6° Le curve di attività specifica della L-α-gliceril-fosforilcolina e L-α-glicerilfosforiletanolamina hanno pure esse un decorso simile.

7° La sintesi dei fosfatidi contenenti colina (lecitina e probabilmente i fosfosfingosidi), o etanolamina (fosfatidiletanolamine e acetalfosfatidiletanolamina) oppure serina (fosfatidilserina) si attua attraverso tappe omologhe, secondo lo schema: fosforil-base azotata → citidindifosfato-base azotata → fosfatidil-base azotata.

8° La degradazione della fosfatidilcolina e della fosfatidiletanolamina (probabilmente anche della acetalfosfatidiletanolamina) dà origine alla L-α-glicerilfosforil-base azotata corrispondente.

N. MIANI e G. BUCCIANTE

Istituto di Anatomia, Università di Padova, il 16 settembre 1957.

Summary

The rate of turnover of individual P-compounds, related to the metabolic cycle of some phosphatides, was followed *in vivo* in the brain of rats a few days old after ^{32}P administration. The phosphorylcholine is the precursor of the cytidinediphosphatecholine; this in turn may be the precursor of lecithin. The L-α-glyceryl-phosphorylcholine represents the degredation product of lecithin. The specific activity curves of the phosphoryl-ethanolamine and phosphorylserine are similar to that of the phosphorylcholine; likewise the L-α-glycerylphosphorylethanolamine is similar to the activity curve of the L-α-glycerylphosphorylcholine.

On the Incorporation of S^{35}-Methionine in Artificially Activated Sea Urchin Eggs

In a previous paper the results were described of experiments in which the distribution of S^{35} labelled DL-methionine among cell fractions of unfertilized and developing sea urchin eggs was studied (NAKANO and MONROY[1]). In that investigation advantage was taken of a newly developed technique which allows efficient incorporation of radioisotopes in the unfertilized sea urchin eggs (NAKANO and MONROY[2]). It was shown that in the unfertilized egg the isotope is mainly stored in the fraction soluble in 10% trichloroacetic acid (non-protein fraction, called 'TCA-soluble fraction') while only a minor percentage is taken up by other cell components. This situation does not substantially alter upon storage of labelled unfertilized eggs up to 6 h. Upon fertilization and initiation of development, a depletion of radioactivity of this fraction takes place; this process is very rapid during the first few hours of development and then slows down progressively. At the same time a rapid uptake of isotope is observed in the mitochondria fraction; this follows an exponential course during the first 6 h of development and afterwards proceeds almost linearly.

It appeared then interesting to make a similar investigation on eggs artificially activated, in which no morphogenesis takes place.

Also, in the present investigation, S^{35}-DL-methionine has been used which was incorporated in the unfertilized eggs by the injection of 10–20 μc into the body cavity of adult females of *Paracentrotus lividus*, as previously described (NAKANO and MONROY[2]).

[1] E. NAKANO and A. MONROY, Exper. Cell Res. (in press).
[2] E. NAKANO and A. MONROY, Exper. *13*, 416 (1957).

Activation was obtained by a 45 s treatment of the egg suspension with butyric acid (7 ml of 0·1 *N* butyric acid in 100 ml of egg suspension). The acid was then quickly neutralized with 0·7 ml of 1 *N* NaOH. Membrane formation soon took place. The eggs were then washed three times with sea water and finally divided into three batches which were allowed to develop under gentle shaking at room temperature (about 21°C). A sample of non-activated eggs was also collected.

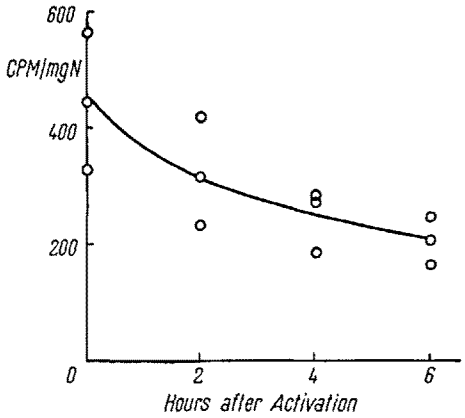


Fig. 1. – Decrease of the activity of the TCA-soluble fraction during the first 6 h after artificial activation of eggs of *Paracentrotus lividus*. The 0 time is the activity in the unfertilized eggs.

The butyric acid activation results, as it is known, in membrane formation and in a succession of monaster cycles. After a couple of hours, the eggs begin to form irregular furrows which give rise to blastomere-like formations. In the course of several hours the eggs undergo cytolysis.

In the present experiments the eggs were collected 2, 4 and 6 h after activation. The washed eggs were homogenized and the homogenate was fractionated as previously described (NAKANO and MONROY[1]). Three such experiments were performed and the results are illustrated in the accompanying diagrams.

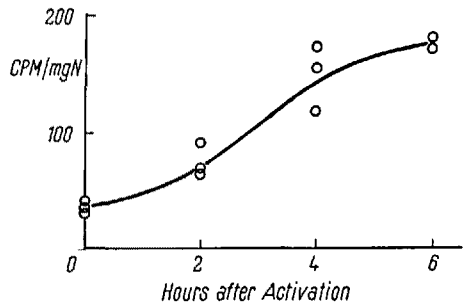


Fig. 2. – Uptake of the isotope by the mitochondria fraction of artificially activated eggs of *Paracentrotus lividus*.

The activity of the TCA-soluble fraction undergoes a decline which is rapid during the first 2 h and then proceeds more slowly (Fig. 1). The reverse is true for the mitochondria fraction in which the uptake of the isotope follows an exponential course (Fig. 2).

These results can thus be well superimposed on those obtained in the case of normally fertilized and developing eggs. This may suggest that these processes, taking place during the first few hours, which in the fertilized eggs correspond to the cleavage period, depend on activation itself rather than on morphogenesis.

This investigation was supported by Grants from Consiglio Nazionale delle Ricerce and the Rockefeller Foundation.

E. NAKANO*, G. GIUDICE, and A. MONROY

Laboratory of Comparative Anatomy, The University of Palermo (Italy), September 19, 1957.

Riassunto

Metionina-S^{35} è stata incorporata in uova vergini di *Paracentrotus lividus*. In queste l'isotopo si trova per la più gran parte nella frazione solubile in acido tricloracetico al 10%. Attivando le uova partenogeneticamente con acido butirrico si osserva una progressiva perdita di attività di questa frazione ed una rapida incorporazione nei mitocondri. L'andamento del fenomeno è del tutto identico a quello già descritto (NAKANO e MONROY) nelle uova normalmente fecondate.

* From the Biological Institute, Nagoya University, Japan. Aided by a Grant from the Rockefeller Foundation.

Efficacité de la cystéamine, administrée par ionophorèse, contre une dose focalisée de rayons X

La cystéamine et la cystamine, administrées immédiatement avant une irradiation protège la souris contre une dose de rayons X létale pour tous les témoins. Ces corps se classent parmi les meilleurs protecteurs connus jusqu'à présent[1].

Dans le cadre de nos travaux sur la radioprotection, nous avons recherché si ces substances avaient une action locale sur une irradiation locale.

Matériel et méthode. Afin d'éliminer toute action éventuelle d'un excipient, nous avons administré la cystéamine *in loco* par ionophorèse.

Le train postérieur du rat est soigneusement rasé avant l'expérience. Une solution de cystéamine à 1% imbibe une compresse entourant la cuisse droite, tandis que du liquide physiologique imbibe la compresse enserrant la cuisse gauche. Ces deux tampons sont reliés aux électrodes d'un appareil d'ionisation fonctionnant sous 3,5 mA, pendant 20 min. La cystéamine est à l'anode.

L'irradiation est effectuée immédiatement après l'ionisation, avec les constantes physiques suivantes: 50 KV, 2 mA, D.F. 4 cm, Filtre 0, débit: 2000 r/min.

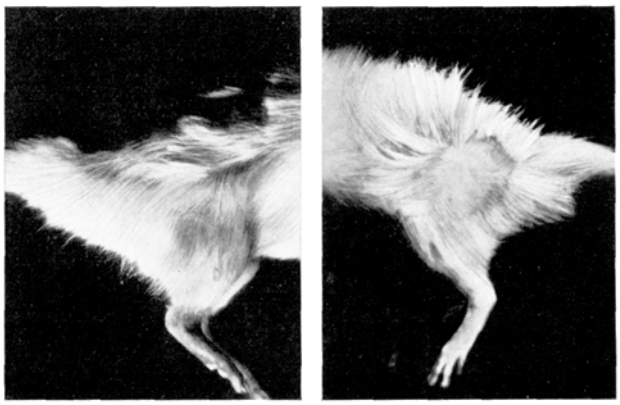
La repousse des poils sert de test.

Nos expériences ont porté sur 10 rats.

Résultat.

Avec notre technique, la dose minimum épilante, sans lésions d'épidermite grave est comprise entre 800 et 1200 r. Tous nos animaux ont reçu 1000 r sur chaque cuisse.

Trois semaines après l'irradiation, la peau a terminé sa réaction épithéliale, et les zones irradiées présentent un aspect rasé légèrement luisant et sans poils, tandis qu'autour du champ réapparaît un duvet léger. Il faut environ un mois pour que les poils repoussent en nappe régulière sur les zones rasées et non irradiées. A ce moment la zone protégée par la cystéamine est couverte d'un duvet à peine moins abondant que la peau avoisinante. La zone témoin irradiée sans protecteur reste glabre.



Ce phénomène s'accentue deux mois après l'irradiation. La zone protégée ne se distingue plus de la peau normale, tandis que sur la patte témoin persiste une zone exempte de poils (Figure).

Discussion. Il n'existe guère, dans la littérature de recherches consacrées à l'action radioprotectrice locale après application locale.

FORSSBERG[2] a montré l'effet protecteur de la cystéine injectée par voie intradermique contre l'épilation de la peau du cobaye; HOFFMANN[3] avec la même substance, a pris comme test l'érythème; DARCIS *et al.*[4] ont étudié l'action de la cystéamine sur la muqueuse vaginale du rat irradié par voie endocavitaire à l'aide d'un tube de Radium. L'examen des frottis leur ont permis de mettre en évidence un effet protecteur sur les cellules de cet épithélium. On pouvait se demander si la cystéamine devait être résorbée dans le torrent circulatoire pour être efficace. Nos expériences prenant comme test une zone témoin et une zone protégée chez le même animal, semblent prouver qu'il s'agit surtout d'un phénomène de radioprotection locale.

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Instituts de Radiologie, de Pathologie et de Physiothérapie de l'Université de Liège (Belgique), le 13 septembre 1957.

Summary

(1) Cysteamine given locally by ionisation to the skin of the rat, immediately before irradiation, protects the skin against the depilation induced by an X-ray dose of 1000 r.

(2) In our experiments, a control area is chosen on the same animal. It seems that the action of the protective substance is a local phenomenon.

[1] Z. M. BACQ et A. HERVE, Bull. Acad. Méd. Belg. *17*, 13 (1950). – Z. M. BACQ, Bull. Acad. Méd. Belg. *18*, 425 (1953). – Z. M. BACQ et A. HERVE, C. R. Soc. Biol. *149*, 1509 (1955). – A. HERVE et Z. M. BACQ, J. Radiol. Electrol. *33*, 551 (1952).

[2] A. FORSSBERG, Acta radiol. *33*, 296 (1950).

[3] D. H. HOFFMANN, Strahlentherapie *96*, 396 (1955).

[4] L. DARCIS, P. HOTTERBEEX et C. ONKELINX, Exper. *12*, 286 (1956).