UCD VET VIEWS
*CALIFORNIA CATTLEMAN*, MARCH 1999

**BOVINE SPONGIFORM ENCEPHALOPATHY: WHERE ARE WE TODAY?**

Bovine Spongiform Encephalopathy (BSE) or what the news media usually insist on calling "mad cow disease" has now been recognized for 10 years as an emerging disease of cattle. There are still many questions regarding this disease. However, there has been progress and much more is known about the mysterious condition.

**What is Bovine Spongiform Encephalopathy (BSE)?**

BSE is a chronic degenerative disease that affects the central nervous system (brain & spinal cord) of cattle, first diagnosed in cattle in Great Britain in 1986. BSE belongs to a family of diseases known as Transmissible Spongiform Encephalopathies (TSEs) These TSEs include scrapie (sheep & goats), transmissible mink encephalopathy, feline spongiform encephalopathy (cats), chronic wasting disease of elk and mule deer, and BSE in cattle. Humans have a number of TSEs also and these include kuru, Creutzfeldt Jakob Disease (CJD), Fatal Familial Insomnia, Gerstmann Straussler syndrome (in humans). The clinical signs or symptoms in cattle appear as nervousness or aggression, abnormal posture, incoordination, weight loss, difficulty rising, progressing to death. There is no treatment for these conditions and currently there are no vaccines available for prevention.

**How is BSE recognized or diagnosed?**

BSE **cannot** be confirmed in the live animal—it has signs similar to rabies, polioencephalomalacia, *Hemophilus somnus* infection, and a number of other diseases. The microscopic examination of brain tissue is the only way BSE can currently be diagnosed.

**What causes BSE?**

The cause of BSE and the other TSEs in other species is not fully understood. Most of the scientific community feels the cause is a prion or abnormal protein. BSE (like all TSEs) has (1) a long incubation period (months to years), (2) is smaller than a typical virus, (3) the agent is resistant to sunlight, radiation, and common disinfectants, and (4) the agent causes no detectable immune response in the host.

**Why did BSE occur in Great Britain?**

The bottom line to this question is "No one knows for sure." The epidemiologic data suggests that BSE was associated with the feeding of meat and bone meal as a protein source to dairy cattle and other cattle. The causative agent is suspected to have come from either scrapie-infected sheep or from cattle with a previously unknown TSE. Changes in the rendering practices in the U.K., such as lowering the temperature of processing, may have allowed the survival of the agent in the meat and bone meal. BSE had never been identified before 1986, when it was first recognized in Britain. BSE has been confirmed in native cattle in Ireland, Northern Ireland, France, Portugal, and Switzerland. It is now thought that meat and bone meal exported from the U. K. was responsible for the infection of native cattle in these other countries. BSE has been identified in cattle exported from Britain to other countries. Prior to 1986, a small amount (14 tons) of ruminant protein (rendered products) was imported from the U.K. to the U.S.A. Our current regulations prohibit the import of ruminant proteins from all countries affected with BSE. Overall, 99% of the BSE cases have occurred in the U. K. Currently, the BSE epidemic in Britain is winding down as the control measures are successfully taking affect; however, the epidemic has been devastating to the dairy and cattle industries in the U.K.

**Do we have BSE in the United States?**

**No. There have been no cases of BSE in the U.S.A.**

There was one case in Canada (which was in a cow imported from Britain). Before the ban on British cattle imports into the U.S.A. went into affect in 1989, there were 499 cattle brought to the U.S.A. from Britain. All of those cattle were carefully accounted for and none showed evidence of BSE. Of these 499 cattle, 11 are still alive and are being monitored carefully. These cattle are in Alabama and Pennsylvania and are under close surveillance. Veterinarians and others in the U.S.A. are continuing very aggressive surveillance programs for BSE. This includes the National Veterinary Services Laboratory in Ames, Iowa, the Centers for Disease Control, the USDA, and all state veterinary diagnostic laboratories. Surveillance of high risk populations such as disabled dairy cattle has continued at a high rate, with more than 1,000 cattle from California alone examined for evidence of BSE to date. So far, there has been no evidence of BSE in the U.S.A.

**What else has been done to prevent BSE from occurring in the U.S.A.?**

No beef or beef products, including items such as fetal bovine serum for use in research laboratories, have been imported from Britain since 1989. Also, no beef products were imported from Britain to the U.S.A. prior to 1989 because no FSIS-approved establishments for export to the U.S.A. existed in the U.K. Current regulations prohibit the importation of ruminant protein from all countries affected with BSE. As mentioned above, surveillance is continuing at a very high rate.

**What is Creutzfeldt Jakob Disease (CJD)?**

CJD is a slow progressive disease of humans that affects the central nervous system, causing dysfunction, progressive dementia, and death. CJD occurs throughout the world at a rate of about 1-2 cases per million population per year. There has been a major change in CJD in Britain since the outbreak of BSE in cattle. This change has been the recognition of a new variant CJD or nvCJD in humans. To date, there have been 35 cases of nvCJD recognized in humans in Britain and one case in France. The exact cause of this new form of the disease is not entirely known; however, the evidence suggests that BSE is involved. This is probably occurring through the eating of "infected" meat prior to the recognition of the BSE epidemic in cattle. The abnormal protein in the brain of nvCJD patients and the abnormal protein in the brain of BSE cattle is very closely related and perhaps, more closely related than the proteins identified in other TSEs. While the exact relationship between BSE and nvCJD is not fully understood, the prudent course has been to assume a link between the two and work to eliminate BSE in Europe and prevent BSE from occurring in the U.S.A.

**What is currently being done to prevent BSE in the U.S.A.?**

In addition to importation bans on cattle and ruminant protein sources from countries with BSE, surveillance in the U.S.A. continues at a very high rate. Also, in 1997 the FDA enacted a ruminant feed ban here in the U.S.A. This prohibits feeding protein derived from mammals (such as meat and bone meal) to be fed to ruminants. There are some exceptions to this rule, but in general it is very strict and would certainly help limit any outbreak should one occur. We have some TSEs that occur in the U.S.A. These include such diseases as scrapie in sheep, chronic wasting disease in elk and deer, and transmissible encephalopathy in mink. Monitoring of all of these TSEs is occurring and active research is also ongoing on these conditions. There has been a large increase in the efforts to eliminate scrapie in sheep. New, more accurate diagnostic tests in sheep are being developed and when these tools become available, it may be possible to completely eradicate scrapie in sheep. Currently, there is no known risk to the cattle population of the U.S.A. with regard to BSE and there is no risk to people consuming beef products in this country. Obviously, this problem has decimated the cattle industries of the U.K. and other countries, and we must all continue to work hard to prevent this problem in the U.S.A. This disease illustrates how important research of cattle diseases is to the health of the cattle industry and to public health and confidence.

John Maas, DVM, MS
Diplomate, ACVN & ACVIM
Extension Veterinarian
School of Veterinary Medicine
University of California, Davis

Home | Beef Cattle Programs | FAQ/Beef | INFO/Beef | Top