

BSE (Bovine Spongiform Encephalopathy) / Mad Cow Disease
Sep. 21, 2001, Shiroy, Chiba

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A livestock cow mysteriously lost the ability to stand In Shiroy, Chiba prefecture. The Livestock Health Station found that the pathological test revealed air pockets in the cow's brain. The specimen was submitted to the Veterinary Laboratories Agency in England and diagnosed with BSE-infected. On September 21, 2001, Japan ranked the 16th country confirmed with BSE detection. The imported cattle was feed believed to be the source.

1 . Event

A livestock cow mysteriously lost the ability to stand In Shiroy, Chiba prefecture. The Livestock Health Station found that the pathological test revealed air pockets in the cow's brain. A specimen was submitted to the Veterinary Laboratories Agency in England and diagnosed with BSE-infected.

2 . Course

On August 6, 2001, a milk cow (Holstein, 5y 4mo) owned by a cattle farmer became incapable of standing. A brain specimen was collected at the slaughterhouse and tested at the National Institute of Animal Health.

The prionics test, a method of diagnosing BSE, was negative when tested at the National Institute of Animal Health on August 15.

Chiba prefecture, after the return of the negative prionics test, proceeded with further pathological tests and detected air pockets in the microscopic image of the cow's brain at a Livestock Health Station (Aug. 24).

On September 6, the specimen was again submitted to the National Institute of Animal Health.

The institution also confirmed air pockets on histopathological diagnosis and further tests, immunohistochemistry (IHC), had come out positive for BSE (Sep.10).

On September 10, the Ministry of Agriculture and Forest officially announced the possibility of BSE and set the investigative task force led by Endo Vice Minister.

By the advice of the investigative commission led by Takashi Onodera, a professor of Tokyo University, on September 11, the specimen and domestic test results were submitted to the Veterinary Laboratories Agency in England for the final test.

The test result was received from England in the evening of September 21 and confirmed that the cow was infected with BSE.

Although the BSE infected cow was originally brought into the slaughterhouse, the inspector

misdiagnosed it as septicemic disease since there were scars all over the body. Then the cow was sent to the lettering process (making it into bone-and meat feedings) since it was not suitable for meat processing.

After the official announcement on September 10, it dominated news headlines. Also other BSE infected cows (5y 7mo, 5y 8mo) were found in November and December respectively. Alarmed consumers refrained from consuming beef and severe economic losses hit the related industries.

3 . Cause

A certain protein called an abnormal prion causes BSE. An abnormal prion transforms the nature of a normal prion that originally exists in the brain into abnormality (Fig.1). As abnormal prions are accumulated in the brain, the brain tissue forms sponge-like spaces with fine air pockets and causes disorders such as motor disorder. It is assumed that the cattle feed in this case has contained the infected bone-and-meat feed which carry abnormal prions and caused BSE. Although the bone-and-meat feed that was made from the cow infected by abnormal prions also contained abnormal prions, the infection route has not clearly identified yet.

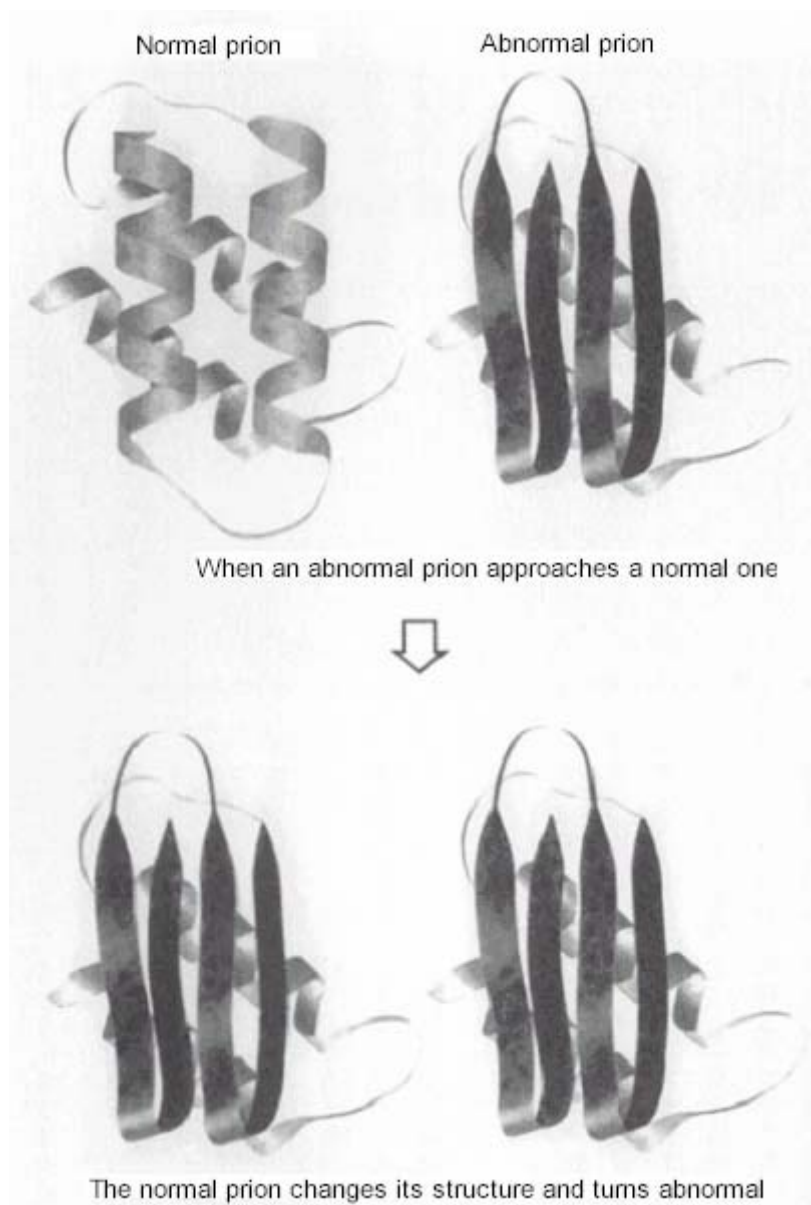


Fig.1 abnormal prion growth (model) [1]

4 . Immediate Action

After receiving the test result from the National Institute of Animal Health, the Ministry of Agriculture and Forest, on September 10, officially announced the possibility of BSE. Government officials immediately ordered a quarantine of the cow and initiated an environmental epidemiologic investigation on this matter including the background of the cow and a description of the cattle feed.

On the same day, the Ministry of Health, Labor and Welfare took the precaution of suspending the sales of beef until the diagnosis was confirmed. The government officials also decided to hold a study group meeting of "Research on BSE" led by Morikazu Shinagawa, a professor of Obihiro University of Agriculture and Veterinary.

On September 19, a screening test was introduced at national Meat Sanitary Inspection Stations (117 stations). Further testing was performed on suspected cows and the study group confirmed the diagnosis.

The Subjected cows had the following findings;

Within the age group of 24 month and older, those presenting symptoms of motor disorder, perceptual disorder, neurological dysfunction such as abnormal reflexes or consciousness, and absence of systemic symptoms (the test was already implemented at the site of the initial occurrence).

The group of cattle 30 months and older including those who do not present any dysfunctions.

Also the media broadcast scenes that Takebe, Minister of Agriculture, Forestry and Fisheries or Sakaguchi, Minister of Health, Labor and Welfare consuming beef on TV to cast aside consumer's safety concerns.

5 . Countermeasure

A new law banned providing cattle with bone-and-meat feed with a penalty, to avoid spreading BSE.

The Government also suspended all imports and domestic production and distribution of bone-and-meat feed. These measures were as good as those in England but did not last long. Although distribution of bone-and-meat feed was stopped at once, related businesses were strongly against total prohibition. In addition, there were not enough incineration and repository facilities; suspension was rescinded on only cattle within a month.

To avoid human transmission, a BSE test became mandatory on all beef cattle. Although there was no clear scientific indication that cows under 30 months old need to be tested, there was no census registration system on cattle, and erring on the side of safety was thought to be the most important issue.

Moreover, high-risk meat speciation such as brain or spinal marrow was banned for consumption while the processing method of beef cattle was re-examined. The government incinerated those high-risk meat speciation produced at slaughterhouses, and recalled medical supplies and food that contain those meat speciation.

6 . Summary

In September 2001, Japan was the 16th country that confirmed detection of BSE. It was the first case in Asia other than Eastern and Western Europe. It is important to find out why the cattle disease which had occurred only in England and Europe has landed in Japan where human and economic bonds are much weaker than those with the US or Australia. Although there are still many unsolved mysteries regarding BSE, the affected countries have already established measures to block the spread and transmission to humans. By contrast, not enough measures were taken in Japan until this suspected case occurred in September 2001.

After discovery of three BSE infected cows, four more cases were found in May 2002 (6y 1

mo), in August 2002(6y 8mo), in January 2003 (6y 11mo, 6y 9mo), a total of seven cows that were in an age group of five to six years old. The incubation period for BSD is believed to be between two to eight years after infection. However, prions were found in young cows (1y 11mo, 1y 9mo) in October 2003 and furthermore the structure of this protein agent was different from the original one, which reversed the original thought that there was a single kind of BSE (two of the same cases each were also reported in Italy and France). This discovery was due to performing mandatory testing on every cow, regardless of their age. It would be a chilling revelation if the original plan to limit the screening tests to cows 30 months and older was granted. The mystery of BSE regarding such as infectability or its source deepens more and more.

7 . Acquaintance

Effective measures are usually not taken until an incident actually happens. People's perception of "fire on the other side of the river" will not be easily mended even though the world has become globalized.

Also the business world often tends to care about profits before safety so that consumers need to have their own means (opting to not eat beef in this case).

In the meantime the view that "guilty until proven innocent" is indispensable for our own protection. A new type of abnormal prion was found by testing all beef cattle regardless of their age.

8 . Background

BSE was originally found in England in 1986. After the investigation of this case, England banned the use of bone-and-meat feed which was known to be the source of BSE. However, even cows that were born after the banning and were not supposed to have eaten any of the bone-and-meat feed were infected with BSE. The theory that cattle feed had been contaminated by that for pigs or chickens was highly suspected and the use of bone-and-meat feed was completely banned for any livestock feed in 1996. Even so, England experienced a serious outbreak of BSE, which peaked in 1992 at 36,682 infected cows and recorded a total of about 170,000 cases between 1990 and 2000.

The risk of bone-and-meat feed was reported from Meldrum, British CVO (Chief Veterinary Officer) of the OIE (Office International des Epizooties) in May 1989. Also a letter dated February 14, 1990 was sent to every CVO in the countries that import bone-and-meat feed (including Japan). (Fig1).

Regarding human transmission of BSE, in the village of Queniborough in England, three people in 1998 and two people in 2000 had sudden denaturation in their brain nerve cells, caused by abnormal prions and subsequently died from a new variant of Creutzfeldt-Jakob Disease (CJD), where the brain sometimes becomes like a sponge. These people were exposed to cows infected with BSE in common (March 21, 2001). There is another infectious disease of sheep called "Scrapie" caused by a prion other than bovine BSE; it had not appeared to be transmissible to humans before.

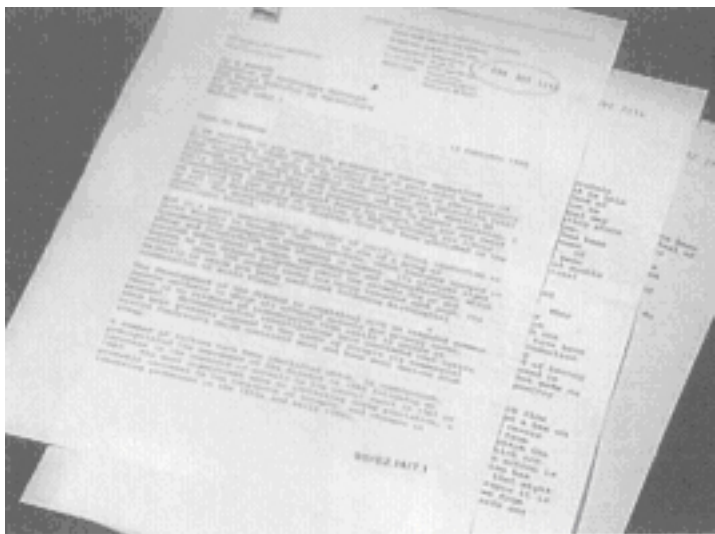


Figure 1 a letter sent to CVO of countries England exports their bone-and-meat feeding [1]

9 . On the side

Before the first case of BSE was reported in Japan in August 2001, the EU, in 1990, first warned the Ministry of Agriculture and Forestry that their methods of prevention against BSE were not sufficient. The officials quickly requested the EU to withdraw their exhortation. Awareness of the fact that governmental institutions become autotelic once they become entrenched; and that makes them incapable of taking precautions from making mistakes. Although the Agricultural Ministry reviewed their previous actions and launched a BSE research committee afterwards, there were no clear statements for improvement even in the report finalized in April 2002.

<References>

- [1] NHK “BSE” research crews, written by Toshihide Yabuki: face up to “BSE” published by NHK (2002)
- [2] Ministry of Health, Labor and Welfare web page: <http://www.mhlw.go.jp/>
- [3] Nihon Keizai Shimbun dated November 16, 2003: Mysteries of a new variant of BSE