significantly, as shown in the Figure. The rise in acid output was due to a significant increase of the volume rate of gastric secretion. There was no significant change of the concentrations of hydrogen ions and chloride in gastric juice after injection of theophylline. Under such conditions osmotic concentration ratio between gastric secretion and plasma was similar to the control values and did not exceed the limiting level of 1.0[19]. Upon stimulation the osmolality of gastric juice increases and in the normal stomach at maximum equals that of the plasma. In comparison with this finding, the effect of histalog on the concentrations both of hydrogen ions and chloride in gastric juice can be augmented by combining it with atropine[17]. As a result, previously obtained isotonic secretion will become hypertonic to plasma. This is, however, the only condition at present known, under which hypertonic gastric juice can be obtained. A complete description of these findings together with additional investigations to elucidate the mechanism of action of theophylline on gastric acid production will be presented elsewhere[20]. The possibility that cyclic 3′, 5′-AMP participates on a molecular basis in the secretory mechanism of gastric acid merits further investigation. The true nature of structural alterations and the biochemical pathway involved in this process are still unknown[21].

Zusammenfassung. Während submaximaler und maximaler Säurestimulation mit Histalog steigert i.v. Injektion von 340 mg 7-(β-Hydroxyäthyl)-theophyllin und 100 mg Theophyllin (= «OT Homburg») beim Menschen die Magensalzsäurebildung signifikant durch Zunahme der Volumenrate. Die Befunde werden im Hinblick auf die mögliche Bedeutung von zyklischem 3′, 5′-AMP als intrazelluläre Mittlersubstanz bei der Bildung und Sekretion von Magensalzsäure diskutiert.

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Note sur l'innervation des branchies chez *Anguilla anguilla* L.

De nombreux travaux morphologiques ont décrit la structure des organes de la respiration aquatique chez les poissons Téléostéens. Ces contributions ont permis d'expliquer plusieurs phénomènes physiologiques observés au niveau des aires vasculaires et des tissus constituant les branchies. Plus particulièrement, les renseignements rassemblés par Vialli[1], Hughes et Grimstone[2] et puis par Newstead[3] confirment les plus anciennes observations de Biétrix[4] relatant l'existence d'un système contractile associé aux cellules du pilastre.

Récemment, Gilloteaux[5,6] a montré l'intérêt de la technique de fixation-coloration de Maillet appliquée aux Invertébrés. Celle-ci fut utilisée avec succès sur les branchies de l'Anguille. Rapprochant ces résultats de ceux recueillis par Laurent et Dunel[7] à propos de l'innervation de la pseudobranchie chez divers Téléostéens, nous avons remarqué des fibres nerveuses et des corps neuroniques parmi les tissus formant les feuillets branchiaux (Figure 1). Des prolongements nerveux aboutissent à la paroi des artérioles afférentes et efférentes. A la hauteur des fibres musculaires adductrices, nous avons relevé de nombreuses jonctions neuro-musculaires en anneau (Figure 2). Les cellules piliers situées à la base des lamelles sont fréquemment entourées par des faisceaux de prolongements issus de neurones bi- et multipolaires (Figures 3 et 4).

Compte tenu de ces observations, il nous semble possible de penser qu'une régulation nerveuse produirait

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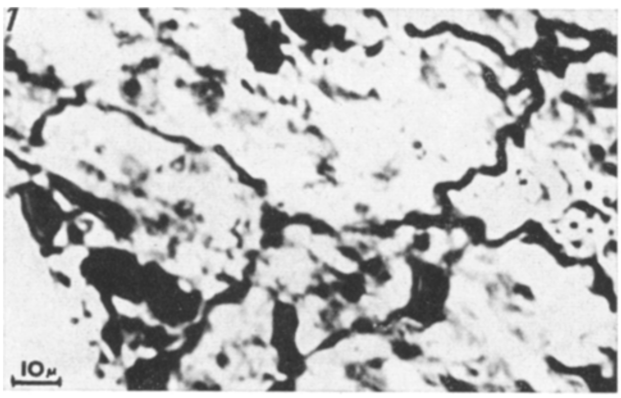

Fig. 1. Neurones et prolongements situés dans l'arête branchiale (Maillet).

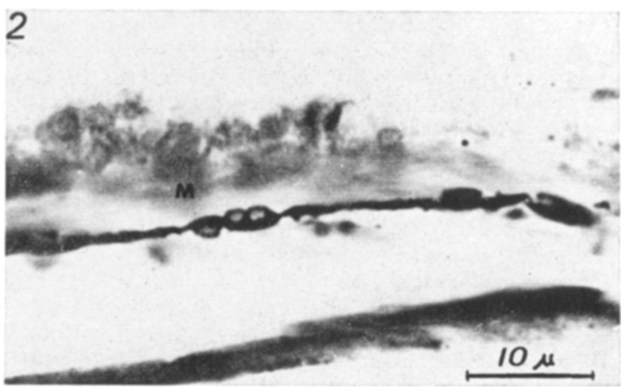

Fig. 2. Jonctions neuro-musculaires en anneau; M, fibre musculaire de l'adducteur des filaments branchiaux (Maillet).

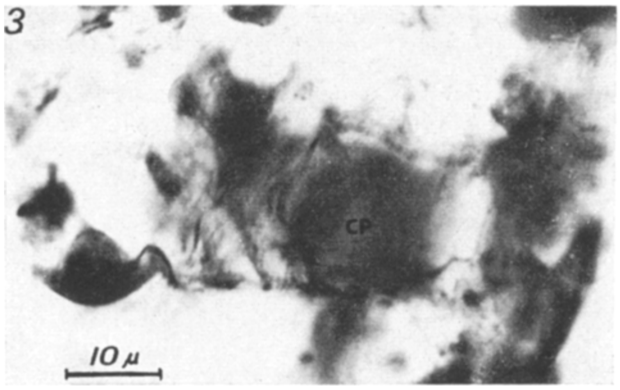

Fig. 3. Neurone dont les prolongements enserrent les cellules piliers (CP) d'un capillaire afférent (MAILLET).

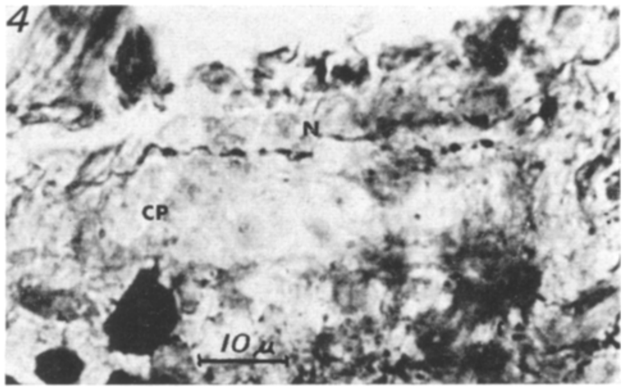

Fig. 4. Prolongement nerveux (N) associé à des cellules piliers (CP) situées à un niveau plus profond (MAILLET).

une contraction ou une relaxation des cellules du pilastre situées dans le feuillet branchial. Dans le cas particulier d'une contraction, l'irrigation des lamelles branchiales serait freinée ou détournée au profit de la circulation efférente. KEYS et BATEMAN[8], STEEN et KRUYSSE[9] ont déjà noté qu'une influence humorale modifie le flux du courant sanguin passant au travers des branchies. Ces structures nerveuses n'excluraient nullement l'existence de l'effet humoral déjà observé et, dans cette éventualité, contribueraient à expliquer ces mécanismes contractiles et leur incidence sur la physiologie des branchies[10].

Summary. MAILLET's technique demonstrated the innervation of pillar cells of the secondary gill lamellae in *Anguilla anguilla* L. Nervous control may work in conjunction with an humoral regulation which would make clearer the understanding of the in- and outflux of blood in the respiratory organs.

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Spikes of Smooth Muscle in Calcium-Free Solution (Isolated Taenia coli of the Guinea-Pig)[1]

During the last few years, evidence has accumulated that the depolarizing current of action potentials in smooth muscle is carried by calcium ions and not by sodium ions, as in nerve and skeletal muscle of vertebrates. This concept is based mainly on the facts that spike discharge of smooth muscle (1) can continue in sodium-free solution, (2) stops in calcium-free solution, (3) is blocked by manganese ions and (4) cannot be blocked by tetrodotoxin[2-6]. Recent experiments by KEATINGE[7], however, have shown that this concept is not applicable to all types of smooth muscle, for example not to arterial smooth muscle, where the spikes seem to be 'sodium spikes'. We have now been able to record spikes in isolated intestinal smooth muscle for several hours when only K^+ and Na^+ were present as cations in the solution.

From the caecum of the guinea-pig, a piece of longitudinal muscle (taenia coli) with an in situ length of 20–30 mm was cut out and pulled into a glass capillary containing platinum wires which were used for recording the electrical activity extracellularly (Tektronix preamplifier type 122). One end of the tissue was connected to a mechano-electric transducer for recording the tension development. The glass capillary was continuously perfused with saline solution. Krebs solution aerated with 95% O_2 and 5% CO_2 was taken as normal. The system was kept at 35 °C by a thermostat.

In comparing different metabolic inhibitors, we noticed a strong stimulating effect of sodium fluoride. Since KLINGENBERG[8] found that NaF causes contraction of uterine smooth muscle even when the tissue is kept in Ca-free solution, we also tested these conditions in taenia coli. If the taenia is kept for a longer time in Ca-free solution (30 min or longer), NaF (5–10 mM) has no effect, or elicits slight electrical activity without tension development. If NaF is given simultaneously with Ca depletion, the phase of decreasing activity, which leads usually in 5–10 min to a complete stop of activity under Ca depletion alone, is prolonged. The spike discharge usually continues with smaller amplitude, or reappears, after the tension development has reached zero. In this phase an additional magnesium depletion leads to an increase

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