

Distribution of infectivity and PrPsc in edible tissues of scrapie-infected sheep

Area of research interest: [Foodborne pathogens](#)

Study duration: 2004-04-01

Project code: M03059

Conducted by: ENVT

Background

The Moredun Research Institute (MRI) sheep flock with a high force of natural scrapie infection, represented a unique source of tissues. The combined application of antibody-based and Protein Misfolding Cyclic Amplification (PMCA) techniques as well as bioassay to edible tissues provided key information on their infectivity in TSE infected sheep. These studies provided new information that is useful to risk assessors and allows the optimisation of strategies to prevent TSE transmission to humans via the food chain, not only in the case of scrapie infection but also by extrapolation to other ovine TSEs.

Research Approach

Infectivity was assessed in skeletal muscle, sciatic nerve, lymph nodes, liver, heart, kidney and lung from Suffolk sheep clinically affected with naturally acquired scrapie, by bioassay in bank voles. Immunohistochemistry, Western blot, Enzyme-Linked ImmunoSorbent Assays (ELISA) and PMCA techniques. Distribution in those same tissues was also established to demonstrate its relations to infectivity.

Results

In both sheep analysed prescapular lymph node (LN), sciatic nerve, oculomotor muscle and kidney showed detectable levels of scrapie infectivity by vole bioassay. The levels of infectivity were rather low, being 2-to-3 orders of magnitude less than in the brain. The prescapular LN contained the highest levels of infectivity, followed by the sciatic nerve, the oculomotor muscle and the kidney.

The relative levels of infectivity of edible tissues compared to the brain were in good agreement with the relative levels of PrPsc determined by Western blotting of the same inocula.

It was also noted that:

- There was a good correlation between laboratory techniques and bioassay results
- Discrepancies were observed in tissues with very low levels of abnormal PrP
- Sampling is critical to avoid potential false negative rapid tests and bioassay results

Published Papers

- Di Bari, M.A., Chianini, F., Vaccari, G., Esposito, E., Conte, M., Eaton, S.L., Hamilton, S., Finlayson, J., Steele, P.J., Dagleish, M.P., Reid, H.W., Bruce, M., Jeffrey, M., Agrimi, U., Nonno R., 2008. The bank vole (*Myodes glareolus*) as a sensitive bioassay for sheep scrapie. *Journal of General Virology* 89, 2975–2985

- PET Blot versus IHC and WB labelling in a selection of tissues from sheep naturally infected with scrapie. S. Eaton, P. Steele, S Siso, M.P. Dagleish, J. Finlayson, S. Hamilton, H.W. Reid, , Y. Pang, M Jeffrey, & F. Chianini. Prion 2009 23-25 September Porto Carras, Chalkidiki, Greece, in : Prion 2009 book of abstracts

Research report

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