Infectivity of atypical scrapie in slaughter age sheep following oral dosing of young lambs

Maes o ddiddordeb ymchwil: Foodborne pathogens
Hyd yr astudiaeth: 2007-01-01
Cod prosiect: M03057
Cynhaliwyd gan: AHVLA

Research Approach

Brain material from one atypical ARR/ARR case and one atypical AHQ/AHQ scrapie case were used to orally dose six ARR/ARR (genotype most resistant to scrapie) sheep. All dosing occurred within the first 14 days of life. Of the 12 dosed animals, six animals (three of each genotype) were killed at the cut-off age for current Specified risk material (SRM) regulations (12 months), and the remaining 6 animals were kept alive for a further 12 months. A full range of neural, visceral and lymphoid tissues will be collected and a proportion (initially) tested by Enzyme-Linked ImmunoSorbent Assays (ELISA) and Immunohistochemistry. A range of tissues were harvested for bioassay in a transgenic mouse model as these can be considered more sensitive than biochemical testing.

Results

The first aim of this current study was to look at the distribution of infectivity in peripheral tissues in experimentally challenged animals at and beyond the ‘cut-off’ point for the current European Commission (EC) meat hygiene regulations (i.e. 12 months of age). The second aim was to investigate the potential for oral transmission of atypical scrapie.

Lambs were challenged orally with atypical scrapie, and killed at 12 or 24 months. A range of tissues which are associated with early disease in classical scrapie, and/or which are currently removed from the human food chain as ‘specified risk materials’ were sampled at post-mortem and tested with the screening and confirmatory tests which are currently approved in the EU for the surveillance of sheep for scrapie. All tests were negative in all but two recipients, which were positive on examination of brain, but negative in peripheral tissues. In addition, tests which use mice to screen for infectivity were used, and evidence of disease was found in some animals and tissues which were negative on all screening tests.

These results confirm that atypical scrapie can transmit orally, under experimental conditions at least, indicating potential for some level of natural transmission and/ or spread through animal feed, should the current controls be sufficiently relaxed. Additionally, the detection of infectivity in tissues which test negative using current surveillance methods indicates that diagnostic sensitivity is suboptimal for atypical scrapie, and potentially infectious material may be able to pass into the human food chain. However, studies are ongoing in other laboratories to assess whether humans are likely to be susceptible to infection with this form of TSE, and to date no evidence has been found to support the hypothesis that it might pose a direct risk to human health.

Published Papers

1. Simmons, M.M., Moore, S.J., Konold, T., Thurston, L., Terry, L.A., Thorne, L., Lockey, R., Vickery, C., Hawkins, S.A.C., Chaplin, M.J. & Spiropoulos, J. (2011) Experimental oral transmission of atypical scrapie to sheep. Journal of Emerging Infectious Diseases, 17(5), 848-854
doi: 10.3201/eid1705.101654

Research report

England, Northern Ireland and Wales

PDF
Gweld M03057 – final technical report as PDF(Open in a new window) (1.31 MB)