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ENERGETICS OF TELEOST DEVELOPMENT

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This work is part of a long-range project to establish the biochemical parameters of cellular differentiation, especially as expressed during embryogenesis. The morphological alterations which have been used to denote stages in development have been quite thoroughly described for many species. However, the chemical events which underlie these gross changes remain largely undiscovered.

Because of their availability in large quantities and their well described development pattern, the embryos of choice were of the teleost Fundulus heteroclitis. The object of the present investigations is to assess the role of the quantity and source of adenosine triphosphate (ATP) in the maintenance and control of embryo development. Earlier reports from this laboratory have established that cyanide prevents the consumption of oxygen by embryos of F. heteroclitis, as measured polarographically. Furthermore, morphogenesis was arrested and this effect could be reversed by removal of the cyanide, even if the embryos had been in cyanide for five days. This latest series of investigations was directed toward further expanding our knowledge of this reversible cyanide effect on embryos.

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FINE STRUCTURE OF SALT-REGULATING EPITHELIA

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Comparative studies on the electron microscopy of salt-glands and other epithelia concerned in transport and exchange were extended to additional forms especially among invertebrates. In holothurians in addition to the respiratory trees, the tree of urns and the haemal rete have been examined. The external gills (ceratia) of nudibranchs and gills in nereids have been prepared for subsequent study.

From the work to date on the alkaline (Marshall's) gland of the male skate it is evident that there are marked variations in stage of the secretory cycle in different areas of the same gland. In some cells (resting) the golgi areas are inconspicuous and the mitochondria are grouped around the nucleus. The apical surface shows fusiform vesicles and residues which may be related to water resorption as suggested in certain bladder epithelia. In other areas most of the cells (active) show markedly hypertrophied golgi regions throughout the apical half of the cell. Intermediate conditions show distended endoplasmic reticulum and abundant glycogen. Secretory capillaries seem to be variable in occurrence between cells of the simple epithelium.

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