Eine ausführliche Beschreibung unserer Arbeit wird in der Zeitschrift «Chemické listy» erscheinen.

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Summary

The distribution of ascorbigen in various organs of kohlrabi during vegetation suggests that ascorbigen probably plays a part in the metabolism of the indole growth-substances of numerous Brassicacae.

Influence of Estrogen and Progesterone on the Oxygen Consumption of Rats, with Reference to the Role Played by the Thyroid

The administration of small doses of estrogen in a single dose or within a short duration of time, stimulates thyroid activity (EPSTEIN and WOLTERINK[1], MONEY *et al.*[2], and REINEKE and SOLIMAN[3]). In rats, SOLIMAN[4] found that the oxygen consumption is greater during estrus than during the other stages of the reproductive cycle. The rise in oxygen consumption of rats during estrus was also accompanied with increased thyroid activity (SOLIMAN and REINEKE[5] and FELDMAN[6]). The chronic administration of large doses of estrogen, either has no effect on the thyroid (SOLIMAN and REINEKE[7]) or has a depressing effect on it (EMGE and LAQUEUR[8]).

Progesterone is known to exercise a thermogenic effect which is not mediated through the thyroid (ROTHSCHILD and RAPPORT[9]). A single injection of 0·4 mg of progesterone decreases the uptake of radioactive iodine by the thyroid, while 0·8 mg increased thyroid uptake of radioactive iodine (SOLIMAN and REINEKE[7]). It was intended in the present investigation to study the effects of estrogen and progesterone on the oxygen consumption of rats, and to clarify the role played by the thyroid under these conditions.

28 mature male albino rats, with a body weight ranging from 160–180 g were used in this experiment. 12 rats were castrated, 10 castrated-thyroidectomized and the rest were kept as controls. The rats were then divided into 5 groups of 5 or 6 rats each. A group of castrated rats and another of castrated-thyroidectomized ones were injected with 2 μg of estradiol monobenzoate contained in 0·2 ml of cottonseed oil. 24 h later, their oxygen consumption was measured by the use of a closed circuit apparatus adopted by MACLAGAN and SHEAHAN[10]. The same groups of animals were then immediately injected intraperitoneally with one dose of 0·4 mg progesterone contained in 0·2 ml of cottonseed oil. Their oxygen consumption was again determined after 48 h from progesterone administration.

Each rat of the other groups of castrated and castrated-thyroidectomized ones was injected intraperitoneally with a single dose of 0·4 mg progesterone. The oxygen consumption of these rats was then determined 48 h after the progesterone injection. The data were analysed statistically, using the 't' test, for evaluating the differences between the averages.

As it appears in the accompanying table, castration of male rats resulted in a significant drop in oxygen consumption as compared with the controls. Thyroidectomy of castrated rats resulted in a further drop in oxygen consumption. The administration of 2 μg of estradiol benzoate in a single dose increased the oxygen consumption of castrated rats, but had no effect on castrated-thyroidectomized ones. These findings indicate that the stimulating effect of estrogen on oxygen consumption is not a direct one, but seems to be mediated through the thyroid.

The administration of progesterone caused an increase in the oxygen consumption of both castrated, and

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The effects of estrogen and progesterone on the oxygen consumption of castrated and castrated-thyroidectomized rats

Group No.	Operative Procedure	Number of Animals	Oxygen Consumption in ml/100 g Body Weight per hour			
			No. Treatment	Estrogen	Progesterone	Estrogen-Progesterone
I	Control	6	124·12 ± 7·41 *	–	–	–
II	Castrated	6	100·21 ± 6·10	139·40 ± 5·59	–	147·46 ± 5·26
III	Castrated	6	98·42 ± 2·97	–	137·99 ± 2·85	–
IV	Castrated-Thyroidectomized	5	59·63 ± 5·99	64·97 ± 4·17	–	93·65 ± 1·99
V	Castrated-Thyroidectomized	5	67·26 ± 3·00	–	97·70 ± 3·83	–

* Standard error.

castratred-thyroidectomized rats. This shows clearly that this stimulating effect of progesterone to general metabolism is either a direct one or through other pathways than the thyroid.

When rats were treated with estrogen, followed by progesterone their oxygen consumption did not differ significantly from that of rats treated with either of these hormones alone.

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Résumé

Une seule dose de 2 μg d'estradiol a augmenté la consommation d'oxygène des rats castrés, seulement quand les thyroïdes étaient intactes. Une dose unique de 0,40 mg de progestérone a augmenté aussi la consommation d'oxygène des rats castrés, en présence ou absence des thyroïdes. A ces doses, il n'y a ni synergisme ni antagonisme entre l'estrogène et le progestérone dans leur influence sur la consommation d'oxygène.

An Electron Microscope Study of Nerves in the Corneal Epithelium

There has been a long-standing difference of opinion as to whether or not certain epithelial nerve-endings are intracellular. The best known exponent of the intracellular view was BOEKE, who published his principal paper on the subject in 1925[1]; part of his work was on the cornea in vertebrates. The question has been discussed more recently by ZANDER and WEDDELL[2], who were unable to agree with BOEKE that there are any intracellular nerve-endings in the cornea, and by ABRAHÁM[3], who was also unable to find intracellular nerves in the corneal epithelium.

An investigation of the innervation of the cornea in mice, using electron microscopy, has shown that, in a sense, both sides are right. The accompanying illustrations show the position of the nerve fibres running in the basal layer of the epithelium of mouse cornea, fixed in buffered osmium tetroxide. The fibres, most of which are less than half a micron in diameter, are cut in approximately transverse section; they have emerged from the Schwann cell sheath before reaching this point. It will be seen that the fibres lie in deep grooves in the base of the epithelial cells, wrapped around by the membrane of the cell in such a way that, though they are external to the cell membrane, they are in a sense internal to the cell. BOEKE's drawings of the corneal epithelium of frogs and of *Falco* show fibres in just this position, though he could not, using the light microscope, make out the details of the course of the cell membranes. ZANDER and WEDDELL also state that the nerve fibres of this plexus are not beneath the basal layer of epithelial cells but within it; they thought that the fibres were running between the cells rather than enclosed within them.

BOEKE's drawings also show intracellular nerve fibres in the outer layers of the corneal epithelium. The present investigation has not yet gone far enough to state positively whether the fibres which have risen above the basal layer are enclosed or not. Structures which appear to be nerve fibres have been seen in the intermediate layers of the epithelium, and in the inner layers of the flattened cells, sometimes in shallow grooves and sometimes between the cells; it is however much more difficult to identify nerve fibres with certainty in the outer layers of the epithelium, for they do not there have so regular an orientation as they do in the basal layer, and so may be confused with the interdigitating processes of the epithelial cells, described by JAKUS[4].

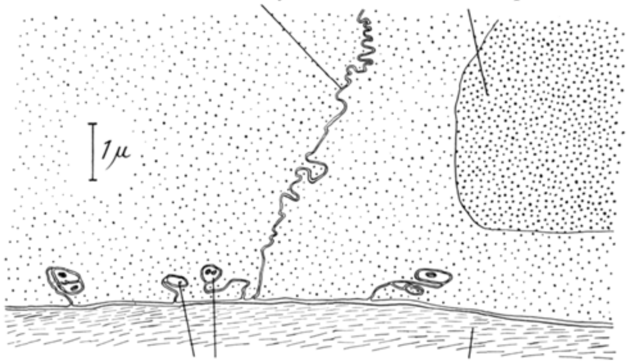

Fig. 1. – Mouse cornea. Diagram made by tracing from an electron-micrograph, showing parts of two epithelial cells of the basal layer, and nerve fibres cut in transverse section. The thickness and spacing of the cell membranes has been exaggerated.

WERSÄLL[5] has shown that, in the sensory epithelium of the cristae ampullares of the ear, the supporting cells surround the nerve fibres after they emerge from the Schwann cells at the base of the epithelium. In the cornea, undifferentiated epithelial cells are in a similar close relationship to the nerve fibres.

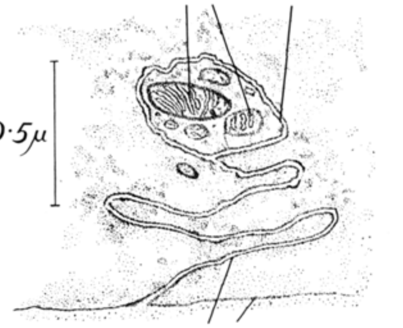

Fig. 2. – Mouse cornea. Tracing from an electron-micrograph showing a fine nerve fibre in transverse section, enclosed within a cell of the basal layer of the epithelium.

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