we have initiated dietary studies in this direction, keeping in mind, however, that the above effect might be due to loss in weight, rather than to dietary deficiencies.

TABLE IV

INFLUENCE OF DIET ON SEX ORGANS OF THE MALE

Diet	Nature of experiment	Number of animals	Duration days	Weight	Loss or gain in per cent.	Food	Test. g	S.V. g
I	C.	8	39	1,314	+11	2,449	23.7	5.75
I	60 g. yeast per kg food	8	39	1,241	+46	3.359	22.8	8.33
I	200 g. whole wheat added to kg food..	8	39	1,327	+27	3,246	22.6	7.31
I	C.	8	32	1,070	− 6.3	1.977	26.9	1.5
I	Casein extr.*	8	32	1,069	− 5.2	2.297	28.7	1.8
I	C.	8	35	841	+ 9.5	1,844	26.2	1.24
I	Casein extr.†	8	35	834	+ 1.6	1,710	22.6	0.85

* Acetone, acid alcohol and aqueous HCl extract added to imperfectly purified casein.
† Acetone and alcohol extract added to imperfectly purified casein.

From the above table we gather that the nature of dietary additions plays an important role in maintaining the normal aspect of the sex apparatus of the male rat. Additions and extracts containing undefined substances of yeast, whole wheat and aqueous casein extracts exert a favorable action on the food intake and weight, as well as on the picture of the seminal vesicles. Contrary to this, the only experiment with fatty extract of casein was unfavorable in these respects.

Finally, experiments were performed for the purpose of ascertaining the action of synthetic estrogens (dihydro-stilbestrol) which have nothing in common in chemical structure to natural estrogens. Further, we investigated whether testosterone can replace estrin as a hormonic dietary precursor.

Both groups of rats receiving dihydro-stilbestrol in their food showed continuous estrus. The action was practically the same on an incomplete and on a more complete diet. This is in marked contrast to the estrin action, which is only evident on an incomplete diet. As compared with the controls, testosterone initiated in several instances the beginning of an estrus, but it could not be substituted as a dietary estrin precursor. Stilbestrol on a more incomplete diet was somewhat toxic, but less so on a more complete dietary. Testosterone acted adversely in female rats regarding the food intake and therefore weight.

On a deficient diet female sex organs undergo a marked retrogression with cessation of estrus. Inclusion of estrin in such cases shows evidence of definite activity. On the other hand, a more complete diet causes no retrogression and estrin activity is not noticeable. Dihydro-stilbestrol, on the contrary, exerted the same activity on both types of food. Testosterone can not replace estrin as a dietary hormonal precursor.

TABLE V

ACTION OF DIHYDRO-STILBESTROL AND TESTOSTERONE PROPIONATE ON FEMALE RATS

Diet	Nature of experiment	Number of animals	Duration days	Dose mg	Weight	Loss or gain per cent.	Food	Ovar. mg	Uteri mg
I	C.	8	34		779	− 8.9	1,183	294	542
I	Stilbestrol.	8	34	4.7	774	−27.9	906	273	1,779
I	Testost. ..	8	34	9.1	777	−12.1	1,143	315	541
I	Stilbestrol.	8	34	5.3	754	− 5.8	1,319	369	1,716

SUMMARY

The sex organs of the male are more resistant to dietary deficiencies, the animals showing only retrogression along with a significant loss in weight. Testosterone and gonadotropic hormone (of pregnant mare serum) produce a small but definite restorative effect.

Oral administration of estrin to females depresses the food intake, while testosterone, and less so the gonadotropic hormone in males produces the opposite effect. This effect can be regarded as evidence of the dietary significance of these two hormones.

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THE EXCRETION OF CORTIN AFTER SURGICAL OPERATION

A METHOD for the extraction and determination of cortin in human urine has been described.[1] The determination is based on a biological assay for cortin described by Selye and Schenker.[2] Using the method in a study of a group of cases, including one appendectomy, one dilatation and curettage, two gastric resections and one colostomy (none of whom developed post-operative shock), it was found that after operation there is an increased amount of cortin in the urine. Two cases are illustrated in the accompanying table. The excretion of cortin increases to a maximum between the third and fifth post-operative day and then gradually declines to pre-operative levels.

It had previously been shown[1] that cortin appeared in the urine during convalescence from influenza in persons who normally excrete none and that in the presence of chronic suppurative infection cortin is

[1] P. Weil and J. S. L. Browne, Proc. Am. Physiol. Soc., Toronto, 1939, Vol. 121, p. 652.
[2] Hans Selye and V. Schenker, *Proc. Soc. Exp. Biol. and Med.*, 39: 518, 1938.

TABLE I

Date		Units
June 9		0
10		0
11		0
13	Operation-Colostomy	
14		25
15		25
16		50
19		75
July 2		50
4		25
6	Operation-Gastrectomy	
7		75
9		125
10		125
11		100
12		50

excreted. We believe that the increased excretion of cortin is a manifestation of the response of the organism to a damaging stimulus by an increased secretory activity of the adrenal cortex. It has been shown that the adrenal cortex of the laboratory animal hypertrophies after damage.[3] These experiments and the present investigation suggest that an increased secretion of the adrenal cortical hormone forms part of the protective mechanism against damage.

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PERIODIC MITOTIC ACTIVITY IN THE EPIDERMIS OF THE ALBINO RAT

THE knowledge that mitotic activity was periodic in some plants led Fortuyn-van Leyden to investigate this phenomenon first in various tissues of young kittens,[1] later, in young mice.[2] She found periods of maximum and minimum activity. Since then Ortiz Picón,[3] working with the epidermis of young mice, and Carleton,[4] studying the epidermis and hair follicles of young mice, have corroborated her findings as to periodicity, but have not agreed as to the time of maximum and minimum activity. More recently Cooper and Schiff[5] have demonstrated periods of greater and lesser mitotic activity in the epidermis of the prepuce of human male infants. The author[6] has reported a study of mitotic activity in the renal cortex of male albino rats. The curve plotted from the findings exhibited both periodic and rhythmic features (Fig. 1, broken line). Elliott,[7] as part of a study on the growth mechanisms of articular cartilage, obtained specimens during the day and night, but found no difference in rate of cell division.

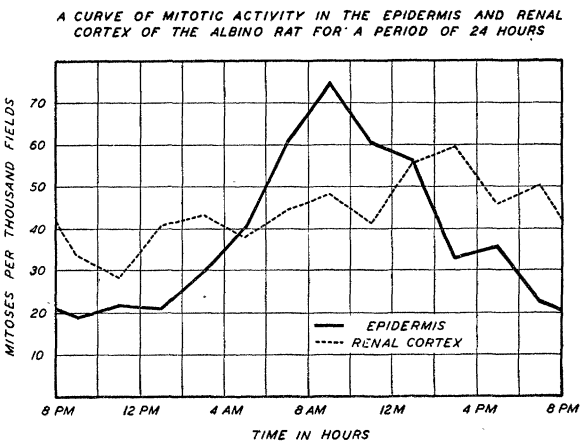

FIG. 1

The importance of such studies in the problem of normal and abnormal growth is obvious. The differences in results of various investigators may be due to the ages and orders of mammals employed, organ or region studied, inherited qualities or individual variation, character of environment or the small size of some of the samples. An addition to available data is here presented, a study of mitotic activity in the epidermis of the albino rat.

Materials and methods were as follows: from each of 96 male albino rats, 28 days old, killed in groups of 8 at intervals of 2 hours during a period of 24 hours, a square of skin was cut from the central ventral portion of the abdominal wall. The specimens were fixed in Bouin's, cross-sectioned at 8 microns, mounted serially and stained with hematoxylin and eosin Y. Every fourth section was studied to avoid counting the same mitosis twice. The number of mitoses observed in 1,000 consecutive fields was taken as an index of mitotic activity in a specimen. From the data obtained a curve was constructed and biometric studies made. To conserve space individual values are not presented.

The curve (Fig. 1, solid line) is composed of mean values for each 2-hour interval, placed at the mid-point of the interval. Each mean value is the average of 8 individual values. It will be seen that mitotic activity was greatest during the interval 8 A.M. to 10 A.M. (75 mitoses per 1,000 fields) and least during the interval 8 P.M. to 10 P.M. (19 mitoses per 1,000 fields); or, in other words, mitoses were almost 4 times as numerous in the morning interval as in the evening period. With few exceptions the skin was obtained from the same rats as were the kidneys previously studied. A

[3] Hans Selye, *Endocrinology*, 21: 169, 1937.

[4] Aided by a grant from the Banting Research Foundation.

[1] C. E. D. Fortuyn-van Leyden, *Proc. Akad. wet. Amsterdam*, 19: 38, 1917.

[2] C. E. D. Fortuyn-van Leyden, *Proc. Akad. wet. Amsterdam*, 29: 979, 1926.

[3] J. M. Ortiz Picón, *Zeitschr. f. Zellforsch. u. mikr. Anat.*, 23: 779, 1933.

[4] A. Carleton, *Jour. Anat.*, 68: 251, 1934.

[5] Z. K. Cooper and A. Schiff, *Proc. Soc. Exp. Biol. and Med.*, 39: 323, 1938.

[6] C. M. Blumenfeld, *Anat. Rec.*, 72: 435, 1938.

[7] H. C. Elliott, *Am. Jour. Anat.*, 58: 127, 1936.