

su uteri poco sensibili all'enteramina) in sostanze ad azione antagonista a quella dell'enteramina, depressiva sul tono e sui movimenti spontanei.

Dobbiamo ritenere sicuramente provato che l'azione eccitante sull'utero esplicata dagli estratti di *Tethium*, di *Ciona stom.*, di *Scyllium*, di *Mustelus int.* e *Mustelus stom.* è dovuta all'enteramina od a una sostanza enteraminosimile: detta azione è infatti abolita o notevolmente indebolita (del 90–95%) in seguito a trattamento dei liquidi con jodato di potassio o con sale di diazonio della paranitroanilina in ambiente alcalino (fig. 1 e 2).

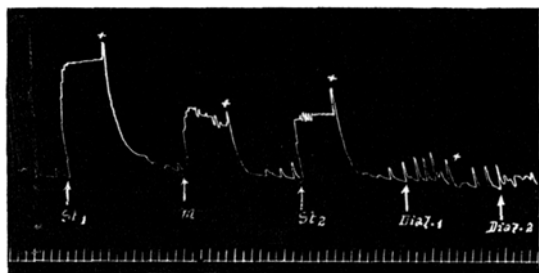


Fig. 1. Utero di topo in estro sospeso in 8 cm³ di liquido di Tyrode atropinizzato a 1:1000000.

St₁ = estratto di *Tethium* (STYELA) II: 0,4 cm³ 2/1.

St₂ = *idem*: 0,2 cm³ 2/1.

M = estratto di milza di bue: 0,2 cm³ 1/10.

Diaz₁ = estratto di *Tethium* II trattato con sale di diazonio della paranitroanilina: 0,2 cm³ 6/1.

Diaz₂ = *idem*: 0,6 cm³ 6/1.

1 cm³ di estratto 1/1 = ovunque a 1 g di tessuto fresco. Tempo: 15 sec.

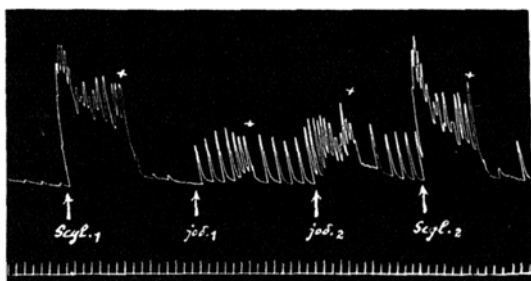


Fig. 2. Utero di topo in estro, atropinizzato.

Scyl₁ = estratto di *Scyllium*: 0,15 cm³ 1/2.

Scyl₂ = *idem*: 0,1 cm³ 1/2.

jod₁ = estratto di *Scyllium* trattato con jodato: 0,2 cm³ 1/1.

jod₂ = *idem*: 0,5 cm³ 1/1.

1 cm³ di estratto 1/1 = ovunque a 1 g di tessuto fresco. Tempo: 15 sec.

Non è stato possibile risolvere il quesito se la debolissima attività spiegata dagli estratti di *Teleosteo* possa o no essere attribuita all'enteramina. La presenza, in quasi tutti i più disparati estratti d'organo, di una modestissima azione eccitante sull'utero lo farebbe legittimamente escludere.

Conclusioni

1) Gli estratti di tubo gastroenterico di *Tethium plicatum* e di *Ciona intestinalis* contengono quantità apprezzabili di enteramina o di una sostanza enteraminosimile. In *Ciona* lo stomaco ne è più ricco dell'intestino. La natura enteraminica della sostanza attiva è

provata dalla sua labilità di fronte a trattamento con jodato e con il sale di diazonio della paranitroanilina.

L'enteramina è quindi presente anche nel tubo digerente dei Tunicati e le cellule descritte dal LISON¹ nello stomaco di *Ciona intestinalis* devono essere considerate perfettamente omologabili alle cellule enterocromaffini dei Vertebrati.

2) Anche gli estratti di mucosa gastrica e, ancor più, quelli di mucosa intestinale di *Selacio* contengono enteramina. La sostanza non sembra invece presente negli estratti gastrointestinali di *Teleosteo*. Questi fatti confermano l'esistenza di strettissimi rapporti d'interdipendenza fra cellule enterocromaffini e enteramina gastroenterica.

3) L'identificazione di sempre nuove localizzazioni dell'enteramina e nei Vertebrati e negli Invertebrati costituisce evidentemente un elemento di primo ordine in favore dell'attribuzione alla sostanza di una notevole importanza biologica.

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Summary

It was possible to demonstrate, by means of chemical and biological reactions, the presence of enteramine or of an enteramine-like substance in gastro-intestinal extracts of two *Ascidia*, *Tethium plicatum* and *Ciona intestinalis*.

The same substance was also found in gastric and still more in intestinal extracts of *Selacia*, but seems not to be present in the spleen of *Selacia* nor in the alimentary canal of *Teleostea*.

¹ L. LISON, C. r. Soc. Biol. Paris 112, 1237 (1933).

Variations in Ca and Mg contents in *Arbacia* eggs as a result of fertilization

According to MAZIA¹ a certain amount of Ca in the eggs of *Arbacia* would pass from a bound to an ionic condition soon after fertilization. Later on, Å. and M. ÖRSTRÖM² were able to state the presence of a KMnO₄-reducing substance in sea water in which sea urchin eggs had been fertilized; a substance which, according to the A.S. is Ca released from the eggs, as a result of insemination.

In view of the great importance of the mineral ions equilibrium in the life processes in general and in the "Entwicklungserregung" in particular, an investigation on the behaviour of the mineral components of sea urchin eggs at fertilization and during the one-cell stage is being carried on. A preliminary account is given here about some variations I was able to find in the Ca and Mg contents of the eggs during the first hour after fertilization; data concerning the other inorganic components will be reported in a later paper.

Eggs of *Arbacia pust.* were collected at various intervals after fertilization, washed in M-urea, rapidly centrifuged and dried at 100°–120° C: the same washing and drying procedure was applied to unfertilized eggs. The dry matter was ashed (at 500°–600° C) and the ashes

¹ D. MAZIA, J. cell. a. comp. Physiol. 10, 291 (1937).

² Å. et M. ÖRSTRÖM, Protopl. 36, 475 (1941/42).

were dissolved in dilute HCl; samples of such a solution were analyzed for Ca (CLARK's method¹) and for Mg (tested as NH_4MgPO_4 , according to BRIGGS²).

The results (expressed as per cent of dry matter) are summarized in the following table; the analytical data will be dealt with extensively in a later paper.

Table 1

	unfertilized	fertilized		
		15 min.	30 min.	1 hour
Calcium ..	0.21 $\pm$ 0.003	0.13 $\pm$ 0.032	0.109 $\pm$ 0.0006	0.155 $\pm$ 0.00001
Magnesium	0.16 $\pm$ 0.00013	0.106 $\pm$ 0.0013	0.081 $\pm$ 0.0007	0.084 $\pm$ 0.0006

From the above data a marked decrease in Ca and Mg contents of the eggs is evident in the first minutes after fertilization; it reaches its maximum after $\frac{1}{2}$ h: i. e. 48.1% of Ca and 49% of Mg. After 1 h there is again an increase, which is much more marked for Ca than for Mg (29.7% of Ca and 3.7% of Mg, with respect to the $\frac{1}{2}$ h values); the increase in Mg is however statistically controlled.

These variations appear to take a similar course as the other chemical and physico-chemical ones which occur in the eggs after fertilization.

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Zoological Station, Naples, August 13, 1946.

Zusammenfassung

Es werden die Veränderungen im Ca- und Mg-Gehalt der Eier von *Aybaea pust.* während der ersten Stunde nach der Befruchtung untersucht. Es wird ein Ca- und Mg-Verlust mit Höhepunkt eine halbe Stunde nach der Befruchtung festgestellt.

¹ G.W. CLARK, J. biol. Chem. 49, 487 (1921).

² A. P. BRIGGS, J. biol. Chem. 59, 255 (1924).

Sex-linkage in *Culex molestus*

A white-eyed mutant arose in a stock of the mosquito *Culex molestus* (= *C. pipiens autogenicus*). This behaved as a recessive. Heterozygotes crossed to recessives gave $48.45 \pm 0.76\%$ white-eyed, and recessives mated together gave $27.36 \pm 0.71\%$ white-eyed. Dominance and penetrance were complete. When however the male was heterozygous, most of the white-eyed flies were of the same sex as the white-eyed paternal grand-parent. *Culex* has no sex chromosomes. All our results can be explained if maleness is due to a single dominant gene M, and the recessive gene w for white eye is in the same chromosome with it, with $6.3 \pm 0.6\%$ crossing-over between the two loci. Thus $\frac{mw}{mw} \text{♀} \cdot \frac{m+}{M+} \text{♂}$, that is to say the mating of white-eyed females with heterozygous males whose mothers had white eyes, gave

41 + ♀, 711w ♀, 824 + ♂, 47w ♂;

$\frac{mw}{mw} \text{♀} \cdot \frac{m+}{M+} \text{♂}$ gave

409 + ♀, 30w ♀, 39 + ♂, 376w ♂,

and corresponding results were obtained in the F_2 .

These results are closely parallel to those obtained in *Lebistes* and other Cyprinodont fishes. It seems likely that this simple and perhaps primitive type of sex-linkage may be fairly common. It may be remarked that the genetical behaviour of white eye in *Culex molestus* is formally the same as that of a gene in the same chromosome as the gene for heterostylism in those species of *Primula* in which illegitimate fertilization is impossible.

B. M. GILCHRIST, J. B. S. HALDANE

London School of Hygiene and Tropical Medicine and University College, London, August 12, 1946.

Résumé

Culex molestus n'a pas de chromosomes sexuels. Le caractère «œil blanc» est récessif, mais ce phénotype apparaît avec des fréquences très différentes chez les ♂♂ et les ♀♀ issus d'un père hétérozygote. La masculinité est due à un gène dominant situé dans le même chromosome que «œil blanc», et à six unités de celui-ci, environ.

Über die Verwendung von künstlichen radioaktiven Isotopen zur Erzielung von lokalisierten biologischen Strahlenwirkungen

(II. Direkte Einspritzung in biologisches Gewebe, speziell in Tumorgebiete)

In vorangehenden Mitteilungen¹ hat Verfasser eine Methode beschrieben, welche bezweckt, künstliche radioaktive Isotope zur Erzielung von lokalisierten biologischen Strahlenwirkungen (Strahlentherapie) zu verwenden. Diese Methode beruht auf der Entwicklung eines geeigneten Präparationsverfahrens, welches darin besteht, daß das radioaktive Isotop in einem Sol oder Gel großer fadenförmiger Moleküle suspendiert wird, wodurch die wichtige Bedingung einer maximal eingeschränkten Diffusion des radioaktiven Substrates außerhalb des Anwendungsortes erfüllt wird. Zur Verwendung kamen bisher Suspensionen von *Radiozink* (Zn^{63}) in einem *Pektinsol*, welcher für medizinische Zwecke speziell zubereitet wurde (CH. WUNDERLY²). Wie bereits mitgeteilt, gelingt es auf diese Weise, das eine intensive *Positronen-* und *γ-Strahlung* emittierende *Radiozink* intraperitoneal zu applizieren (bei Peritonealkarzinosen), *eo ipso* auch in Hohlorganen, wie z. B. in der Harnblase usw. In den vorangehenden Mitteilungen wurde darauf hingewiesen, daß es auf diese Weise voraussichtlich auch gelingen würde, ein künstliches radioaktives Isotop *direkt in einen Tumorgebiet* einzuführen. Über inzwischen durchgeführte Versuche, welche diese Vermutung bestätigen, wird im folgenden kurz berichtet.

Tierversuche

Beim *Kaninchen* wurden teils *subkutan* (unter die Rückenhaut), teils *intramuskulär* (in die Hinterlaufmuskulatur), in Einzelmengen von ca. 3 cm³, radiozinkhaltiges Pektinsol eingespritzt. Zwei Stunden später haben wir eine Menge von ca. 5 cm³ Blut aus der Ohrarterie entnommen und mittels einer empfindlichen Zählrohrapparatur³ auf Radioaktivität ge-

¹ J. H. MÜLLER, Exper. 1, 6 (1945). Gynaecologia Vol. 121/3 (1946); Radiologia clinica, 1946 (im Druck).

² CH. WUNDERLY, Helv. chim. acta 27, 417 (1944).

³ Diese Zählrohrapparatur wurde dem Verfasser von der Isotopenkommission der Schweizerischen Akademie der Medizinischen Wissenschaften in entgegenkommender Weise zur Verfügung gestellt.