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GILL BLOOD FLOW AND AMMONIA EXCRETION IN Myoxocephalus scorpius

L. Goldstein, R. P. Forster, and G. M. Fanelli, Harvard University, Boston, Mass., and Dartmouth College, Hanover, N. H.

A method was developed to measure gill blood flow while quantitative evaluations of branchial ammonia excretion were being made. Gill blood flow was determined with oxygen by application of the Fick Principle. The average gill blood flow as 1,665 ml/kg hr (95% c.l. = 1,283 - 2,047 ml/kg hr). This value was used to estimate the contribution of ammonia preformed in the blood to total ammonia excreted by the gills. Extraction of ammonia from blood passing through the gills could account for approximately 60% of the excreted ammonia. The remaining 40% could be accounted for by the extraction of plasma α-amino acid-N. These results indicate that both blood ammonia and plasma amino acids are sources of ammonia excreted by the gills of the marine teleost, Myoxocephalus scorpius.

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CHANGES IN PROTEIN COMPONENTS DURING SAND DOLLAR EGG DEVELOPMENT

R. C. Herold, University of Pennsylvania, Philadelphia, Pa.

Preliminary experiments on the isolation of the mitotic apparatus from the sand dollar, E. parma, were conducted in conjunction with E. Palincsar. In initial experiments we attempted to use the methods of Mazia et al. developed for some other sea urchin eggs. These were not successful with our material and required modification.

Some of the basic problems encountered were:

1. The timing of the mitotic stages in the sand dollar is not well established. There seems to be a rather large natural variation in the eggs of even a single female and of course a much larger variation among several females. These factors drastically reduce the yield of mitotic apparatus.

2. The permeability of sand dollar eggs to dithiodiglycol reagent, which stabilized the mitotic apparatus, was much lower than in other sea urchin systems. This characteristic of the sand dollar egg was overcome by using high concentrations of the reagent.

After overcoming various problems, we developed protocols which resulted in reasonable yields of 'mitotic apparatus.'

Isolated 'mitotic apparatus' was solubilized in 0.53 M. KCL and run in disc electrophoresis. We were able to isolate one major slow moving protein band and two minor fast moving components which stained with Amido-Schwarz. Unfixed samples of the disc electrophoresis runs were stained with Methyl Green-Pyronin mixture of Brachet. The slow moving major component and one of the fast moving minor components stained with pyronin. These tests suggest that the 'mitotic apparatus' consists mainly of RNA-protein components.

Experiments were continued on the time relationships between the limb regeneration process and metabolism in the hermit crab, Euparagurus acadinesis.