

Developmental Changes in the Level of Vitellin-immunoreactive Proteins  
in Hemolymph and Tissues of the Blue Crab, *Callinectes Sapidus*:  
Relation to Vitellogenesis

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Abstract

Female blue crabs (*Callinectes sapidus*) were assigned to 1 of 6 stages based on oocyte development. An immunohistochemical study showed vitellin (Vn)-immunoreactivity was absent from ovaries in stages I and II, and was present in stages III, IV, V, and VI (postspawning). Vn-immunoreactivity was not detected in hepatopancreas, regardless of stage. Hemolymph vitellogenin (Vg) was quantified by enzyme-linked immunosorbent assay. Vg was not detected in hemolymph of stage I and II animals, but was detected in some animals in stages III, IV, V, and VI. The percentage of crabs having detectable hemolymph Vg was 17% (III), 32% (IV), 73% (V), and 100% (VI). Mean Vg levels were  $0.02 \pm 0.01$  mg/ml (III),  $0.02 \pm 0.04$  mg/ml (IV),  $0.12 \pm 0.15$  mg/ml (V), and  $0.14 \pm 0.04$  mg/ml (VI). The facts that Vg was present at low concentration in only a portion of the vitellogenic crabs, and that the level of Vg did not reach maximum until after spawning, are not consistent with the hypothesis that Vg is synthesized by extraovarian tissues and transported via hemolymph to the ovaries. It is possible that the presence of Vg in hemolymph may be a result of leakage of yolk proteins from the ovary due to oocyte reabsorption. The existence of atypical, possible atretic, oocytes in stage V and VI ovaries is consistent with this hypothesis. Considered together with the results of previous studies, these findings suggest that the ovary is the exclusive site of Vn synthesis in *C. sapidus*.