dass sich die relative Aktivität der Substratatmung mit Temperaturerhöhung von 17,5 auf 37,5°C (nicht jedoch darüber hinaus) vermindert.

Im Lichte der Theorie von Johnson[4] ist die Verhinderung des bei der endogenen Atmung starken Abfalls über dem Maximum durch Substratzusatz, etwa im Sinne einer Protein-Stabilisierung, verständlich. Die Verminderung der Aktivierungsenergie der Substratatmung gegenüber dem Wert der endogenen Atmung lässt sich durch die Annahme verständlich machen, dass durch hohe Substratkonzentration bereits eine Enzymaktivierung eingetreten ist und daher die auf Temperatureinfluss zurückgehende Aktivierung nurmehr ein geringeres Ausmass annehmen kann. Ein Phänomen dieser Art ist seit längerem für die Atmung gewisser Seeigeleier bekannt[5]. Hier ist der Temperaturkoeffizient (Q_{10}) der nach der Befruchtung hohen Atmung kleiner als der der niedrigen Atmung des unbefruchteten Eies. Auch tritt nach Aktivierung der Atmung des unbefruchteten Eies mit Pyocyanin eine Verringerung des Q_{10} ein[6]. Andererseits steht jedoch unser Befund im Gegensatz zu einer Untersuchung über ein Zytochromoxydase-Succinodehydrogenase-System aus Rattenlebermitochondrien[7], bei welchem ein höherer μ-Wert erhoben wurde, als er für die endogene Atmung von Leberschnitten bekannt ist. Dagegen wurde an der Gehirnatmung der Ratte für ein Homogenatsystem die gleiche Aktivierungsenergie wie für Gewebsschnitte erhoben[8]. Die Abnahme der relativen Aktivität der Substratatmung mit Temperatursteigerung (Abbildung) steht in Übereinstimmung mit dem Einfluss von 4,6-Dinitro-*o*-kresol auf die Atmung der Säugerleber[9] und Froschhaut[3] unter gleichzeitiger Temperaturvariation.

A. Locker

I. Medizinische Klinik der Universität Wien, 31. Juli 1958.

Summary

(1) The influence of temperature on tissue respiration of frog skin and rat liver, stimulated by succinate and pyruvate, was studied. The temperatures ranged from 17·5 to 47·5°C.

(2) The activation-energy (μ) of the substrate-stimulated respiration was significantly lower than that of the endogeneous O_2-uptake. Therefore, in the submaximal range of temperature, the relative activity of the stimulated respiration decreased with increasing temperatures.

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Acetylcholinesterase, Acid Phosphatase, and Succinic Dehydrogenase in the Hypothalamic Magnocellular Nuclei after Serotonin Administration

It is the generally accepted opinion that the antidiuresis produced by serotonin is due to the renal effects caused peripherally by this drug[1,2]. However, Abrahams and Pickford[3] have presented the possibility that the antidiuretic effect of serotonin might, in part, also be a result of the release of antidiuretic hormone from the posterior lobe of the pituitary. In a previous histological investigation, the present authors were able to show that the neurosecretory material, which is considered the carrier substance of the antidiuretic hormone or the hormone itself[4], decreased after serotonin administration in the posterior lobe of the hypophysis as well as in the cytoplasm and the neurites of the cells of the supraoptic and paraventricular nuclei[5,6]. In order to further the understanding of the mechanism of effect of serotonin upon these hypothalamic nuclei, we have continued our work with the object of determining the kind of effect serotonin has on the acetylcholinesterase, acid phosphatase and succinic dehydrogenase enzyme activity in the nucleus supraopticus (n.s.o.) and the nucleus paraventricularis (n.p.v.), where these have been shown previously to occur[7,8,9].

For this study 16 female albino rats of about 200 g weight were used. Half of them served as controls; the other half of the animals received serotonin (5-hydroxytryptamine sulf. c. creatinin sulf., 'Lääke Oy') subcutaneously daily during seven days in a dosage of 0·5 mg/kg (in 0·1 ml). The animals of the control series were given correspondingly 0·1 ml saline solution. Throughout the test the animals received food and beverage *ad libitum*. The animals were killed by rapid decapitation 2 h after the last injection. From the n.s.o. and n.p.v. of the test animals, as well as the controls, the acetylcholinesterase was determined histochemically according to Koelle's modification[10], the acid phosphatase according to Eränkö's modification[11], and the succinic dehydrogenase according to Seligman and Rutenburg[12].

In the control series the acetylcholinesterase, acid phosphatase, and succinic dehydrogenase activity was found to confirm with the earlier findings. On examination of the hypothalami of the animals treated with serotonin the observation was made that, of the investigated enzymes, the acetylcholinesterase and acid phosphatase activity had distinctly increased in both nuclei, whereas no difference between the test animals and the controls was noted with regard to succinic dehydrogenase (Fig. 1–4).

The result just obtained indicates that subcutaneously administered serotonin affects the acetylcholinesterase and acid phosphatase activity of the hypothalamic magnocellular nuclei, increasing these activities. It is generally accepted that the chemical transmitter responsible for stimulation of the hypothalamic cells is acetylcholine, which is decomposed by acetylcholinesterase (e.g.[13,14]).

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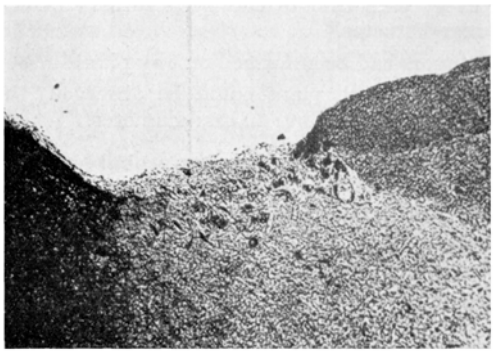

Fig. 1.—The activity of acetylcholinesterase in the nucleus supraopticus of a control rat. × 72.

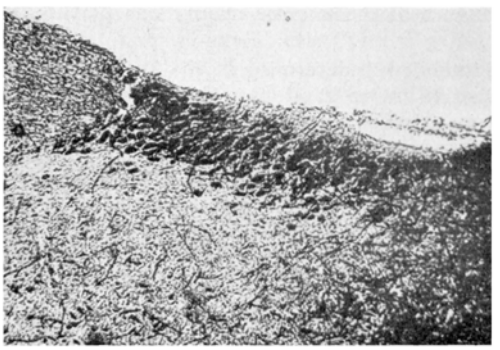

Fig. 2.—The activity of acetylcholinesterase in the nucleus supraopticus of a serotonin treated rat. × 72.

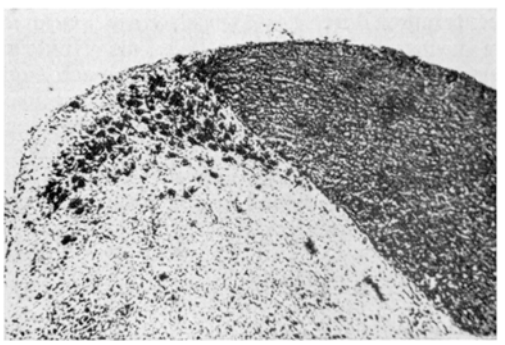

Fig. 3.—The activity of acid phosphatase in the nucleus supraopticus of a control rat. × 72.

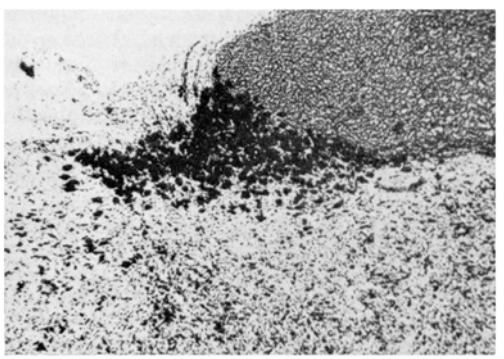

Fig. 4.—The activity of acid phosphatase in the nucleus supraopticus of a serotonin treated rat. × 72.

On the other hand, it is known that acid phosphatase is involved in the protein synthesis mechanism. The fact that serotonin increases the activity of just these enzymes thus tends to strengthen the hypothesis that serotonin stimulates the activity of the nuclei under consideration[5,6]. The activity of the respiratory enzyme, succinic dehydrogenase, is normally fairly slight in the n.s.o. and n.p.v.; therefore it has been assumed that aerobic metabolism has no great significance in the activity of the cells[15]. Also the result obtained in this work can be considered an indication in this direction.

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Department of Anatomy, University of Turku (Finland), August 25, 1958.

Zusammenfassung

Es wurde histochemisch festgestellt, dass Serotonin eine mässige Steigerung der Acetylcholinesterase- und sauren Phosphataseaktivität des Nucleus supraopticus und Nucleus paraventricularis bewirkt. Es wird an eine Aktivierung des N. supraopticus und N. paraventricularis durch Serotonin gedacht.

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The Role of Nucleic Acids in Crown-Gall Tumor Induction

In a previous paper[1], the preparation of a tumor inducing principle TIP which was germ-free was described. These experiments, first made on *Pelargonium zonale*, have been extended to other plants. Finally it was decided to use *Datura stramonium*, a plant which reacted well and speedily to inoculations of virulent strains of *Agrobacterium tumefaciens* (Smith and Townsend), the causal agent of Crown-Gall. The germ-free induction of Crown-Gall tumors was achieved by incubating the bacteria for a two-day period at 27°C together with a juice expressed from plants, wounded 48 h beforehand. A sterile filtrate of this mixture was capable of inducing typical tumors on *Datura*. Furthermore it was demonstrated that TIP was not obtained by adding a deoxyribonuclease to the mixture before incubation.

These results have now been confirmed, and in addition the deoxyribonuclease was found to have no effect if added to the mixture after incubation. The fact that this enzyme can inhibit the formation of TIP *in vitro* would emphasize the importance of the role of nucleic acids in Crown-Gall tumor induction. Such results show that the active principle of the bacterium is closely related to the nucleic acids, but it is also clear that the nucleic acids are not identical with TIP and are not alone responsible for the tumor induction. Manil *et al.*[2] have studied this problem and have prepared different fractions of nucleic acids from a mass culture of the organism. The proliferations on plants after inoculation with these preparations were very limited and, as the authors state, not typical. It may be

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