The molecular basis of cholesterol uptake system in an insect steroidogenic organ prothoracic gland

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Cholesterol is an indispensable lipid for normal growth, development and reproduction of insects, utilized for a component of cellular membrane and a substrate of steroid hormone. Since insects have lost the ability to synthesize *de novo* cholesterol, the requirement of cholesterol is fulfilled by dietary sterols. Although the sterol metabolism in insects has not been fully understood, it is of interest that insects could have developed abilities to uptake and/or metabolize the dietary derived sterols.

Here we report a molecular basis of cholesterol uptake system in the prothoracic gland which produces a steroid hormone, ecdysone. The analysis of the sterol composition in the silkworm larvae showed that the cholesterol concentration in the prothoracic gland and the hemolymph gradually increased along with the periodic increase of the ecdysteroid titer in the hemolymph. Moreover, the expression of *lpr* and *npc1a*, which could be involved in cellular cholesterol transport from lipoprotein particles, also increased along with the ecdysteroid titer. These results suggested cholesterol uptake was in active during a period of ecdysteroid synthesis. Additionally, we discuss the effect of prothoracicotropic hormone (PTTH), which was secreted by the brain and stimulated the prothoracic gland to release ecdysone, in the cholesterol uptake system.