1 mg/kg of reserpine, respectively. All the doses proved to be lethal for the dogs, and the 0·5 and 1 mg/kg doses were lethal for the majority of the rats.

The daily urinary excretion of 5-HIAA in the experimental animals is shown in the Tables I and II. In parentheses is the 5-HIAA content per ml of urine (in μg).

SHORE *et al.*[1], ERSPAMER[5], and FISCHER and LECOMTE[6] observed that the rate of excretion of 5-HIAA markedly increased during the first hours following the administration of high doses of reserpine (2–5 mg/kg, intraperitoneally). This was now confirmed in dogs and in group *B* of rats.

It clearly appears, however, from the tabulated data that, after this initial increase in the 5-HIAA urinary output, the daily excretion of the metabolite of 5-HT returns to normal values, in spite of the continuous administration of reserpine and the persistent very low levels of 5-HT in serum and spleen tissue of reserpine treated rats. An apparent, unexplained exception is group *B* of rats in which the urinary excretion of 5-HIAA remained constantly above the normal levels.

Present results show that reserpine, even in lethal doses, does not appreciably interfere in the biosynthesis of 5-HT in the dog and rat organism. This is in accordance with the observations of HAVERBACK *et al.*[7], who found that reserpine, in a dosage known to lower platelet 5-HT, did not change, in normal human subjects, the excretion of the 5-HT metabolite.

We can conclude that the only hitherto demonstrated action of reserpine on 5-HT is that of causing a more or less conspicuous liberation of the amine from some body depots.

5-HT creatinine sulphate and 5-HIAA were synthetized in the Farmitalia Research Laboratories, Milan.

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Institute of Pharmacology, University of Parma, and Farmitalia S.p.A. Research Laboratories, Milan, November 3, 1956.

Zusammenfassung

Wiederholte intraperitoneale Reserpindosen (0·1–1 mg/kg), die bei vielen Tieren tödlich wirken, sind beim Hund und bei der Ratte kaum imstande, die Biosynthese des 5-Oxytryptamins (Enteramin) zu beeinflussen, obwohl sie eine erhebliche Ausschüttung der Substanz aus einigen Körperdepots verursachen können.

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[6] P. FISCHER and J. LECOMTE, C. r. Soc. Biol. Paris *150*, 1026 (1956).

[7] B. J. HAVERBACK, A. SJOERDSMA, and L. L. TERRY, New England J. Med. *255*, 270 (1956).

Absence of Uricolytic Activity in Human Parotid Glands*

For the past fifty years investigators have unsuccessfully sought for an uricase in human tissues[1]. The search has been given new impetus by the observation that the amount of urate lost from the body pool is 100–250 mg greater than that excreted in the urine[2]. This finding is suggestive evidence for the presence of uricolytic activity in the body. GEREN *et al.*[3] have shown that N-labelled uric acid, administered by mouth to humans, was extensively degraded, a result quite different from that obtained when the same preparation was administered parenterally. Thus, the localization of a uricase in humans may reside in either (or both) the intestinal flora or in the host tissues.

Recently STERN and IGLESIAS claim to have demonstrated the presence of a uricolytic ferment in human saliva and particularly in human parotid gland[4]. Their method of uricase detection was not described, nor did the authors present their scheduled paper orally at the International Physiological Congress, Montreal, 1953.

Inasmuch as the occurrence of a uricase in human tissues would be of prime importance in considerations of purine metabolism and gout we endeavored to confirm the presence of this enzyme in human parotids. Two fresh human parotid glands were minced, passed through a tissue press, homogenized and diluted with phosphate buffer. An aliquot of each suspension (equivalent to 130 mg of parotid) was incubated with urate under conditions of pH, temperature and time which permit the direct relation of uricase concentration to disappearance of urate in mammalian (other than primate) liver and kidney homogenates[5]. Urate concentration was measured by standard photometric procedures.

There was absolutely *no* disappearance of urate from the parotid tissue, urate-containing medium. Thus uricase, as determined by conventional methods is absent in human parotid. This conclusion is in keeping with the very many past failures to demonstrate uricase in any or all human tissues.

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Department of Biochemistry, College of Medicine, University of Vermont, Burlington, July 11, 1956.

Zusammenfassung

In homogenisierter menschlicher Speicheldrüse liess sich entgegen den Angaben von STERN und IGLESIAS[4] keine Urikase nachweisen.

* This work was performed during the tenure of Grants A 139 and A 139-C from the National Institute of Arthritis and Metabolic Disease, Department of Health, Education and Welfare, Public Health Service.

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[5] A. H. SCHEIN, E. PODBER, and A. B. NOVIKOFF, J. biol. Chem. *190*, 331 (1951).

Electrophysiological Investigation on the Antennal Receptors of the Silk Moth During Chemical and Mechanical Stimulation

Progress in the biochemical isolation of the sexual attracting-substance of the Silkmoth (*Bombyx mori*) was recently achieved by the use of new methods (BUTENANDT[1] and HECKER[2]). The extract of the attracting

[1] A. BUTENANDT, Naturwiss. Rdsch. (Stuttgart) *8*, 457 (1955).

[2] E. HECKER, Chem. Ber. *88*, 1666 (1955); *Verteilungsverfahren im Laboratorium* (Verlag Chemie, Weinheim 1955).

substance of *Bombyx*, as well as two other highly effective substances, cycloheptanone and sorbinol[1], proved to be suitable for investigations on insect olfactory reception. Continuing previous publications[3], the present note precedes an extensive report on the function of the antennal receptors of *Bombyx*[4]. The morphological analysis of the antenna of *Bombyx* has been completed[5].

(1) If the electrodes are attached to the base of the head and the tip of one antenna resp., or to the tips of both antennae, the resulting oscillogram is dominated by the activity of scapus and pedicellus muscles. Therefore, the impulses of the sense cells become obscured.

(2) R-C recording of impulses from the amputated antenna was done by two methods: (a) large-surface iron or Ag-AgCl needle electrodes or (b) fluid-filled capillary Ag-AgCl microelectrodes. Method (a) demonstrates summated spontaneous spikes and (b) single spontaneous spikes.

(3) Still-air stimulation of the antenna by extracted or fresh sexual attracting-substance, cycloheptanone, or sorbinol, increases the spontaneous activity. Vapors of ether or chloroform suppress the spikes.

(4) Air jets evoke electric oscillations (physiological antennal microphonics ?) in the flagellum of the antenna[6] and in the organ of JOHNSTON.

(5) Bending of the antenna by air currents suppresses spontaneous signalling of other mechanoreceptors in the flagellum. Afterwards, spikes return with an postexcitatory burst.

(6) If an odour-containing air current hits the isolated antenna, slow electrical potential-differences between the tip and the base of the antenna are recorded. The exact form of this *electroantennogram* (EAG) was demonstrated by D-C amplification.

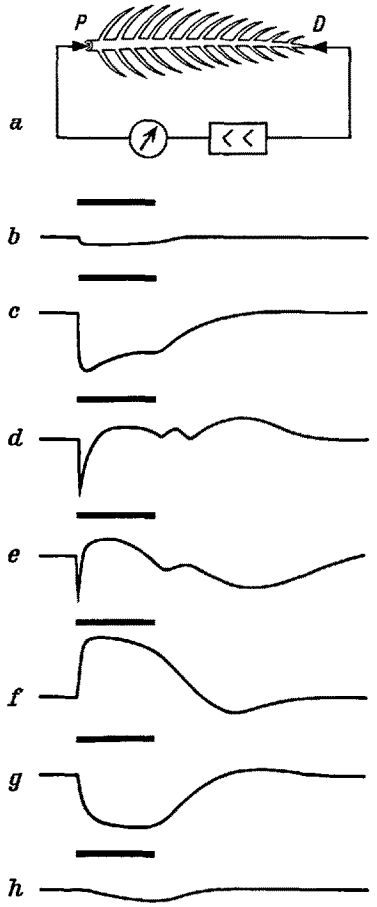
(7) The form of the EAG depends on the odour component of the air current. The amplitude of the EAG depends on the odour concentration or, if concentration remains constant, on the rate of air motion.

(8) Every odour-EAG starts with a negative on-effect (periphery of sense organ becomes negative in relation to base). During the odour current, the intermediate potential is negative for sexual attracting-substance, positive or zero for cycloheptanone and negative or zero for sorbinol. EAGs for cycloheptanone and for sorbinol cease with an off-wave. The attracting-substance-EAG slowly returns to zero after stimulation (Fig.).

(9) Vapors of ether or chloroform suppress the odour-EAG. Within 15 min after narcosis, the odour-EAGs reappear. The recovery time depends upon the deepness of narcosis.

(10) During ether- or chloroform-narcosis, air currents cause the receptors to respond with narcotics-EAGs. The form of these EAGs depends on the deepness of narcosis and the narcotic used. In the initial phase of narcosis, ether- and chloroform-EAGs are similar to the cycloheptanone-EAG (Fig. *e*). Deep ether-narcosis EAGs are either positive or negative, deep chloroform-narcosis EAGs are negative (Fig., *f* and *g*).

(11) No spikes, odour- or narcotics-EAGs are recorded, if, before amputation of the antenna, the whole breathing insect was killed by ether-, chloroform- or HCN-vapor in a gas chamber (Fig., *h*).



Bombyx-Electroantennograms (EAGs). An air current hits the normal or narcotized antenna. The current may or may not contain odorous substances. The duration of the current is symbolized by black bars.

a Method: The isolated antenna is fixed between the distal (*D*) and proximal (*P*) electrodes. The electrodes are connected to a D-C-amplifier and oscilloscope. The EAGs (moving film) are to be read from left to right. Downward deflection of the electrone beam means that *D* becomes negative in relation to *P*.
b Control: Air from the laboratory compressed-air system.
c Air + extracted sexual attracting-substance.
d Air + cycloheptanone.
e Air during the beginning phase of ether or chloroform narcosis.
f Air during deep ether narcosis.
g Air during deep ether or chloroform narcosis.
h Reaction of the antenna of a dead moth independent of the odor component of the air current or narcosis.

(12) Only the antennae of males are showing an increase of spikes or an EAG when stimulated by the sexual attracting-substance. The antennae of both sexes are responding to sorbinol and cycloheptanone.

(13) Different alcohols and other odorous substances are giving different EAGs.

(14) The EAG contains several components of different form, time relations and polarity. Apparently the negative (initial) component inhibits the spontaneous spikes of chemoreceptors and the following positive phases facilitate them.

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[4] D. SCHNEIDER, Z. vgl. Physiologie *40* (1957), in preparation.

[5] D. SCHNEIDER and K. E. KAISSLING, Zool. Jb. (Anat.) *75*, 287 (1956); *76* (1957), in press.

[6] J. BOISTEL and E. CORABOEUF, C. r. Soc. Biol. (Paris) *147*, 1172 (1953).

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Zusammenfassung

Die isolierte Antenne von *Bombyx* beantwortet eine Duftreizung mit erhöhter Signalfrequenz vorher spontanaktiver und dem Signalisieren vorher ruhender Chemorezeptoren. Auf Duftströme reagiert das Sinnesorgan mit einer langsamen Potentialschwankung, dem *Elektroantennogramm* (EAG). Luftströme erregen in Schwingungsrezeptoren frequente Entladungen und löschen in Druckrezeptoren spontane Spikes aus.

Premiers résultats d'analyse fonctionnelle électro-biochimique sur l'oreillette isolée étalée de *Scyllium canicula*

La technique de l'oreillette isolée étalée ouverte sur diélectrique, mise au point avec la Roussette par l'un d'entre nous et CORTOT[1] permet d'observer optiquement la contraction automatique et de suivre simultanément le film de ses manifestations électriques; l'exploration chirurgicale associée à la détection électrique a rendu possible la mise en évidence d'un certain nombre de propriétés nouvelles des structures macroscopiquement différenciées les plus caractéristiques de l'oreillette de Roussette[1].

Le problème que nous nous sommes posé ici revient, en premier lieu, à examiner l'action d'*inhibiteurs rapidement réversibles* de la contraction automatique de façon à déterminer les modalités mécaniques et électriques de la *reprise* fonctionnelle dans des délais pratiques. Normalement la contraction des valvules sino-auriculaires et de la masse musculaire auriculaire se produit en phase. Nous avons été rapidement amenés à élargir la perspective de notre investigation en agissant non plus par «narco-analyse» mais à l'aide de substances pouvant produire des *dissociations* dans les phénomènes contractiles. Disons tout-de-suite que, travaillant en aérobiose, nous n'avons pu jusqu'à présent déceler d'action nette ni avec l'arséniate de sodium 10^{-2} *M*, ni avec l'acide monoiodacétique $0{,}4 \cdot 10^{-3}$ *M*, ni avec le fluorure de sodium 10^{-2} *M* (en solution *A*[2]; avec NaF la solution est légèrement opalescente).

Montage. Le cœur est prélevé sur animal anesthésié à l'éther[2]. On place l'oreillette, munie généralement d'une partie du sinus veineux, sur un bloc de paraffine, épinglée – par une pointe à chacun des trois angles auriculaires – après avoir ouvert la préparation par sa face ventrale à partir de l'espace auriculo-ventriculaire défini par la section qui a permis l'isolement de l'oreillette. La partie *interne* de l'oreillette peut ainsi être commodément observée à la loupe binoculaire; elle montre particulièrement les deux valvules sino-auriculaires (nous dénommons l'ensemble *plastron valvulaire*) et les travées musculaires de l'oreillette dont la forte travée centrale équivalente d'un muscle papillaire. La préparation imbibée de solution *A* peut poursuivre ses contractions pendant une dizaine d'heures à 20–25° C sans qu'il soit nécessaire de lui fournir la «catalyse» d'une impulsion mécanique. Deux pinceaux pour aquarelle appliqués sur le bloc de paraffine près de la préparation sont disposés selon des axes choisis, ils assurent un dispositif de détection bipolaire très souple. Il n'est pas toujours nécessaire de pré-amplifier l'électrocardiographe (nous utilisons un appareil à inscription directe): la résistance électrique de la paraffine réduit efficacement tout court-circuit. On recouvre l'ensemble préparation-pinceaux d'un couvercle transparent. Les préparations sont facilement lavables par arrosages à la pipette et dessications périphériques au papier filtre.

Résultats. Nous ferons état ici des types de tracés les plus fréquents que nous avons obtenus à 25°C.

I. *Analyse par inhibiteurs rapidement réversibles*

1° *Action du gaz carbonique.* La figure 1 donne un exemple de réponse obtenue. Montage de détection: longitudinal (électrode «BG» vers le sinus). Le passage du CO_2 se fait sur préparation humidifiée par la solution *A* jusqu'à arrêt (contrôle électro-optique); quelques secondes sont nécessaires (si le passage du CO_2 se fait pendant 3–4 s, il y a seulement ralentissement du rythme (de ½ environ) sans modification apparente de la forme et de l'amplitude des potentiels d'action). N.B.: à t_0 la contraction est totale.

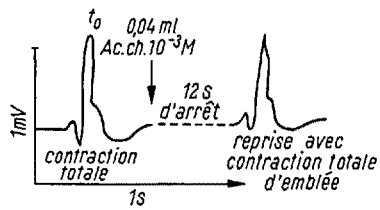

Figure 2

2° *Action de l'acétylcholine-HCl.* La figure 2 montre une réponse avec reprise totale d'emblée (montage de détection: transversal, électrode «BD» vers la valvule gauche); la figure 3 représente le film du développement de la reprise fonctionnelle avec réponse propagée (montage de détection: transversal, électrode «BG» vers le sinus légèrement à gauche); c'est un bel exemple de dis-

[1] B. RYBAK et H. CORTOT, C. r. Soc. Biol. (à paraître).
[2] B. RYBAK, C. r. Acad. Sci. *241*, 1411 (1955).

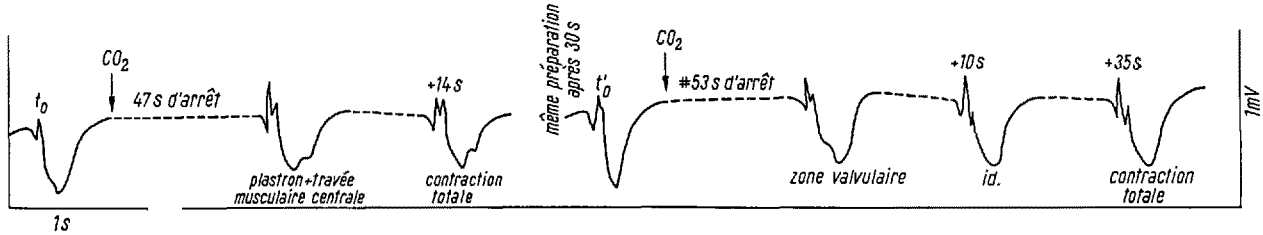

Figure 1