line, peu ou pas potentialisé; il en a été de même pour la choline, étudiée dans quelques essais supplémentaires.

Dans ces conditions, on ne peut s'empêcher de penser que la sensibilisation du rectus de grenouille aux deux esters résulte essentiellement d'inhibitions enzymatiques affectant une AcChE, dans le cas de l'acétylcholine, et une XChE, dans celui de la butyrylcholine, et que, dans cet organe, il n'existe pas de «réserve» importante de l'une ou l'autre estérase.

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Summary

The hydrolysis of acetylcholine chloride (0·01 *M*) by frog's rectus extracts, is inhibited by low concentrations of 3318 CT (CI-50 $3{\cdot}2 \times 10^{-7}$) and high concentrations of D.F.P. (CI-50 $1{\cdot}3 \times 10^{-5}$). Inversely, the hydrolysis of butyrylcholine perchlorate is inhibited by low concentrations of D.F.P. (CI-50 3×10^{-9}) and high concentrations of 3318 CT (CI-50 3×10^{-4}). Both are inhibited by similar concentrations of neostigmine (CI-50 $1{\cdot}1 \times 10^{-7}$ and $1{\cdot}5 \times 10^{-7}$). Frog's rectus thus contains true and pseudo-cholinesterases. The inhibitions produced by D.F.P. added to the muscle itself (and not the extract) correlates well with the potentiation of the corresponding ester. Sensitization to AcCh and to BuCh appears to be specifically related to the inhibition of Ac ChE for the former ester, of XChE for the second one.

Selective Activity of Morphine on the 'EEG Arousal Reaction' to Painful Stimuli

Consulting the accumulated literature on the effect of morphine on the electrical activity of the brain (WIKLER[1]; FUJTA *et al.*[2]; GANGLOFF and MONNIER[3]), it would appear that no systematic investigation has been carried out on the influence of morphine on the central brain stem activating system (MORUZZI and MAGOUN[4]). Many authors, however, have attributed to this system an important role. In fact it was recently demonstrated that potentials evoked by peripheral stimulation may be conducted corticipetally as well through the reticular formation and through the great lemniscal fillets and thalamic relay nuclei (FRENCH *et al.*[5]). It was assumed that the reticular conduction is related to the maintenance of the alert, wakeful state and with the central integration of sensations[6]. A significant feature of the analgesia is that it occurs in the absence of sleep and without impairment of consciousness and of other sensory perceptions. It therefore seemed reasonable to investigate whether the specific analgesic action of morphine corresponded to a selective influence on different types of afferent stimulations which activate the central brain stem desynchronizing system. The present work considers the influence of morphine on the EEG arousal reaction elicited by sensitive, sensorial, noxious and by electrical stimulation of the réticular substance at the mesencephalic and diencephalic level.

The experiments were performed using unanaesthetized uncurarized rabbits. The registrations of the cortical and subcortical activity, together with the stimulation of deep structures, was carried out with a technique described elsewhere (LONGO *et al.*[7]).

The electrical activity of the brain was recorded in the animal at rest and during various types of sensory stimulations (blowing on the nose, buzzer, touching of the back) and of painful stimulations (thermic stimuli applied to the hind leg, pinching of the ear, electrical stimulation of the central end of the cut sciatic nerve and of the auricular nerve). All these kinds of stimulation produce at the cortical and subcortical level a generalized change of the EEG, called desynchronization, or 'arousal response'. This response can also be obtained with electrical stimulation of some deep structures located on the central core of the brain stem (reticular formation) and of the diencephalon (thalamus and hypothalamus). During the experiments, the provocation threshold of the EEG arousal was carefully determined by electrical stimulation of the reticular substance situated in the periaqueductal gray matter at the level of the anterior quadrigeminus body and of the antero-medial nuclei of the thalamus.

After the administration of small amounts of morphine intravenously (5–10 mg/kg), a selective depression of the arousal reaction following painful stimuli can be noticed, while the arousal reaction to the sensory stimuli remains unaltered. At the same time there is a rise in the stimulation threshold of the anteromedial nuclei of the thalamus, not accompanied by a similar variation at the mesencephalic level. As the dose of morphine is increased (10–25 mg/kg), the selective effect becomes less marked and the arousal reaction to any type of stimulation is blocked.

On the other hand, in control experiments small amounts of scopolamine (0·01–0·02 mg/kg intravenously) and Pentobarbital (5–15 mg/kg intravenously) blocked more significantly the sensitivo-sensorial arousal reaction than that provoked by the nociceptive stimuli. Moreover, these drugs act equally on the reticular substance of the thalamus and mesencephalon.

BERNHAUT *et al.*[8], studying the effectiveness of various stimuli in eliciting the arousal reaction, found that the sequence of the stimuli, listed in order to produce an arousal reaction, are: pain, proprioception, auditory stimulation, optic stimulation. The ability of morphine to change this sequence would appear to be highly significant.

One of the more important factors of the analgesic action of morphine is its influence on the differentiation between suffering and pain experience. The patients, after morphine administration, still affirm that they perceive the painful stimulations, but without suffering (WOLFF[9]). This selective blocking by morphine of the arousal reaction with respect to painful stimuli would indicate that it has a specific action on the

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reticular integration of pain, especially at the thalamic level.

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Résumé

L'action de la morphine sur l'activité électrique cérébrale a été étudiée sur le lapin ni anesthésié ni curarisé. La réaction d'arrêt, qui se traduit par une désynchronisation du tracé EEG, consécutive à un stimulus douloureux (stimulation du nerf sciatique, pincement de l'oreille) est abolie par des doses de morphine qui n'influencent pas les modifications analogues du tracé EEG provoquées par les stimulations sensitives ou sensorielles (stimulation olfactive, acoustique ou tactile).

Une telle spécificité, qui n'apparaît pas dans le cas de la scopolamine et des barbituriques (Pentobarbital), peut être mise en rapport avec l'action analgésique caractéristique de la morphine.

Spontaneous Anastomosis Between Surgically Closed Intestinal Loops

In surgical practice it is taken for granted that any transected portion of the alimentary tract can be induced to close and seal its lumen reliably and permanently. In an intestine of small caliber a satisfactory closure can be effected by simply tying it off with a thread which may even be of absorbable material (catgut). Necrobiotic and reparative reactions dispose of the tie and furnish a tissue seal which in due course of time solidifies into a scar. Numerous appendectomies executed with this technique prove that for the human appendix, at least, this method is adequate.

In dealing with intestinal segments of larger caliber a mere ligation is considered insufficient, and recourse is taken to more involved techniques which effect a folding of the intestinal wall over the line of closure bringing the outer, serosal, layer in broad contact with itself. The serosal layer of the intestines possesses marked fibrino- and fibro-plastic faculties which, if utilized properly, render the closure water-tight within seconds; within a few weeks the closed intestines can withstand even excessive strains: abnormally high intra-enteric pressure will dilate the gut and may cause a blow out, but usually not at the point of closure.

This sealing and cicatrizing process can, of course, be halted and reversed by marked failure of local tissue nutrition and by infection. If this occurs the result is a surgical calamity. Herewith are reported observations indicating that suppression of the sealing process can obtain under circumstances not leading to clinical emergencies but, on the contrary, to a fortuitous development. I have observed that intestinal segments closed with proper surgical methods can be made to open after a few days and to establish connection between their lumens. This paradoxical behaviour has been accidentally observed in human patients and to some extent, it has been reproduced in the following experiments:

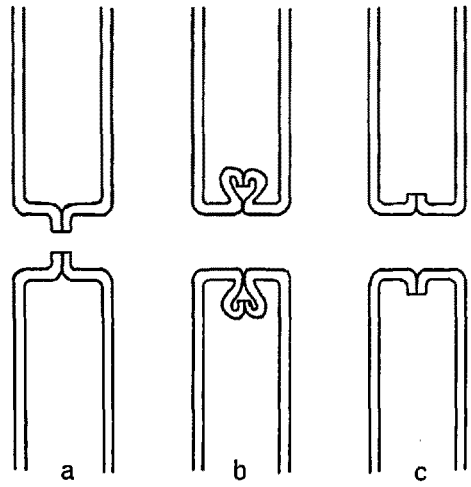
Thiry-Vella loops were prepared in dogs by excluding segments of small intestines, 10 cm long, from the continuity of the alimentary tract and inserting the ends into the abdominal surface. The loops remained, of course, residing in the abdominal cavity with their mesenteric blood vessels intact. The loops were transected at their midpoint, and the resulting cross sections were closed with several standard suture techniques as indicated below. The matching halves of each Thiry-Vella loop were closed identically, fine nylon thread being used.

In 2 instances closure was effected by a single row of non-inverting sutures (Fig. 1*a*).

In 1 instance the non-inverting suture line was covered by a second row of a sero-muscular suture (Fig. 1*b*).

In 2 instances closure was effected by a single row of inverting sutures (Fig. 1*c*).

The closed segments of the Thiry-Vella loops were then brought together by suturing them in axial alinement. Outwardly, they were reconstructed while their lumen was interrupted by a double diaphragm of intestinal wall. The broad, tension-free contact of the serosal coats should have assured smooth and solid healing of the closed ends.



Diagrams of types of intestinal closures used in experiments. (*a*) Mucosa everted. (*b*) Mucosa everted, but burried with Lembert sutures. (*c*) Mucosa inverted. Type *a* and *b* seemed to favor establishment of a spontaneous anastomosis.

Instead, in three out of five a connection established itself between the lumens of the two segments. It was found by irrigating through the orifices of the loops that perforation of the diaphragms occurred between the 9th and the 14th day. This was, of course, verified by autopsy.

It might be significant that in the two instances where the closure remained permanent the suture method used was identical, a single row of mucosa *in*verting sutures, a method that has been found superior but not indispensable for effecting intestinal closure. Conversely, the instability of the other types of closure is probably explained by the presence of everted mucosal wound edges. These mucosal tabs easily provide a nidus of infection in the pocket created by the approximated serosal surfaces. The infection will sustain itself until it erodes the lines of closure and the exudate can drain into the intestinal lumen.