolytic stage were reactive with some of the BSE screening tests, but remained unconfirmed. In the Western immunoblot (WB), a truncated form of PrP<sup>res</sup> type was detected after proteinase K (PK) digestion, with a profile distinct from either H-, L- or C-BSE. In order to investigate whether this particular PrP profile was related to the effects of severe autolysis, we compared the PrP species present in these autolytic samples to those in non-autolytic BSE negative samples and BSE positive samples.

**Material and methods.** Fallen stock autolytic brainstem samples that were initially reactive in the screening laboratory were selected. Freshly prepared control brains were collected at the slaughterhouse. All samples were analyzed with and without PK digestion and deglycosylation respectively using standard