SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE EFFECT OF ULTRA-VIOLET IN PRODUCING FUSION OF EGGS OF CHAETOPTERUS

DURING the summer of 1926 at the Marine Biological Laboratory, Woods Hole, Massachusetts, while repeating some experiments on the effects of ultra-violet radiation on eggs of *Chaetopterus* before insemination, in order to preserve series of them for cytological study, I noticed during the cleavage stages a tendency of the eggs to fuse. Such fused eggs developed as far as the trochophore stage, as many as fifteen eggs frequently taking part in the fusion. This result is best obtained by an exposure of sixty to seventy seconds, the eggs being 21.5 cm distant from a Cooper-Hewitt mercury vapor arc lamp. Since the effect of ultra-violet radiation at lower exposures, namely, thirty, forty and fifty seconds, produces profound alterations of the cortex, as I shall show in a forthcoming paper, I assume that the fusion due to longer exposures is likewise attributable to changes in the cortex. For example, in observations made on eggs inseminated after radiation, on August 12, I found the next day innumerable fused eggs. Some fused masses were made up of twelve to fifteen eggs. Subsequently, it was learned that fusion is more readily brought about in dishes containing closely crowded eggs, and in dishes with few eggs in which the eggs are brought into close proximity. The fusion therefore, is primarily the result of radiation, and not of overcrowding, since of two equal lots of eggs from the same female—one lot inseminated with and one without previous exposure to the ultra-violet rays and suspended in equal volumes of sea-water—fusion takes place only in the exposed lot. Eggs centrifuged before insemination, that show while living a gray cap which after fixation with solutions containing osmic acid proves to be a disk of oil drops, behave in the same way.

Ultra-violet radiation has another interesting effect on eggs of *Chaetopterus*. In the swimming stage, the single trochophores show the apical tuft of long cilia displaced sometimes as much as 90°. In the majority of cases, however, this displacement amounts to about 75°. This result seems to indicate a change in the original organization of the egg. While it is true that ultra-violet radiation induces some eggs to differentiate without cleavage, the types here described show fairly normal cleavage, especially after the shorter exposures.

I might point out also that at times normal fertilized eggs of *Chaetopterus* used during these observations failed to form a yolk lobe. This is invariably a sign that the eggs are not in optimum condition.

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A SIMPLE METHOD FOR EXPERIMENTAL PARTHENOGENESIS

HYPERTONIC sea-water is undoubtedly the simplest method for the experimental initiation of development. Hypertonicity is brought about by the addition of concentrated salt solution to the sea-water. The salts most commonly used are sodium, potassium and magnesium chloride. In practice, one makes up a 2.5 M solution of the first or second, or a 1.25 M solution of the third, varying proportions of the molar solution and sea-water being employed.

A very simple method for experimental parthenogenesis is as follows. To clean filtered sea-water, crystals of Na_2SO_4 are added to excess. After the supernatant sea-water has become perfectly clear, it is decanted. Eggs exposed to this sea-water plus Na_2SO_4 for thirty to sixty minutes show a high per cent. of cleavage and plutei on return to normal sea-water. While in the solution, the eggs show separated membranes. A nicer method is to take the supernatant sea-water after the addition of the Na_2SO_4 in excess and add it to sea-water in varying proportions. For example, one may set up dishes in a series, the first of which contains the Na_2SO_4 sea-water solution alone; the second, nine parts of the solution plus one part of normal sea-water; the third, eight and two parts respectively; the fourth seven and three, etc. To each dish equal amounts of eggs from the same female are added. Eggs are then transferred at fifteen-minute intervals during a period of two hours. In this way one may take into account any variations in response of eggs during a given season to exposure to hypertonic sea-water.

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THE AMOUNT OF OSMIC ACID IN FIXING SOLUTIONS NECESSARY TO BLACKEN FAT

FIXING agents containing osmic acid are generally conceded to be the best for cytoplasmic fixations. There are several difficulties that militate against successful results with such agents. Preparations which the worker oftentimes describes as "over-osmicated" stain very poorly with Heidenhain's iron hematoxylin. Since this stain is so generally employed by cytologists fixatives containing osmic acid are less frequently used than others. Bouin's, for example, is many times preferred. Some of the difficulties in the way of successful results with osmic acid in combination with