IN CONFIDENCE

PARENTERAL TRANSMISSION OF BSE TO THE PIG

This is an interim report prepared at the request of the Tyrrell Committee, 23.8.90 on the experimental parenteral transmission of BSE to the pig.

The report outlines the experimental design of the study and the clinical and pathological findings in a single challenged pig (PD115)

Experimental design:

Inoculum A ten per cent saline suspension of pooled brain stem homogenate was prepared from four natural cases of BSE (the same animals as those used in the initial mouse, hamster and cattle transmission studies). Saline served as the control inoculum.

Experimental Animals: Ten 1-2 week old piglets were each inoculated under halothane anaesthesia with brain suspension:

- 0.5ml intracranially (i/c) by percutaneous transcalvareal injection into the left cerebrum
- 1-2ml intravenously (i/v) into the left jugular vein.
- 8-9ml into the peritoneal cavity (i/p)
- (PD115 received 0.5ml i/c, 1.0ml i/v and 8.5ml (i/p)

Eleven control piglets were inoculated similarly with saline. All inoculations were made in late February and early March 1989. Challenged and control pigs were housed separately in loose boxes in groups of 2-3. Clinical observation was undertaken 3-4 times weekly.

Clinical Observations:

The first clinical signs in pig PD115 were observed approximately 481 days post inoculation. They included mild aggression (to handlers), intermittent inappetence and depression. Within one week of the onset inexplicable random biting activity, swaying whilst standing, mild pelvic swaying whilst walking and inappetence were apparent. The pelvic limb ataxia persisted and was later accompanied by aggression, periods of apprehension of familiar and unfamiliar objects and uncharacteristic reluctance to leave the pen. Defecation was no longer confined to the normal dunging area.

One week before termination PD115 showed progressive generalised weakness and increasingly required assistance to stand. Occasionally spontaneous falling occurred. Aggression was not apparent at this stage but there was constant following and nuzzling of the handler.

At termination (31 July 1990), five weeks (35 days) from onset of clinical signs, the pig had behavioural changes, ataxia, weakness and loss of bodily condition. When examined on 31 July it showed frequent rooting behaviour in straw bedding and restless pacing. Repeated attempts to lie down were made and then seemingly abandoned, the standing posture was constantly shifting and there was generalised limb weakness. There was a generalised gait ataxia with hypermetria. The stance was widebased. The ears were symmetrically abnormally positioned, drooping whilst the pig was standing, giving a "depressed" facial expression, or directed back in a "fixed" position when the pig was recumbent. General bodily condition was fair with a markedly reduced body weight and a "hairy" coat compared to the control littermates.

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Macroscopic Observations:

There was no gross major organ pathology.

There were no significant gross observations of fixed brain material.

Microscopic observations:

Brain:

- Spongiosis of grey matter throughout major brain areas with greatest intensity in medial geniculate body, superior colliculus and corpus striatum.
- Vacuolation of perikarya sparsely represented in dorsal nucleus of the vagus nerve.
- Widespread astrocytic response.

Diagnosis:

Spongiform Encephalopathy

Conclusions:

The changes in PD115 are unequivocally those of a scrapie-like encephalopathy. The clinical history of this animal also provides strong supportive evidence of a scrapie-like disease.

The result, albeit confined to one animal in the experimental challenge group is incontrovertible evidence of the transmissibility of BSE to the pig by simultaneous intracerebral, intravenous and intraperitoneal inoculation with an incubation period of approximately 481 days.

This indicates the previously unrecognised susceptibility of the pig to a scrapie-like disease and extends the experimental host range of BSE. Like

the results obtained from similar studies in mice and cattle the finding provides no information on the probability of disease occurring in pigs from natural dietary exposure.

The greatest political impact of this finding will be to renew concerns regarding the practice of recycling animal proteins and the potential human health risk from consumption of products of species receiving such proteins.

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