Controlled Amylophagia in Female Mice

Amylophagia or the ingestion of starch is a perversion of the appetite. The starch consumed is generally Argo brand laundry starch. Frequent, though not exclusive occurrence of such practices has been described among pregnant females[1]. Some investigators have studied the effects of artificially controlled amylophagia on laboratory animals[2-4]. The results of these diverse experiments fail to clarify basic questions about this particular form of pica. This study was undertaken to augment the paucity of information on controlled amylophagia.

Methods and materials. The experiments were performed upon 6 -week-old HA-ICR Swiss strain female mice, each weighing approximately 20 g at the outset of the experiment. Group A (the control group) was fed 100% meal – Rockland laboratory primate diet (17% protein). Group B was fed a diet of 50% meal and 50% starch – Argo gloss laundry starch-by weight. Group C was fed 100% starch. 4 g of food per animal were provided per day. These diets were continued for 15 weeks in groups A and B. The animals in group C subsisted on their diet for varying times up to a maximum of 4 weeks.

The blood used for the hemoglobin values was taken from the tail of the mouse. Values were determined initially and after 1, 2, $4^1/_2$, and 10 weeks respectively.

After 14 weeks on the diet, the animals were mated by introducing 4 male mice per 10 females for 20 days. The females were then placed in separate cages and watched for another 20 days.

Results. Body weight. The data pertaining to body weight is shown in Figure 1. The animals who consumed a diet of 100% starch expired within a month; their weight curve showed a continual downward slope. After an initial increase in weight over the controls, the animals on the 50% starch diet maintained an almost identical slope as the control group. The difference in weight between these 2 groups was not statistically significant.

Hemoglobin. Figure 2 demonstrates the hemoglobin values of the groups of mice. Somewhat lower hemic values among the starch-eating mice were noted after $2^1/_2$ and 4 weeks. However, this tendency was not statistically significant ($P > 0.05$). The mice eating 50% and 100% starch had similar hemoglobin values in spite of the difference in their diets.

Reproductive performance. The Table points out the differences between the control group and the starch-eating group with regard to reproduction. The number of pregnancies achieved in the control group was significantly higher than in the starch-eating mice ($P = 0.05$). Significance was also achieved in a comparison of litter size between the 2 groups ($P = 0.05$). Larger litters occurred in the controls than did in the starch-eating mice. 24 litter mortality was 100% in the offspring of the starch-eaters; slight mortality occurred in the litters of the controls during the first 14 days of life. An anomalous pair of hind legs was noted on a fetus of one of the starch litters.

Discussion. In laboratory animals, there is evidence that protein depletion may increase both the rate of erythropoiesis and iron absorption[5]. Such a protective mechanism may explain the lack of a significant anemia in our starch-eating animals when the protein, vitamins and minerals were diluted by 50% with starch.

Relative deficiency of protein, however, may not lead to weight loss, especially when the diet is buffered by so called 'empty calories'. While a 50% reduction of protein content by weight was achieved in the mice whose diet

Differences between normal controls and amylophagic mice

	Group A (Control)	Group B (50% Starch)
Pregnant	70%	20%
Mean number in litter	9	5
Viability of litter	8 per litter alive after 14 days	All dead within 24 h
Mother's concern	Builds nest, preans litter, allows suckling, litter kept in 1 spot	No nest, litter scattered, no suckling
Percent anomalies	0%	9%
Time between introduction of males and giving birth	20–35 days Mean = 29.4	22–27 days Mean = 24.5

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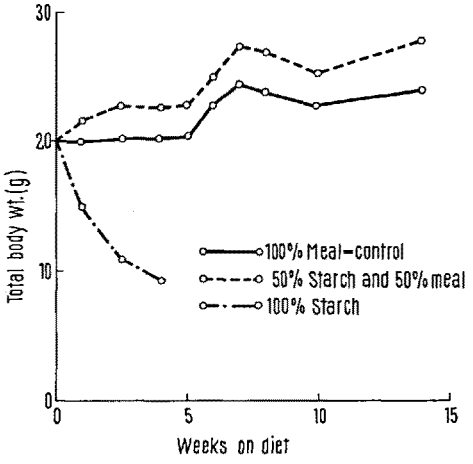

Fig. 1. Average body weights of normal mice and those on starch diets.

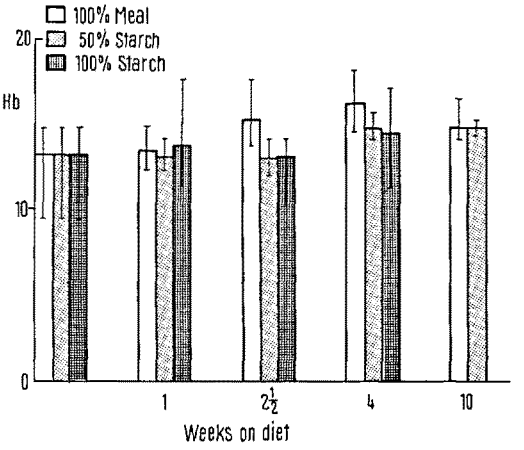

Fig. 2. Comparison of hemograms of normal and starch-eating mice. The ranges of values are noted.

contained 50% starch, weight loss did not occur. The Argo starch conceivably provided protein deficient, carbohydrate calories to support this slight augmentation of weight.

The difference in conception rate, however, between the starch-eating mice and the controls was striking. The same may be said for the litter size. Perhaps of greater importance was the total lack of interest or concern for the offspring exhibited by the starch-eating mice. This certainly could have contributed to the 100% 24 h mortality among the starch litters.

Zusammenfassung. Es wird gezeigt, dass die Amylophagie bei der Maus keine Anämie, dagegen eine Verminderung der Graviditäten und Abnahme der pro Geburt geborenen Jungtiere herbeiführt.

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An Increase in Thyroid Radioiodine Uptake Following the Administration of Cyproterone Acetate

Cyproterone (6-chloro-Δ^6-1, 2-α-methylene-17α-hydroxyprogesterone, Schering SH 80881) and cyproterone acetate (Schering SH 80714) are two of the most potent antiandrogens. Both block the effect of endogenous and exogenous testosterone and other androgens at both peripheral[1–5] and central (hypothalamic)[6–8] receptor sites. Cyproterone acetate possesses stronger antiandrogenic activity but is also gestagenic; cyproterone is a weaker antiandrogen but has no gestagenic effects[9]. Apart from the principal effects (seminal vesicle and prostate atrophy), several reactions in the endocrine system in general were observed following antiandrogen administration: changes in the blood gonadotrophin level and the adenohypophysial gonadotrophin content[10–12], development of the castration cells in the adenohypophysis[13] and a decrease in adrenal weight[14]. The last effect is probably due to gestagenic activity, since it is also produced by other gestagenic substances[15]. Although the effects of various steroid hormones on thyroid activity have been widely studied, no study on the effects of antiandrogens has so far, to our knowledge, been published. In the course of study of the effects of steroid hormones on ^{125}I-thyroxine binding by adenohypophysial proteins in vitro[16,17], we observed that oestrogens had a stimulant effect and testosterone (as well as the thyroid hormones) an inhibitory effect. In a study of the action of cyproterone acetate, described in detail elsewhere[18], we observed an increase in thyroid radioiodine uptake following its administration. This effect, as well as its interaction with an oestrogen, oestradiol dipropionate, forms the subject of the present communication.

Cyproterone acetate was administered to adult male rats (descendants of the Wistar strain, Velaz, Prague) in a standard laboratory diet (Larsen diet, Velaz, Prague) in 1.6‰ concentration (representing about 5 mg/day/rat). Oestradiol dipropionate (Agofollin SPOFA) was administered i.m. in daily doses of 50 μg in olive oil. In the first experiment, there were 9 control rats and 9 rats treated with cyproterone acetate. In the second experiment, there were 10 controls, 10 cyproterone acetate treated rats, 10 treated with oestradiol dipropionate and 10 treated with both substances. After 20 days, the animals were given 0.5 μC ^{132}I (obtained by elution from ^{132}Te columns, Isocommerz) i.p. in 0.5 cm³ physiological saline and were killed by exsanguination 4 h later. The thyroids were dissected out, weighed and hydrolyzed in 2 cm³ 10% NaOH. The radioactivity of the samples was measured in an Tesla NZQ laboratory set and, after correction for decay, the percentage of the administered dose per thyroid and per mg thyroid was calculated. An analysis of variance and DUNCAN's[19] test was used for statistical evaluation.

The results are given in the Table. A slight but significant increase in thyroid weight was observed in all the

Group	Body weight initial (g)	Body weight final (g)	Thyroid (mg)	Thyroid (mg/100 g)	^{132}I uptake (%/ thyroid)	^{132}I uptake (%/mg thyroid)
Experiment No. 1						
1. Controls	218.33 ± 15.16	251.33 ± 15.97 (2)	13.31 ± 1.72	5.56 ± 1.04	7.22 ± 1.63 (2)	0.54 ± 0.10 (2)
2. Cyproterone acetate	205.56 ± 15.81	198.67 ± 22.01 (1)	12.78 ± 3.32	6.33 ± 1.19	13.86 ± 3.84 (1)	1.10 ± 0.16 (1)
Experiment No. 2						
1. Controls	188.0 ± 6.57	214.2 ± 12.20 (2, 3, 4)	12.93 ± 2.25 (3, 4)	5.92 ± 0.75 (2, 3, 4)	4.25 ± 0.75 (3, 4)	0.33 ± 0.04 (3, 4)
2. Oestradiol diprop.	183.0 ± 5.64	182.5 ± 6.75 (1, 3)	12.79 ± 1.67 (3, 4)	6.99 ± 0.78 (1, 3, 4)	4.66 ± 0.96 (3, 4)	0.38 ± 0.09 (3)
3. Cyproterone acetate	190.5 ± 7.62	197.8 ± 12.38 (1, 2, 4)	18.47 ± 1.16 (1, 2, 4)	9.39 ± 0.80 (1, 2)	13.21 ± 2.32 (1, 2, 4)	0.73 ± 0.12 (1, 2, 4)
4. Oestradiol diprop. + Cyproterone acetate	187.5 ± 4.54	179.4 ± 6.75 (1, 3)	15.56 ± 2.32 (1, 2, 3)	8.68 ± 1.33 (1, 2)	7.26 ± 1.24 (1, 2, 3)	0.48 ± 0.10 (1, 3)

Means ± 95% confidence limits. In bracketts are given the numbers of groups with statistically different means (DUNCAN's test). 9 (Exp. No. 1) or 10 (Exp. No. 2) animals in each group.