

# Vitellin and Vitellogenin of the Beet Armyworm, *Spodoptera exigua* Expression, Titer, and Purification

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Previous study in our laboratory showed that egg production of *Spodoptera exigua* adults is induced by juvenile hormone I and II (JH I and JH II, respectively). To further analyze the effect of JH and other gonadotropins on vitellogenesis, molecular markers such as vitellogenin (Vg) and vitellin (Vn) need to be characterized. A female-specific protein in the hemolymph was found in 180 kDa. This protein was not found in newly emerged females, but its titer increased with female development and followed gonadotropic cycle. Similar, but a little smaller sized ( 170 kDa) protein was found in egg extracts. Immunoblotting showed that both proteins reacted specifically with antiserum raised against Vn of *S. litura*. These results indicate that these two proteins are Vg and Vn of *S. exigua*, respectively.

To get antiserum against Vn of *S. exigua*, Vn was extracted from the oocytes of 3 days old females. The extracted proteins were fractionated by different concentrations of ammonium sulfate. Vn fractions were combined and subjected to DEAE-ion exchange chromatography, concanavalin-A affinity column, and finally G-100 size exclusion chromatography. The purified Vn was used for raising its antiserum.

Decapitated males and females were used for analyzing gonadotropin effect because this therapy could get rid of the source of JH and other brain factors. Exogenous JHs (JH I, JH II, and JH III), fenoxycarb, 20-hydroxyecdysone, and RH-5992 were applied on decapitated adults and compared in their inducing effect on Vg biosynthesis. All JHs and their analog were effective to induce Vg synthesis in females. In males, however, only JH I could induce Vg synthesis in the tested JHs. Males also could synthesize significant amount of Vg in response to RH-5992. These results suggest that *S. exigua* use ecdysteroid as well as JH for effectively inducing Vg biosynthesis like *S. frugiperda*.