IN CONFIDENCE

INFECTIVITY OF TISSUES FROM ANIMALS PRE-CLINICALLY INFECTED OR CLINICALLY AFFECTED WITH BSE OR SCRAPIE

I BSE

Apart from brain we do not yet know what other tissues in the body harbour the infective agent, at what titres the agent exists (if it does exist) or the pathogenesis of infection (ie. the order in which tissues may become infected after exposure to the agent). Thus advice must be based upon our knowledge of scrapie. Bovine brain in terminal cases of disease is infected with BSE agent.

II SCRAPIE

1. Detection of infectivity is traditionally done in experimental animals, notably mice, by the most sensitive route of inoculation - intracerebral. Absence of clinical disease or histopathological lesions following exposure by this route does not necessarily mean absence of infectivity.

   To advise on the risk of transmitting scrapie and hence BSE to animals via food it is necessary to make some assumptions based on field and experimental data eg:-

   a) Infection in scrapie is usually established in the perinatal period or perhaps even *in utero*. Adult infection may occur but is less frequent.

   b) The route of exposure is one factor controlling incubation period of the disease. Generally the oral route is a very inefficient route compared with intracerebral inoculation. Thus since most infections may be contracted in sheep by oral exposure to infected placenta(s) the exposure may be repetitive and the dose high.

   c) To infect animals orally therefore some of the features of exposure that would increase this risk would be:

      i) Expsoure to tissues with very high titres.
      ii) Repeated exposure.
      iii) Increased susceptibility of the host to oral infection.

   d) Note - experimental infections usually result in higher titres in brain tissues than do natural infections.

   In the context of advising about food for human consumption we can say:-

   a) There is no evidence that any scrapie or BSE-like disease in humans (such as CJD) has been contracted from sheep by virtue of occupation or consumption of scrapie (or BSE) infected food.

   b) Pasteurising or boiling food would be unlikely to materially affect the infectivity if any was present. Temperatures in excess of 134°C for 18 minutes in specified conditions may reduce infectivity to undetectable levels.

   c) We should preferably use data derived from natural disease since it is only that that the human may be exposed to via food.

2. Studies on the infectivity of tissues from natural scrapie in sheep and goats have been reported.

   a) **Pre-clinical infection in sheep** (Hadlow *et al* 1979). Infection was detected only in lymphatic tissues (tonsil, lymph nodes, spleen and intestine) of lambs 10-14 months

   b) **Clinically affected sheep** (Hadlow *et al* 1979). In addition to the above tissues, age was detected in brain and spinal cord and in low titre in adrenal and pituitary glands cerebrospinal fluid, sciatic nerve and nasal mucosa and exceptionally in pancreas, liver and bone marrow. It was not found in blood, serum, saliva, salivary glands, thyroid, heart, lung, ovary, uterus (gravid or not) mammary gland or skeletal muscle

c) **Clinically affected goats** (Hadlow *et al* 1980). Infected tissues were as a) above, plus brain, cervical and lumbar spinal cord, adrenal gland, sciatic nerve, nasal mucosa, thymus and lung. Agent was not found in blood clot, milk, faeces, bone marrow, kidney, salivary glands, ovary, uterus, mammary gland or muscle. Heart liver and pancreas were not examined.

Titres of agent were generally highest in lymphatic, CNS tissues and intestine and considerably lower in sciatic nerve and cerebrospinal fluid.

3. Decisions relating to human health are the responsibility of the Department of Health. MAFF should provide veterinary information that is essential to making such decisions. The foregoing data may assist in this process. Based on the precedent of decisions made by DoH and on a knowledge of infectivity data for nerve, csf, muscle, heart, liver and kidney there would be no reason for exlcuding any muscle including tongue or tail muscles from a list of approved tissues for oral consumption. All high titre tissues including all lymphatic tissues and CNS should be excluded however.

4. Cross contamination of naturally non-infected tissues or tissues with low titres of agent accepted as safe by DoH is a possibility as a result of the processes of slaughtering and butchering. This risk is greatest from the sawing of the vertebral column to produce sides of beef. However prime beef animals for human consumption are killed at around two years of age which is two years before the peak age specific incidence of BSE. Furthermore clinically affected cattle are notifiable to MAFF and not permitted to enter the food chain. Thus in the context of this document high titre infection of the CNS in the two year old animal in unlikely. Infection may occur in the specified lymphoreticular tissue (spleen, lymph nodes, tonsil, thymus) of pre-clinically infected animals.

5. It might be prudent to advise that where bovine or ovine bones are required for food purposes particularly for baby foods they should be obtained from limb bones alone.

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References

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