genetically, and that the insulin-sensitive form of early onset behaves as if it were due to one or more recessive genes with or without reduced penetrance(7). Considerable evidence has accumulated to indicate that in the Chinese hamster, the disease is hereditary. The mode of inheritance is being investigated. It is obvious that there is tremendous value in having at hand an experimental animal in which genetic studies of diabetes can readily be made. Such a tool is also of importance in screening and study of potentially hypoglycemic agents.

Summary. Spontaneous diabetes mellitus, as observed in Chinese hamsters, has been described and compared with diabetes in human and experimental animals. Evidence was cited that in Chinese hamsters, the disease is genetically determined. Certain inferences were drawn as to the importance and significance of this observation for the future study of inheritance of diabetes, screening of hypoglycemic agents in the Chinese hamster, and metabolic studies.

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Serotonin (5-Hydroxytryptamine) Content of Canine Mastocytoma.* (24787)

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A number of biological materials have been associated with mast cells. Considerable amounts of heparin and histamine are produced and stored in dog mastocytomas(1); in addition, production of hyaluronic acid has been observed(2). However, the quantities of heparin and histamine, in dog mastocytomas are only half those of mouse mastocytomas (3). The serotonin content of dog mast cell tumors has not previously been established.

The results of our assays are reported in this paper.

Experimental. A. *Biochemical studies.* 5-Hydroxytryptamine (5-HT) was determined in 8 canine mastocytomas, following the method of Udenfriend *et al.*(4). The 5-HT equivalents found are presented in tabular form (Table I).

B. *Histochemical studies.* Sections of tumors were stained with hematoxylin-eosin, Giemsa, and toluidine blue, and by the post-coupled benzilidin reaction.† The mast cells of the different tumors contained a varying number of granules which stained deep blue with Giemsa and toluidine blue. Size of the granules decreased with malignancy of the tumors. The post-coupled benzilidin reaction is group-specific for all indol bodies, but does not identify serotonin as such(5). By this technic, the cytoplasm of the mast cells revealed a diffuse bluish staining and the granules showed a more intense blue color. A similar preparation from a mouse mastocytoma showed the same type of reaction, in regard to both cytoplasmic and granular staining (Figs. 1 and 2).

Discussion. Whereas heparin and histamine

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TABLE I.

Breed	Age (yr)	Sex	Tumor site	Size (cm)	Duration	Serotonin (μg/g)†
Boxer	9	♂	Stifle	1.5 × 1.5 × 1.5	Unknown	.32
"	7	♂	Scrotum	4 × 4 × 2	"	.39
"	3	♂	Thigh	2.8 × 2.8 × 2.8	5-6 mo	.81
"	7	♂	Shoulder	3.2 × 1.7 × 1.7	Unknown	.83
Collie	7	S♀*	Tarsus	2.0 × 0.4	"	.29
Pointer	9	♂	Scrotum	2 × 2 × 2	Several mo	.78
Spitz	4	♀	Shoulder	2 × 2 × 1.7	2 wk	.52
Terrier	15	♂	Scrotum	1.5 × 1.5 × 1.5	Unknown	.59

* S♀—Spayed female.
† Wt refers to dry, lyophilized tumor material.

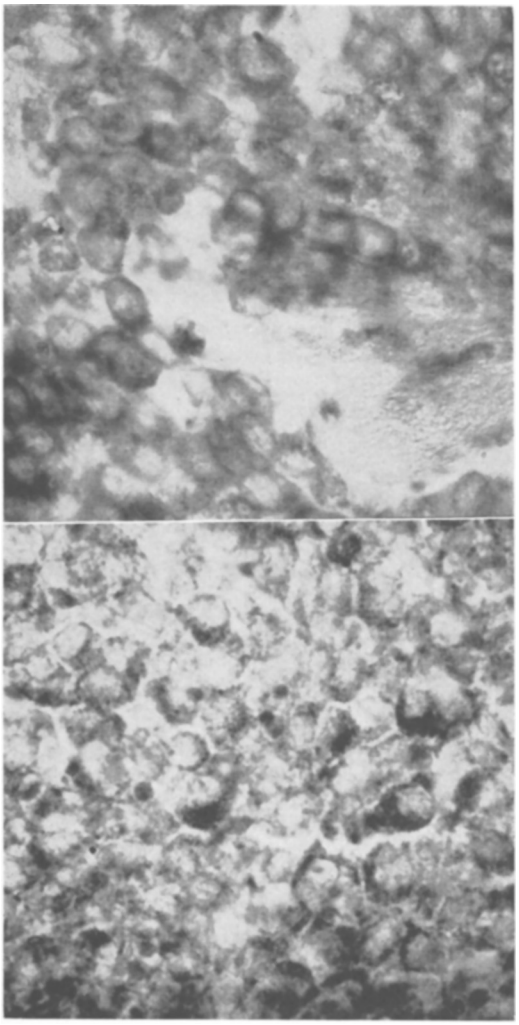

FIG. 1 (top). Section of a canine mastocytoma stained by the post-coupled benzilidin reaction. Diffuse cytoplasmic and granular staining indicates presence of indol bodies.

FIG. 2 (bottom). A comparable section of a mouse mastocytoma illustrating indol-positive granules.

appear to be universally present in mast cells of higher vertebrates, the mast cells of mice and rats contain, in addition, large amounts of 5-HT(6). The 5-HT content of mouse mastocytoma is as high as 28 μg/g of lyophilized tumor, which is the largest concentration reported for mammalian tissue other than carcinoid tumors of man(3,6). Canine mastocytomas yield extremely small quantities of 5-HT, as do other tissues of the dog(7). The accumulation of indol bodies, as evidenced histochemically, would suggest either excess oxidation (by monoamine oxidase) or deficient synthesis of serotonin in the dog due to absence of some enzymes (hydrolase, decarboxylase). The widespread distribution of monoamine oxidase in the vertebrate tissues and the high urinary excretion of 5-hydroxyindolacetic acid in the dog would indicate rapid metabolism of 5-HT, rather than a deficiency of production(8). Microscopically, no correlation has been found between degree of anaplasia or maturity of the mast cells, size of the granules, and the serotonin content, as was demonstrated for heparin.

Summary. Eight canine mastocytomas revealed only negligible quantities of 5-HT, averaging 0.49 μg/g dry weight, although histochemically large amounts of indol compounds could be demonstrated.

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Relation of Viral Proliferation and Antibody Formation in Mice Exposed to Roentgen Radiation.* (24788)

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Previous work showed(1) that exposure of adult mice to x-radiation prior to parenteral inoculation of Coxsackie virus resulted in an increased proliferation of the viral agent in various organs examined without a concomitant rise in mortality rates. Although the mechanism of this enhancive effect was not made clear by this study, one possible explanation suggested was the inhibition of antibody formation by x-radiation administered prior to injection of the antigen, as demonstrated by Dixon, *et al.*(2,3). The experiment reported here was, therefore, designed as a supplementary study to those previously reported in an attempt to correlate viral titers from selected organs with serum antibody levels. Further, it attempted to determine the effect of x-radiation upon secondary antibody response of mice and its relation to viral proliferation in selected tissues.

Materials and methods. Virus. The Powers strain of Coxsackie virus isolated by Cheever, *et al.*,(4) and classified by Dalldorf(5) as Group B Type 4 strain was used. The characteristic lesions produced in suckling mice have been described by Pappenheimer, *et al.*, (6). The strain had undergone 27 suckling mouse passages in our laboratory and the stock virus consisted of a 20% suckling mouse carcass suspension. All inoculations consisted of 0.10 ml of a 10^{-1} suspension of stock virus representing approximately 100,000 suckling mouse LD_{50}. Swiss white mice of the Tumblebrook and CFW strains obtained from Tumblebrook Farms, Brant Lake, N. Y., and from Carworth Farms, New City, N. Y., respectively, were employed. No differences were noted in susceptibility of these 2 strains of mice to infection with the virus or to effect of x-radiation. Roentgen radiation was delivered by Westinghouse therapy x-ray unit housed in a special chamber. Radiation was delivered by 4 milliampere current operating at 100 kilovolts and filtered through 1 mm of aluminum (HVL 1.1 mm Al). The field size was 20 cm square; individual readings taken at selected points in the target area with Victoreen r meter varied from 5.1 to 5.5 r in air/minute. X-radiation delivered as a single massive dose (400 r) was administered to the whole body of the animal at skin target distance of 75 cm at average rate of 5.3 r/minute. All radiation was administered 24 hours prior to inoculation. *Titration of virus.* Selected tissues were harvested at various intervals following inoculation and prepared as 20% suspensions in 0.2% bovine albumen broth and stored in a CO_2 chest until tested. Infectivity determinations were carried out in suckling mice less than 48 hours old. All litters were pooled and redistributed in random manner prior to inoculation. Decimal dilutions of the suspension to be tested were made in 0.2% bovine albumen broth and 0.02 ml was injected intraperitoneally into each of 16-22 mice comprising 2 litters. The inoculated mice were observed for 12 days. When possible, mice dying after inoculation of critical dilutions were autopsied and examined for gross lesions of interscapular fat pads taken as a criterion of specific death. The LD_{50} endpoint dilution was calculated by the meth-

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