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## THE INCIDENCE OF MALIGNANT NEOPLASMS OF THE DOG IN A 40-YEAR PERIOD (1950 - 1989) IN MUNICH

O. Geisel, S. Kusch, M. Geisenberger, W. Hermanns

Between 1950 and 1989 a total of 27,959 dogs were autopsied at the Institute of Veterinary Pathology, University of Munich. 4,839 dogs (17.3%) had malignant tumours, excluding those of the central nervous system.

The frequency of malignant neoplasms between 1950 and 1954 had an average of 6.4%, increased to 16.4% in the next five years and had a level between 13.4 and 22.9% in the following study period without any significant tendency. The changing frequency was correlated positively with the average age of the dogs necropsied.

The average age of all dogs with tumours was 9.7 years, while that of the dogs without tumours was 5.4 years.

Breed disposition ranged from the more frequently affected breeds German Shepherd dog, Boxer and Airedale Terrier to the less frequently affected breed Dachshound and mixed breeds, these results were statistically proven.

Male dogs showed a higher incidence of haemangioendotheliomas and malignant perianal gland tumours than the female dogs, indicating a sex disposition for these neoplasms.

The incidence of the malignant tumours of the thyroid gland decreased from an average level of 26.5% in the period 1950-55 to 3.0% in the period 1985-89. This tendency is perhaps most likely caused by the effect of the addition of iodine to the dog's food.

The incidence of liver tumours was highest in the late fifties and the beginning of the sixties (up to 16% in 1957). After that a decrease was recognized and at the end of the study period it was on average between 3 and 4%. The causes of this tendency are unknown.

Haemangioendotheliomas were not found until 1955. After that their occurrence increased from 3.5% to 20.8%, computed in five-year periods. The reasons for the increasing incidence are unknown so far.

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## INFLUENCE OF SOCIAL STRESS ON INCIDENCE AND EXTENT OF AMYLOIDOSIS IN THE SYRIAN GOLDEN HAMSTER

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Amyloidosis in the Syrian hamster (SGH) was reported as an age-dependent change (1). The significance of social stress for spontaneous amyloidosis was demonstrated for the SGH (2) and for other species (3). The latter authors (3) defined a 'gradient of stress', characterized by various combinations of space and number of animals (crowding) per cage. This paper reports the relationship of amyloidosis in the SGH to social stress patterns which were induced by crowding the animals by up to 7 animals per cage.

### Material and methods

A total of 220 SGH, 110 animals each sex, were kept under standardized laboratory conditions and were subdivided into four experimental groups: 20 animals (of each sex) were housed individually;

30 animals were housed with 3 animals per cage, 25 animals were housed with 5 animals and 35 animals with 7 animals per cage, respectively. A complete necropsy was performed on each animal which died spontaneously or which was killed when moribund. Tissues were prepared for histological examination, using H.E. stain. Sections showing hyaline deposits were recorded as positive when Congo Red preparations (4) were positive in conventional and polarized light microscopy. Amyloidosis was graded in five selected organs (thyroid, adrenals, liver, spleen, kidneys) using a semiquantitative 0 to 3+ scale. The statistical data were evaluated using the 'Kruskal-Wallis'-test and the 'Wilcoxon-2-sample'-test.

### Results

The most striking differences in the incidence of amyloidosis were seen among the controls and the hamsters of the 7-animal group (Tab. 1). The significant results in the kidneys and the adrenals between the different groups indicates that these organs are possible target-organs for amyloidosis. The comparison of the experimental groups with regard to the other organs was generally not significant. Table 2 shows the significance of the stress-influenced amyloidosis in

Table 1: Incidence (%) of amyloidosis in the Syrian hamster related to the number of animals per cage

organ	thyroid	liver	spleen	adrenals	kidneys	
sex	m	f	m	f	m	f
<b>group</b>						
1	55	63	50	80	47	65
3	67	88	64	93	60	89
5	58	80	59	96	67	96 <sup>B</sup>
7	86 <sup>AF</sup>	87	88 <sup>ADF</sup>	97	84 <sup>AF</sup>	90 <sup>A</sup>
					96 <sup>ADF</sup>	96 <sup>AD</sup>
					92 <sup>ADF</sup>	96 <sup>A</sup>

Significant difference between the experimental groups: A: 7 to control (1), B: 5 to 1, C: 3 to 1, D: 7 to 3, E: 5 to 3, F: 7 to 5;  $p \leq 0.05$ , ('Wilcoxon-2-sample-test')

Table 2: Probability of significant differences for incidence of amyloidosis classified by animals per cage, p-values:

organ	thyroid	liver	spleen	kidneys	adrenals
males	0.01	0.03	0.02	0.001	0.0001
females	0.40	0.18	0.02	0.02	0.07

('Kruskal-Wallis-test', chi-square approximation)