

heartbeat suggests the possibility that thyrothyrene may play a role in the symptomatology of Grave's disease, and so the present experiments may have a bearing on the therapeutic action of thiouracil.

Microincineration of Sea Urchin Eggs during Cleavage

In connection with previous studies on the physiology of fertilization in sea urchin^{1,2,3} and with some works being carried on actually on the inorganic metabolism during fertilization⁴ it became evident that a cytological analysis of the ashes distribution in the same material during fertilization and cleavage, could be of interest.

Eggs of *Paracentrotus liv.*, *Arbacia pust.* and *Sphaerechinus gran.* unfertilized and in various periods of the one-cell stage after fertilization, were fixed in formalin, sectioned after paraffin inclusion and incinerated according to the Policard's technique.

In the cytoplasm of unfertilized eggs the ashes are quite regularly distributed (fig. 1). Sometimes they are arranged around vacuoles. But that may be considered as an artefact. There is also a slight accumulation of ashes towards the cortex, the outermost part of which is extremely resistant to incineration. I think this to be due to the lipidic constitution of the cortex.

After fertilization this picture does not change in the very first moment. The fertilization membrane shows no ashes.

When the eggs reach the stadium of the maximum expansion of the spermaster, the ashes do show a radial arrangement towards the central part of the egg, where the nucleus came to lie (fig. 2). MONNÉ⁵ has expressed the opinion that the radiation of the spermaster "is formed by radial orientation of the fibrils of the structured phase around the nucleus". It would be of interest to decide whether the inorganic material is bound to the "structured" phase or to the "enchylema". But so far this must be left open.

In a later stage, when the radiation is gradually flattened and transformed in the so-called "nuclear streak", the radial orientation of ashes entirely disappears. Fine ashes do then clearly accumulate in the equatorial zone of the egg, whilst the remainder of the cytoplasm — with exception of a large cortical zone — seems to contain only a very scant amount of ashes (fig. 3). This accumulation of ashes preceeds the formation of the little spindle, which develops inside the nuclear streak (MONNÉ⁵), and is much more extended than the true little spindle itself.

At the time the spindle is fully expanded it shows a very strong concentration of ashes and all around the spindle figure the ashes are radially arranged (fig. 4 and 5). The material of the spindle proves to be markedly resistant against incineration. This may perhaps be due to its high content of ribonucleic acid, as it was pointed out by BRACHET⁶. The zone of the astrospheres is somewhat poorer in ashes and sometimes appears even com-

pletely free of it. The accumulation of ashes in the spindle remains evident up to the end of the cleavage and no difference was found in the various stages of the mitotic cycle. There is also no change in the picture of the cortical layer.

The high content of inorganic material in the spindle seems to be important. BERNAL¹ has considered the spindle figure as a tactoid made up of long-shaped protein particles. Furthermore it was stated that the

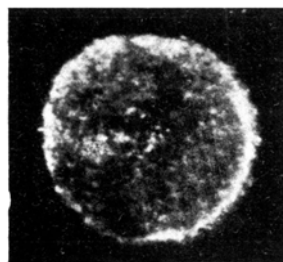


Fig. 1. Unfertilized egg.

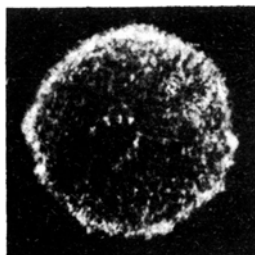


Fig. 2. Spermaster stage.

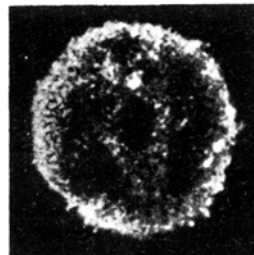


Fig. 3. Stage of nuclear streak.

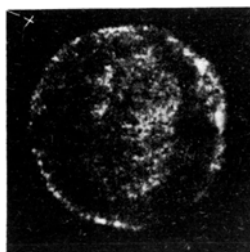


Fig. 4. Egg in metaphase.

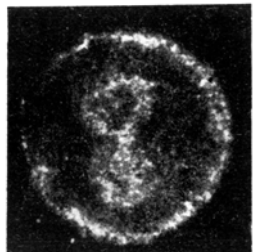


Fig. 5. Egg in anaphase.

Ashes distribution in eggs of *Paracentrotus liv.*

amount of salts plays an important part in the arrangement of the particles in the tactoid itself². On the contrary one has to bear in mind that SCOTT³ failed to find any ashes in the spindle in mitosis of somatic cells. However in the particular case of the sea urchin egg my results, together with those of the chemical and ultrastructural analysis, can perhaps lead nearer to the insight of the nature of the spindle. A. MONROY

Zoological Station, Naples, October 15, 1946.

Zusammenfassung

Im Zytoplasma der unbefruchteten Seeigeleier sind die Aschen gleichmäßig verteilt; gegen die Kortikal-

¹ A. MONROY and A. MONROY ODDO, Boll. Soc. ital. Biol. sper. 20, 237 (1945); Pubbl. Staz. zool. di Napoli, 20, 46 (1946).

² A. MONROY, Exper. 1, 335 (1946).

³ A. MONROY and G. MONTALENTI: Nature 158, 239 (1946).

⁴ A. MONROY-ODDO, Exper. 2, 371 (1946).

⁵ L. MONNÉ, Ark. Zool. 35 A, N. 13 (1944).

⁶ J. BRACHET: Acta biol. Belg. 2, 13 (1942).

¹ J. D. BERNAL, Publ. amer. Ass. adv. Sci. 14, 199 (1940).

² J. D. BERNAL and J. FANKUCHEN, J. gen. Physiol. 25, 111 (1941).

³ G. H. SCOTT, Bull. d'Hist. 7, 251 (1930).

schicht sind sie hingegen etwas angehäuft. Nach der Befruchtung, im Sperma-Stadium, ordnen sich die Aschen radiär um den zentral gelegenen Kern. Eine starke Aschenansammlung findet sich an der Stelle der Spindel.

Urine Therapy

In 1927 I described¹ how recurrent herpes could be cured by vaccinating the contents of a mature vesicle into the skin of the fore-arm, a procedure not dissimilar to the small-pox vaccination. After an incubation period of a few days this auto-vaccination with the patients own (weakened) virus, is followed by a general feeling of discomfort and malaise which is often accompanied by a slight rise in temperature, pains in the limbs and sore throat. When these symptoms have subsided, the herpes does not recur at all, or only after a very long time. This therapy has since been used extensively and has proved its value².

Consequently, the discovery that hepatitis infectiosa is a virus disease transmitted by means of the excrements induced me to try autovirus therapy against this disease too, but using the urine of the patient for vaccination. The result of the trial was that the icterus disappeared, the enlarged liver which had been sensitive to pressure shrank and lost its sensitivity, the intestinal complaints improved, the general feebleness disappeared, the van der Bergh reaction of the urine diminished, and all the other symptoms of the hepatitis infectiosa subsided. These cures were observed whether the cases were acute or of long standing.

Following up this experience it was natural to attempt the treatment of other virus diseases with urine. Consequently I am now able to report that urine injections have a beneficial effect upon whooping-cough and mumps, though the number of cases so treated is as yet far too small to allow of a definite judgement as to the effects and efficiency of this method of treatment. The response of whooping-cough to the urine treatment led me to believe in the virus rather than in the bacterial origin of this disease.

In fact my recommendation to use the urine of the infected person for auto-vaccination is only an extension of the methods of JENNER and PASTEUR and therefore it is strange that auto-urine vaccination has not been used before. The main difference between the PASTEUR-JENNER methods and auto-urine therapy lies in the fact that by inoculating the fresh urine of the patient the active infectious material has been weakened by passage through the recipients own body. I am convinced from my experience that it is worth while investigating this method systematically with respect to all infectious diseases.

Moreover, during the application of this therapy I observed some remarkable effects. Among my first patients whom I treated by the urine therapy there was a typical case of asthma. Immediately after the first injection and before the vaccination effect had time to develop, this patient lost his daily attacks of asthma. Following up this clue, I found that anaphylactic persons could be desensitized by the auto-urine injection. Subsequent investigations convinced me that the auto-urine therapy could be used with considerable advantage

against all kinds of anaphylactic diseases, such as hay-fever, urticaria, disfunction of the intestinal tract such as cramps, meteorism, etc. It relieved migraines and other spastic conditions.

Since I started the auto-urine therapy two years ago I have given several hundred injections and I have not come across a single case where the patient suffered any harm. It is for this reason and because the method is so simple that it can be used by any practitioner without any difficulties, that I decided to publish my findings at this early stage. The observations which I have quoted are without doubt sufficient to indicate to the expert that a completely new field of research is being opened up which may entail considerable additions to our knowledge of bacteriology, immunology and serology. A first step in this direction will obviously be the examination from an immunological point of view of the substances secreted in the urine in the course of the various infectious diseases, in the same systematic manner in which the blood and other body fluids have been examined.

Practical considerations

The fresh urine of men is practically sterile, and that of women too if the exterior genitalia have been cleaned previously. For purposes of immediate injection the urine therefore may be collected directly into sterile vessels. If the urine is to be stored, it must be filtered through a fine grade bacterial filter by means of a suction pump. Since most of the active substances in the urine are unaffected by short boiling, the urine can be sterilized. There is evidence that some of the active substances such as those which affect anaphylaxis, are weakened by this treatment. The urine may also be made suitable for prolonged storage by addition of the usual disinfectants (Phenol etc.).

The application is very simple indeed. The most suitable method is intragluteal injection. When using urine as an auto-vaccine I found that usually one injection of a quarter to a half cm³ of fresh urine is sufficient. In anaphylactic cases I have found it useful to start with 5 cm³ of fresh urine and to repeat the injections with diminishing doses down to ½ cm³ of fresh urine. After the first injection, the subsequent doses are not administered until the previous reaction has subsided i.e. at intervals of 3-7 days.

Effects of the urine injections

Almost without exception the first injections are completely painless but may be sometimes associated with a feeling of limping. After several injections an Arthus effect may develop. The point of injection may develop an interstitial inflammation and oedematous swelling. These local reactions usually disappear within 30 hours. Neither with fresh nor with preserved urine have I ever found purulence or necrosis.

On the other hand the general reaction of the organism may be of many different kinds. In most cases the patient does not suffer any undue distress. Now and then the temperature may rise to 100° F a few hours after the injection, but only for a brief period. Perhaps the most characteristic reaction to this therapy is the very intense psychological depression which has been commented on by many patients.

Generally speaking, there are many analogies between the effect of the urine injection on the human and the anaphylactic shock as observed in experimental animals. The effect on animals consists mainly of sneezing, tickling of the nose, restlessness, discharge of

¹ J. PLESCH, Die Bläschenerkrankung (Pusulosis), Z. klin. Med., 106 (1927).

² HRUSZEK, Derm. Z. 68, 27 (1933); Brit. J. Dermat. and Syph. 46, 296 (1934); Proc. R. S. M. 35 No. 1 (November 1941).