Tumors in Domestic Animals Examined during a Ten-Year Period (1980 to 1989) at Miyazaki University

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ABSTRACT. During the ten years from 1980 to 1989 inclusive, a total of 468 (16.1%) tumors were found in 2,907 pathological samples from domestic animals, collected from Southern Kyushu, around Miyazaki City. In this study, canine tumors were collected most commonly (340/468 cases, 73%). In small animals, the skin and mammary gland were associated particularly with tumorigenetic hazards. In cattle, high incidence of leukemia and mesothelioma was found. These tendencies were almost the same as those we reported for the preceding ten-year period, although the number of cases of tumor was higher in this study.—KEY WORDS: epidemiological study, domestic animal, tumor.

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Considerable progress has been made in epidemiological studies of tumors in domestic animals during the past few decades [6, 9]. To know changes in epidemiological factors associated with tumorigenesis, we examine the tumors in domestic animals every ten years [8]. The present paper shows the incidence of tumors examined from 1980 to 1990 and indicates recent changes of that in domestic animals around Miyazaki City.

Among a total of 2,907 samples from domestic animals examined histologically at the Department of Veterinary Pathology, Miyazaki University during the ten years from 1980 to 1989, 468 tumors were found. The biopsied or autopsied specimens collected mainly from Southern Kyushu, around Miyazaki City, were fixed with 10% formalin or other appropriate fixatives, stained with hematoxylin and eosin or using other special staining methods and examined microscopically.

The numbers of each type of specimen and the tumor occurrence rates in the animals examined are summarized in Table 1. The over-all rate of tumors in domestic animals was 16.1%. The number of samples from small animals was almost equal to that from cattle, but the degree of tumors in the former (31.7%) was considerably higher than in the latter (5.4%). The rate of tumor cases among examined specimens was highest in dogs (33.1%), followed by cats (24.6%). The tumors were classified histopathologically based on the classification of the WHO report 1974 [7]. The tumor occurrences in each body region are shown in Table 2. In cats and dogs, tumors were found predominantly in the skin and mammary gland, whereas in cattle most tumors arose in the haematopoietic system (32.7%). The histological classifications of the tumors found in each animal species examined are presented in Tables 3 to 6. The canine tumors comprised benign mixed tumors (adenoma complex, 81 cases), mammary gland adenocarcinoma (41 cases), canine transmissible venereal tumors (CTVT, 24 cases) and mast cell tumors (21 cases) (Table 3). Table 4 shows the feline tumors; adenocarcinoma (15 cases), squamous cell carcinoma (6 cases) and lymphoid neoplasms (4 cases). In the cattle, leukemia (17 cases) and mesothelioma (10 cases) were observed most frequently (Table 5). Several tumors were also found in birds, horses, monkeys, pigs, donkeys and weasels (Table 6).

The degree of tumor cases among examined specimens (16.1%) in this study was lower than those determined in other countries or large cities, like Tokyo in Japan [1, 2].

Table 1. The number of cases examined and tumors

Species	Specimens	Tumors (%)
Dog	1028	340(33.1)
Cat	203	50(24.6)
Cattle	1014	55(5.4)
Birds	103	12(11.7)
Others	559	11(2.0)
Total	2907	468(16.1)

Table 2. The number of tumors in each region

	Dog	Cat	Cattle	Bird	Other	Total
Skin	109(32.1)*	14(28.0)	8(14.5)	6(50.0)	4(36.3)	141(30.1)
Mammary gland	142(41.8)	20(40.0)	1(1.8)	0(0.0)	0(0.0)	163(34.8)
Urogenital system	38(11.2)	2(4.0)	6(10.9)	1(8.3)	0(0.0)	47(10.0)
Hematopoietic system	17(5.0)	7(14.0)	18(32.7)	3(25.0)	2(0.0)	47(10.0)
Others	22(6.5)	4(8.0)	16(29.1)	0(0.0)	3(27.3)	45(9.6)
Unknown	12(3.5)	3(6.0)	6(10.9)	2(16.7)	2(18.2)	25(5.3)
Total	340	50	55	12	11	468

*: The number shows percentage.

Table 3. Histopathological classification of canine tumors

Classification	Number
Skin	(109)
Mast cell tumor	21
Basal cell tumor	12
Squamous cell carcinoma	11
Fibroma (sarcoma)	11
Perianal gland tumor	10
Epidermal cyst	9
Melanoma	7
Histiocytoma	6
Hemangioma (sarcoma)	4
Sebaseous adenoma	4
Hemangiopericytoma	4
Papilloma	4
Apocria adenoma	3
Lipoma (sarcoma)	2
Tricoepithelioma	1
Mammary gland	(142)
Bengin mixed tumor (Complex adenoma)	81
Adenocarcinoma	41
Duct papilloma	3
Hemangiopericytoma	2
Osteosarcoma	1
Leiomyoma	1
Unidentified	13
Urogenital system	(38)
CTVT	24
Seminoma	8
Sertori cell tumor	4
Interstitial cell tumor	2
Hematopoietic system	(17)
Lymphosarcoma	12
Leukemia	5
Others	(22)
Osteosarcoma	9
Hepatoma	4
Osteochondroma	2
Epulis	2
Lipoma	1
Lung cancer	1
Unidentified	2
Unknown	(12)
Total	340

Table 4. Histopathological classification of feline tumors

Classification	Number
Skin	(14)
Squamous cell carcinoma	6
Basal cell tumor	3
Epidermal cyst	2
Mast cell tumor	2
Tricoepithelioma	1
Mammary gland	(20)
Adenocarcinoma	15
Adenoma	3
Chondrosarcoma	1
Unidentified	1
Urogenital system	(2)
Renal cell carcinoma	1
Granulosa cell tumor	1
Hematopoietic system	(7)
Lymphosarcoma	4
Leukemia	1
Plasmacytoma	1
Reticulosarcoma	1
Others	(4)
Mesothelioma	2
Rhabdomyosarcoma	1
Osteosarcoma	1
Unknown	(3)
Total	50

Table 5. Histopathological classification of cattle tumors

Classification	Number
Skin	(8)
Squamous cell carcinoma	2
Melamoma	2
Papilloma	2
Fibroma (sarcoma)	2
Mammary gland	(1)
Fibrosarcoma	1
Urogenital system	(6)
Granulosa cell tumor	3
Nephroblastoma	1
Transitional cell carcinoma	1
Seminoma	1
Hematopoietic system	(18)
Leukemia	17
Lymphosarcoma	1
Others	(16)
Mesothelioma	10
Ameloblastoma	2
Rhabdomyosarcoma	1
Malignant fibrous histiocytoma	1
Leiomyoma	1
Myxoma	1
Unidentified	6
Unknown	(6)
Total	55

However, this figure is higher than that of last report in our laboratories (240/2,416 cases, 9.9%), which may be attributable to the greater number of biopsy specimens in this study. According to the descriptive classification results, the second most common group of canine tumors changed from CTVT in the last report to mammary gland adenocarcinoma. In the last report [8], the rate of CTVT was about 30% among canine tumors (44/142 cases). Tateyama *et al.* [8] suggested that a high incidence of CTVT was a unique characteristics of canine tumors in rural Japanese cities, as the breeding practices may encourage wide-spread infection with this infectious tumor. By contrast, the degree of CTVT in canine tumors was relatively low (24/339 cases, 7%) in the present study. Our new data suggest that the CTVT incidence may be declining, due to recent improvements in breeding practices in rural Japanese cities. As these changes will have a great influence on the canine life span, the features of tumor incidence in such rural areas should change and resemble those in big cities. The most frequently encoun-

Table 6. Tumors in birds, and other species

Animals	Classification	Number
Parakeet		(7)
	Squamous cell carcinoma	3
	Liposarcoma	2
	Adenoma (carcinoma)	2
Fowl		(4)
	Melanoma	1
	Leukemia	1
	Seminoma	1
	Unidentified	1
Swan		(1)
	Unidentified	1
Horse		(4)
	Adenoma of thyroid gland	2
	Unidentified	2
Monkey		(2)
	Fibroma	1
	Unidentified	1
Pig		(3)
	Leukemia	2
	Malignat melanoma	1
Donkey		(1)
	Fibrosarcoma	1
Weasel		(1)
	Squamous cell carcinoma	1
		23

tered tumors in cats and cattle were almost identical to those quoted in our last paper, although the incidence in cattle differed considerably from those in companion animals.

In conclusion, this paper describes the tumor incidence in domestic animals around Miyazaki City from 1980 to 1989 inclusive and follows on from our last report. Such series of epidemiological studies on tumors conducted at regular intervals in the same area will be useful to establish the changes that occur and regional differences in tumorigenetic factors that affect domestic animals and man.

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