7. CONCLUSIONS

A study concerning classification of cattle tumors and pathological analyses in Miyazaki prefecture was conducted to investigate the situation concerning the annual incidence of cattle tumors at individual meat sanitary inspection centers in Miyazaki prefecture. Mesothelioma cases were detected especially frequently in the jurisdiction of the Miyakonojo Meat Inspection Office and were investigated in detail.

Chapter 1: Cases involving co-incidental malignant mesothelioma and ovarian granule cell tumor in cattle. There have been only a few reports on such simultaneous tumor cases in cattle. In a Japanese black cattle specimen (3 year-old female), co-incidental tumors were found at the thoracic walls and ovaries and histopathological and immuno-histochemical examinations were conducted. The cells of the thoracic tumor were cultured and stained with using various staining preparations. The tumors at the left and right thoracic walls consisted of a large number of grey tumors. The neoplastic cells were immunohistochemically positive for cytokeratin and negative for vimentin and CEA. The epitheloid cells cultured were positive for vimentin. The ovarian tumor was alveolar and the tumor cells proliferating in a solid mass were positive for vimentin and negative for cytokeratin and CEA. From those findings, the case was diagnosed a compound overlapped case of malignant mesothelioma and ovarian granule cell tumor.

Moreover, we investigated 328 tumor cases detected among 139, 556 cattle within the jurisdiction of the Miyakonojo Meat Inspection Office for the 21-year period from April, 1974 to March, 1995, and discussed the etiologies of such simultaneous tumors. In this case, it was speculated that the tumors seen in this area occurred incidentally in the same individual cattle.

Chapter 2: Surveys of cattle tumors at the Miyakonojo Meat Inspection Office over a 23-year period.

As for surveys concerning long-term statistics for livestock tumors, although there have been several reports, there have been only a few detailed reports which take regional factors into consideration. Tumors were found in 377 of 162, 328 cattle at Miyazaki Prefecture Miyakonojo Meat Inspection Office for the 23-year period from April, 1974 to March, 1997 (232 per 100,000 cattle). These included mesothelioma in 64, ovarian granule cell tumor in 56, leukemia in 48, lung cancer in 20, liver cancer in 19 and adrenal cortical adenoma in 17.

Mesothelioma was found in many Japanese black cattle being raised whose breeding period is long and the ages of the occurrence was an average 11 years. This case of multiple mesothelioma corresponded to a report on cattle tumors by Miyazaki University in 1994. The multiple mesotheliomas were thus considered to occur frequently in Southern Kyushu, including the jurisdiction of the Miyakonojo Meat Inspection Office.

Chapter 3: Survey of cattle tumors at six meat sanitary inspection center in Miyazaki Prefecture for 16 years

At six meat inspection offices in Miyazaki prefecture, tumors were detected in 542 (0.116%) among 446,699 for the 16-year period from April, 1978 to March, 1994. Main tumors included bovine leukosis in 87, mesothelioma in 74, ovarian granule cell tumor in 52, liver cancer in 31, lung cancer in 18 and adrenal tumors in 12. Female Japanese black cattle were the larger in number, 23.8 / 10,000 cattle, including mesothelioma and ovarian granule cell tumor. In female Holstein cattle, leukemia and mesothelioma were found in 12.7 / 10,000. There were 1.3 / 10,000 in male Japanese black cattle and 1.4 / 10,000 in male Holstein cattle, both of which were mainly leukemia. At individual

production sites, as an example, there were 24.7 / 10,000 cattle at Miyakonojo where quite older cattle are processed, which was about four times more than that at Takasaki where more fattening cattle are processed.

Cattle leukemia was found at the highest level reported from meat sanitary inspection centers all over Japan, including Kyushu, followed by mesothelioma, although the number was small. There were 5.3 mesothelioma cases / 10,000 within the jurisdiction of the Miyakonojo Meat Inspection Office. This indicated that tumors have been occurring frequently in Southern Kyushu, mainly in Miyakonojo area of Miyazaki Prefecture.

Chapter 4: Survey of cattle mesothelioma at Miyazaki Prefecture Miyakonojo Meat Inspection Office over a 23-year period

Mesothelioma was detected in 64 among 162,328 cattle at Miyazaki Prefecture Miyakonojo Meat Inspection Office for a 23-year period from April, 1997 to March, 1997. The incidence was 39.4 / 100,000.

Macroscopic findings in most of the cases were widely distributed nodal lesions with sizes similar to that of millet seed ~ rice grain ~ soybean ~ small finger tip ~ hen eggs and with white ~ milky white ~ yellow ~ dark red colors in the peritoneum, greater omentum, liver, spleen, diaphragm and pleura.

Histopathologically, time-series pictures indicated the serous membrane lesions had been formed, by their appearance, on the membrane face. The lesion types were epithelial with papillary proliferation or luminal formation of tumor cells in 43 cases (67.2%), sarcomatous fibrous type with marked stoma hyperplasia in 13 (20.3%) and the biphasic type with both the findings in eight cattle (12.5%). The 64 cases included 61 Japanese black cattle and three Holstein cattle. All were females. The mean age was 10.9 and ranged from 1-20.

There have been only a few reports on the high incidence of cattle mesothelioma at specific areas in Japan. In Miyakonojo / some northern prefectural areas within the jurisdiction of Miyakonojo Meat Inspection Office, volcanic ash called "Shirasu" specific in Southern Kyushu has been used frequently for bedding of cattle barns and playgrounds. The volcanic ash contains chemical components similar to asbestos. Thus, it was inferred that the ash might be involved in the occurrence of mesothelioma as "Aktoprak" (White soil), ash in the central area of Turkey is.

Chapter 5 Reports concerning malignant aortic body tumors in cattle

In a female Holstein cattle aged five, a grey tumor of 22×17×15cm in size was detected at the aortic starting base of the left atrium. The tumor surface was covered by fibrous membrane and the section presented a grey color. Histopathologically, the tumor cells had proliferated in a solid manner and were fractionated into irregular alveolar forms by fibroblasts and had a large number of capillary vessels. The cytoplasm of the tumor cell had circular to oviform nucleus, as detected by eosin light staining. Its metastasis was found only at the mediastinal lymph nodes. Immunohistochemically, the tumor cells were positive for NSE and synaptophysin and weakly positive for chromogranin. Electromicroscopic observation revealed clear granules on the border membranes in the tumor cytoplasm.

In addition, we attempted cell cultures by the method used by Hiratsuka et al. The cultured cells presented fusiforms with protruding cytoplasms and were positive for NSE, synaptophysin, chromogranin A, and NF (200kD). From those findings, this case was diagnosed as a malignant aortic body tumor.