Bioassay of BSE infectivity in tissues by intracerebral inoculation of cattle

Maes o ddiddordeb ymchwil: Foodborne pathogens
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Background

To determine qualitatively infectivity in certain tissues, including Specified Bovine Material (SBM), of cattle infected orally with 100 grams BSE-affected brain and killed at specified times after exposure, using a within-species bioassay. This provided the most sensitive means of detection of infectivity in the tissues in order to identify public health risks from exposure to bovine tissues.

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Research Approach

The study provided the most sensitive available assay of BSE infectivity in bovine tissues which form a potential human health risk or have been identified as SBM. The results indicate qualitative differences in the use of cattle versus mice for bioassay of BSE infectivity in experimentally, orally infected cattle. They also provide information for use in quantitative analysis of risks of human exposure to infected bovine tissues and the necessity to retain restrictions on SBM entering the human food chain.

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Results

Infectivity was confirmed in pooled central nervous system tissues from cattle killed 32 months following oral exposure to BSE and from distal ileum sampled from cattle 6, 10 and 18 months after oral exposure. In each of these groups 5/5 inoculated cattle succumbed to disease. These results are consistent with previous results of mouse bioassay of these tissues.

In addition, infectivity was detected in pooled palatine tonsil tissue from cattle killed 10 months after oral exposure with 1/5 cattle in the challenge group affected and in a pool of lymphoid tissue from the nictitating membrane collected from 10 natural field cases of BSE with, again, 1/5 cattle in the challenge group affected.

These results raised the likelihood that bovines had a wider lymphoreticular pathogenesis. However, there is no evidence, to date, from studies of the pathogenesis of BSE that there is, at any stage of the disease, either widespread lymphatic or haematogenous spread of agent. With

the development and application of more sensitive methods of detection of agent and PrPD in future, further evidence of the distribution of agent in BSE infected cattle may emerge, but the present findings reinforce the notion that the involvement of the lymphoreticular system in BSE is highly restricted.

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Published Papers

1. Wells, G.A.H., Spiropoulos, J., Hawkins, S.A.C. and Ryder, S.J. (2005) Pathogenesis of experimental bovine spongiform encephalopathy: preclinical infectivity in tonsil and observations on the distribution of lingual tonsil in slaughtered cattle. Veterinary Record **156**, 401-407

Research report
PDF
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