biological activity; it is interesting to consider the consequences of acetylating this amino group. We prepared *N-acetyl-oxytocin* (Table XI) and found it to be only about 1/250 as active as oxytocin on the rat uterus and on the rabbit mammary gland. Furthermore, instead of the high avian depressor activity exhibited by the above-mentioned des-amino-oxytocin, N-acetyl-oxytocin shows a slight antagonist effect to oxytocin in the same test. These apparently contradictory results can nevertheless be reconciled if we assume that steric effects play a preponderant rôle in the mechanism of action of oxytocin and that any additional group is detrimental to biological activity.

DU VIGNEAUD's group recently prepared *N-glycyl-oxytocin*, which differs from our N-acetyl-oxytocin only by possessing an additional terminal amino group. This compound also possesses a low oxytocic activity on the rat uterus. It has low avian depressor potency and markedly antagonises simultaneous or subsequent doses of oxytocin in the same test.

Some years ago, our group prepared a homologue of oxytocin containing two tyrosine residues instead of one (*Homo-Tyr*^{2,3}*-oxytocin*). This homologue displayed slight but definite antagonism to oxytocin on the rat uterus as well as on the chicken blood pressure. This was the first observation of an oxytocin-antagonistic effect by an oxytocin-like compound and prompted us to synthesize another homologue of oxytocin containing two isoleucine residues instead of one (*Homo-Ileu*^{2,3}*-oxytocin*). However, this compound has hardly any oxytocic or anti-oxytocic activity.

Investigating the influence of the relative positions of the amide group and of the peptide chain linked to the carboxyl group of the glutamic or aspartic residues of the oxytocin molecule, DU VIGNEAUD's team prepared *isoglutamine*^{4}*-oxytocin* and *isoasparagine*^{5}*-oxytocin*. Both are devoid of oxytocic activity. The first compound was also shown to be slightly antagonistic to the pressor effect of vasopressin.

Conclusions. This review shows that relationships which have so far emerged from a study of the chemical structures and the biological activities of the posterior pituitary hormones and their synthetic analogues are in most cases limited in application. When the first members of a series of analogues are investigated, it frequently seems to be easy to correlate biological properties and chemical peculiarities. However, when a greater number of compounds are investigated, the picture often becomes more complex. Furthermore, it is misleading to draw conclusions from only one type of biological assay, since different tests may give rather divergent quantitative results.

Valid conclusions can only be obtained by systematically comparing a fairly large number of compounds of the same chemical family in a battery of biological tests—as has been done in the present review.

Résumé. Afin de mettre en évidence l'influence de faibles modifications de structure sur les propriétés biologiques, les auteurs comparent, à l'aide d'une série de tableaux systématiques, les structures chimiques et les propriétés pharmacologiques des hormones post-hypophysaires avec celles de près de quarante de leurs analogues synthétiques, qui ont été étudiés d'une manière approfondie. Cette confrontation montre qu'il est possible de découvrir quelques relations limitées entre la spécificité biologique de ces corps et certaines particularités de leur structure.

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The Effect of Sea Water on Cytochrome Oxidase and Oxidative Phosphorylation

In the course of our work on the inhibition of cytochrome oxidase caused by a low molecular substance in the unfertilized sea urchin egg[1], it appeared important to check the influence that sea water might have on the oxidase activity. In fact, unless the eggs are thoroughly washed with some artificial solution, which did not seem to us to be advisable, it is practically impossible to avoid a contamination with sea water. As is shown in the diagram, 0.2 cm^3 of sea water added to the reaction mixture (3.0 cm^3 total) in the Warburg flask cause a 7% decrease of the oxygen consumption which reaches 30% when 0.4 cm^3 of sea water are added. On the other hand, the influence on oxidative phosphorylation is very strong indeed. In fact, as is shown in the Figure, a 30% decrease of the P/O ratio is caused by as little as 0.1 cm^3 of sea water and 0.3 cm^3 depress the ratio by 80%. A series of experiments with artificial sea water from which individual ions were removed and then with each ion separately have proved that Ca^{++} is responsible for the uncoupling effect. This is not surprising in view of the well known effect of Ca^{++} as an uncoupler of oxidative phosphorylation[2].

The possibility that the effect of sea water might have been an apparent one, i.e. due to an inhibition of hexo-

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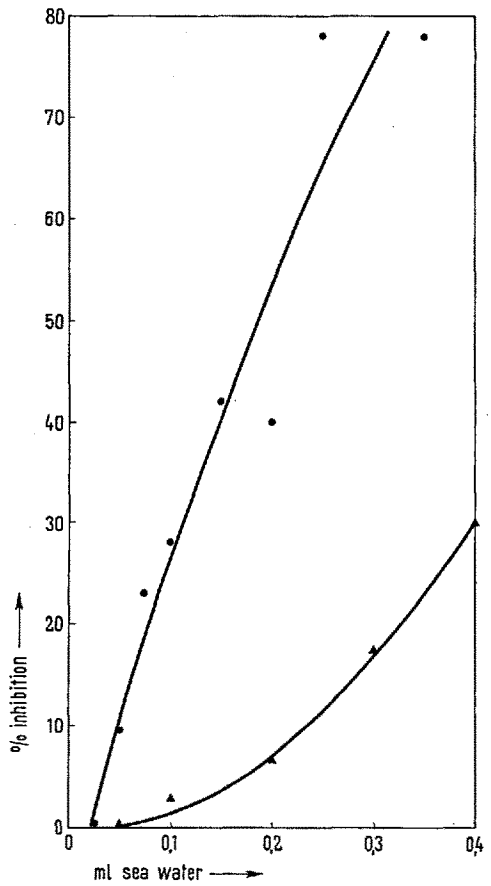

% inhibition of oxidative phosphorylation (●—●) and of cytochrome oxidase activity (▲—▲) of rat liver mitochondria caused by varying amounts of sea water. Technical details as described in the text.

kynase or of glucose-6-phosphate (G-6-P)-dehydrogenase used in the determination of the esterified P, was ruled out.

When working with homogenates of sea urchin eggs, therefore, it appears important to be able to check the amount of contaminating sea water. We have found that the most convenient way to do this is the estimation of Na^+. It is known in fact that the Na^+ content of sea urchin[3] and starfish egg[4] is very small, the prevailing ion being K^+. Therefore, from the estimate of Na^+ in any preparation, the amount of sea water present can be calculated quite accurately. In our practice Na^+ has been determined by flame-photometry.

Our test system consisted of a preparation of rat liver mitochondria; cytochrome oxidase has been estimated manometrically as described by MAGGIO and MONROY[1] and esterified P was determined enzymatically as G-6-P by the use of the dehydrogenase[5].

Riassunto. Piccole quantità di acqua di mare causano una forte inibizione della fosforilazione ossidativa, mentre l'effetto sulla attività citocromossidasica è piuttosto modesto. L'ione responsabile di questo effetto è il Calcio.

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Vergleichende Elektronenmikroskopie reiner DNS und der DNS des Bakteriennukleoids

Die Diskussion um die Existenz eines Bakterienkernes und dessen Struktur war schon lange vor den ersten erfolgreichen Ultradünnschnitten[1] äusserst rege[2–4]. Die Frage nach der makromolekularen Ultrastruktur erfuhr durch die recht verschiedenartigen Ergebnisse und Schlussfolgerungen der einzelnen elektronenoptisch arbeitenden Laboratorien eine neue Belebung[5,6].

Fasst man die stark divergierenden Hypothesen und Deutungen der Befunde in zwei Gruppen zusammen, so stehen Ansichten, in Anlehnung an die Chromosomenstrukturen höherer Organismen, über ein oder mehrere kompakte Bakterienchromosomen, die in einem elektronenoptisch nicht darstellbaren «Kernsaft» schwimmen sollen[7–9] und zum Teil als recht komplexe «Großschrauben» (GIESBRECHT[7,8]) gedeutet werden, diametral den Befunden und Hypothesen der zweiten Gruppe gegenüber[10]. KELLENBERGER et al. zeigen, dass unter bestimmten definierten Fixierungsbedingungen eine von keiner Membran begrenzte, mit homogenem, feinem DNS-Plasma ausgefüllte Kernvakuole beobachtet werden kann. Abweichungen von diesen Bedingungen führen zu elektronenoptisch dichten Körpern, die von den Autoren als Koagulate betrachtet werden. Argumente für diese Folgerungen waren jedoch indirekter Natur[10].

Das Problem kann jedoch unmittelbar angegriffen werden, wenn gezeigt werden kann, dass reine DNS sich gegenüber den Fixierungsbedingungen gleich oder ähnlich verhält wie das DNS-haltige Plasma des Bakterienkernes. Soll reine DNS oder die Bakterien-DNS im Nukleoid im Dünnschnitt dargestellt werden, so ist zu bedenken, dass erst nach einer Fixierung und Dehydratisierung in üblichen Einbettungsmitteln eingebettet werden kann. Was ist bei diesen Vorgängen zu erwarten? Die DNS ist physi-

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