

Protein Synthesis and Ecdysteroidogenesis in Prothoracic Glands of the
Tobacco Horworm (*Manduca sexta*): Stimulation by Big
Prothoracicotropic hormone

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Abstract

The 28-kDa size variant of prothoracicotropic hormone (big PTTH) stimulates ecdysteroidogenesis by prothoracic glands of *Manduca sexta*. In the present studies, big PTTH stimulated in vitro incorporation of [³⁵S]methionine into proteins of prothoracic glands from Day 7 last instar larvae. In 2-hr incubations, big PTTH elicited an ~2-fold increase in total protein-specific activity. The effect appeared to be tissue specific, as big PTTH had no effect on incorporation of label into proteins of control tissue (fat body). Electrophoretic separation of tissue homogenates, followed by autoradiography and densitometric analysis, revealed increased incorporation of radiolabel into numerous glandular proteins. The result suggested that the effect of big PTTH was a general stimulation of protein synthesis, not specific stimulation of a subset of glandular proteins. Big PTTH-stimulated ecdysteroidogenesis was inhibited by cyclobeximide, indicating that the increase in protein synthesis is a requisite for enhanced hormone production. Analysis of gland incubation media revealed numerous radiolabeled proteins. The effect of big PTTH on incorporation of [³⁵S]methionine into media proteins was considerably more variable than the effect of big PTTH on tissue incorporation. The result is consistent with the hypothesis that prothoracic glands may release proteins in addition to ecdysteroids.