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The Mechanisms of Nutrient Distribution in Pluteus Larvae of the Sea Urchins, *Lytechinus Variegatus* and *Eucidaris Tribuloides*

Bethany Kesselring
Illinois Wesleyan University

William B. Jaeckle, Faculty Advisor
Illinois Wesleyan University

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THE MECHANISMS OF NUTRIENT DISTRIBUTION IN PLUTEUS LARVAE OF THE SEA URCHINS, *LYTECHINUS VARIEGATUS* AND *EUCIDARIS TRIBULOIDES*

Bethany Kesselring and William B. Jaeckle*
Department of Biology, Illinois Wesleyan University

In the larvae of the sea urchins, *Lytechinus variegatus* and *Eucidaris tribuloides*, neither the body spaces (coeloms) nor the skin (ectoderm) is directly connected to the digestive system. As there are no specific blood "vessels" in these larvae, the entire body cavity represents a circulation system. Nutrients to be delivered to these tissues must move through the body cavity from the stomach and intestine, which are the primary sites for nutrient assimilation. The motive force for material flow through the body cavity may be the cilia of a "kidney" apparatus, a derivative of the left axocoel (coelom).

This kidney function involves the pore canal-hydropore complex, a fenestrated epithelium containing podocytes. There is also unidirectional trafficking of coelomic fluid out of the hydropore, which is analogous to metanephridia in the adult sea urchin (Ruppert and Balser 1986).

Larvae were incubated in a seawater solution of the iron-containing protein, ferritin, and the carbohydrate (polysaccharide), iron dextran. Samples of larvae were taken every 3 hours over a 24-hour period and then preserved in formalin. The spatial distribution of ferritin and iron dextran within larval bodies was determined using the "Prussian Blue" reaction. The absence of the blue label would be indicative of either an absence of nutrients within the body cavity or an inability of these cells to absorb the macromolecules.

The presence of label in both the cells of the axocoel and pore canal-hydropore complex suggested kidney-like functioning, via a pore canal structure that extends from the left axocoel to the outside of the larval body. Both areas contained blue label while all other coeloms were unlabeled. Also, label was detected at the basal side of the cells of the epithelium, implying there was movement through the blastocoel.