

Those species having small proportions of arachidonic acid in the CEFA of their serums are susceptible to atherosclerosis and develop the disease spontaneously. This study provides evidence, by association, that level of arachidonic acid in the CEFA may be related to susceptibility to atherosclerosis. It remains open to investigation whether the proportion of arachidonic acid in the CEFA is a characteristic of the species or whether it, and the susceptibility to atherosclerosis, can be altered by dietary measures.

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Association between Presence of Transplanted Leukemia and Morphological Changes in Hosts' Thyroid Glands.* (25824)

BARBARA B. JACOBS[†] (Introduced by R. A. Huseby)

Dept. of Medicine, Indiana University Medical Center, Indianapolis

We observed that presence of spontaneous mammary adenocarcinoma in C3H parous females is associated with decreased epithelial height and increased diameter of thyroid fol-

licles as compared to non-tumor-bearing controls(1). These changes suggested that presence of tumor is associated with decreased thyroid function of host(2). This investigation was initiated to determine if this phenomenon might be more widespread in its occurrence, as suggested by earlier observations of Larinow(3) that mice with various types

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[†] Present address: Roswell Park Memorial Inst., Buffalo, N. Y.

TABLE I. Thyroid Measurements,* Body Weight, and Spleen Weight in Leukemic and Non-Leukemic C57 Male Mice.

Group	No. mice	Mean body wt (g)	Mean spleen wt (mg)	Mean epithelial ht	Mean diameter
Control—no leukemia	29	20.0	102.9	7.27	46.99
C1498 present, 8 days	12	22.2	123.8	7.04	47.81
" " , 11 "	17	23.6	226.8	5.97	48.07

* In μ .

of cancer show a depression in height of follicular epithelium.

Methods. Inbred C57 B1/6/JAX male mice were housed in transparent plastic cages and fed Purina Laboratory Chow *ad lib.* with oat supplement. Temperature was controlled between 78-80°F. Two-month-old animals were inoculated with fragments of myelogenous leukemia C1498† subcutaneously in the right axillary region by a No. 12 trocar. Non-inoculated littermates served as controls. Thyroid glands were handled and examined as previously reported(1). The mean of 10 measurements from the thyroid of each animal was recorded and the mean for each experimental group calculated. Spleen weights were recorded as indication of extent of leukemic involvement.

Results. Eight days following leukemia inoculation, thyroids of leukemic mice showed lower epithelia and larger follicular diameters than those of non-inoculated controls (Table I). Since these differences were rather small and not statistically significant, a second series of mice similarly treated was sacrificed 11 days after inoculation. After the neoplasm had been in host for 11 days, considerable proliferation had occurred, as indicated by increase in spleen weight over that observed at 8 days. At 11 days the difference in mean epithelial height of control and leukemic group was statistically significant. Mean total body weights of leukemia-bearing mice in both series were greater than those for control mice. Only a portion of this increased body weight is accounted for by splenomegaly observed in leukemic animals. Neither massive lymphatic involvement nor ascites was apparent and hepatomegaly, although it may have been present, was not massive and would not account for a significant proportion of in-

creased body weight. Mice in both series appeared alert and healthy. Experiments extending beyond 11 days were not feasible due to ensuing poor condition and high mortality of leukemia-bearing animals.

Discussion. The results suggest that there is a lowered thyroid function in presence of leukemia C1498 in C57 Black mice. Similar observations in C3H female mice bearing spontaneous mammary tumors(1) and in mice with spontaneous, transplanted and induced tumors(3) indicate that this phenomenon is not limited to strain of mouse or type of neoplasm employed. Related observations on tumor-bearing rats indicate that this phenomenon is non-species specific(4).

Stevens *et al.* noted that in rats(5) and mice(6) there is a lower concentration of injected I^{131} in thyroids of tumor-bearing than in tumor-free animals, thus strengthening the view that our morphological observations of thyroids are a reflection of functional activity.

These observations may be related to the "iodine-trapping syndrome" described in tumor-bearing rats and mice by Scott *et al.*(7). This syndrome is characterized by a higher than normal retention of I^{131} by skin, muscle, gastrointestinal tract and plasma and lower uptake by thyroid and low excretion in urine. The relationship of these observations to elevated metabolic rates in patients with either myeloid or lymphoid leukemia is not clear since such elevated rates may or may not be accompanied by changes in thyroid function (8,9).

Summary. C57 male mice which had been inoculated 11 days previously with leukemia C1498 had statistically significantly lower thyroid follicle epithelium than did untreated controls. Thyroids of inoculated mice also had slightly, though not statistically significantly, larger follicle diameters. These

† Obtained from R. B. Jackson Memorial Lab.

changes in thyroid morphology were present but less extensive 8 days after tumor inoculation.

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Adrenocortical and Gonadal Responses of Female Mice to Increased Population Density. (25825)

JOHN J. CHRISTIAN*

*Penrose Research Lab., Zoological Society of Philadelphia and Dept. of Pathology,
University of Pennsylvania*

Increased adrenal cortical and decreased gonadal function result from grouping male mice, the magnitude of these responses depending on population density(1). Similar gonadal and adrenocortical changes occur in female mice from populations of mixed sex (2,3,4,5). The changes in male mice are related to intraspecific strife, their magnitude in an individual to its position in a social hierarchy(6). It is not known if the adrenals of female mice and rats react similarly when in groups of females only, although it is known that reproduction is adversely affected with suppression of estrus(7,8). This paper explores the effects on adrenal glands and gonadal function of placing females together in groups in absence of males.

Methods. In each of 3 experiments female mice were placed in individual cages at 12-13 g. Four weeks later the mice were randomized and assigned according to groups or to remain isolated. Ten days after grouping, the mice were sacrificed and weights of adrenals, thymus, spleen, ovaries, uterus and, in Exp. 3, the preputials obtained after fixation in 10% neutral formalin(2,9,10). Adrenals were

serially sectioned at 6 μ in all experiments, and ovaries, uterus, and vagina were sectioned in Exp. 3. Widths of adrenal X-zones, zonae fasciculata-reticularis, and number of cells in straight cords of the latter were determined histologically(2). Eleven groups of 6 each of nulliparous females of the albino NMRI strain were used in Exp. 1. Seven groups of 6 parous mice each, of the same strain, were used in Exp. 2. Parous mice were used to avoid confounding the adrenal weight data by the X-zone, which is involuted at first pregnancy in females. For this experiment male and female littermates were placed, one pair to a cage, at weaning. Males were removed when the females were obviously pregnant for the first time, at 10 or 11 weeks of age. The young were removed at birth and the females isolated until the required number were obtained. Seven groups of 4 each of inbred, nulliparous females, of a strain originally derived from wild mice, were used in Exp. 3. This strain is much more aggressive and more reactive to grouping than laboratory albino mice(9). It is known that females of this strain are in estrus a high percentage of the time and do not undergo spontaneous pseudo-pregnancy.

Results. The results are summarized in Table I as mean organ weight and its stand-

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