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Modification of Development in Arbacia Punctulata on the Basis of Differential Susceptibility to Certain Alkaloids.

MARIE A. HINRICHS.

From the Department of Physiology, The University of Chicago.

In order further to test the effects of the alkaloids, Pilocarpine, Atropine, and Caffein upon development of *Arbacia* embryos, the following experiments were made: Fertilized eggs were allowed to develop in the various concentrations of alkaloids, as in previous experiments reported in the preceding paper, and in a paper by Mathews.[1] A 0.5% solution was used as a stock solution, from which dilutions were made from 0.1 to 10 cc. per 100 cc. of sea water.

The eggs were allowed to develop for 48 hours, after which time micrometer measurements were made of arm length, body length, arm width across the tips, width of the base, and the base and hypotenuse of a triangle which would include the oral lobe in optical section. Twenty-five embryos were measured from eggs of each of 3 females, for each concentration studied, and compared with the controls, measurement for measurement. On the basis of these calculations, it was possible to obtain percentage values for each dimension which indicated increase or decrease in growth rate relative to the same dimension in the control.

It was found that there may be either stimulation or inhibition of development in *Arbacia larvae,* and that the effect is dependent on the concentration of alkaloid used. As previously observed, Atropine is more strongly inhibitory than either Pilocarpine or Caffein, and Pilocarpine is more strongly stimulative than either Atropine or Caffein. Also, it was obvious that the effect in any case was differential. The regions of most rapid growth, *i. e.,* the oral lobe region, and the aboral arms and median region between them, are most rapidly and most completely modified in their rates of growth. Both differential stimulation and inhibition were obtained with each alkaloid, depending on the concentration used.

[1] Mathews, *Am. J. Physiol.,* 1901, vi.