Photoperiodic regulation of juvenile hormone biosynthesis in the brown-winged green bug, *Plautia stali*

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Plautia stali (Heteroptera: Pentatomidae) shows a long-day photoperiodic response with respect to the control of adult diapause. For understanding neuroendocrine mechanisms underlying the photoperiodic response, we compared juvenile hormone (JH) biosynthetic activities by the corpus allatum (CA) between females under long days (LD 16:8) and those under short days (LD 12:12) at 25°C, and examined neurons projecting to the corpus cardiacum-corpus allatum complex (CC-CA). The JH biosynthetic activity increased in females reared under LD 16:8, as the ovaries developed. In contrast, the activity remained low under LD 12:12. Dye fills through the nervi corporis cardiaci to the brain stained 6-8 pairs of somata in the pars intercerebralis (PI) with contralateral axons, and 3-5 pairs in the pars lateralis (PL) with ipsilateral axons. When the CC-CA of females under LD 16:8 was coincubated with a part of the brain including PI and PL somata but excluding optic lobes from females under LD 12:12, the JH synthetic activity was lower than that without the brain. The results suggest that the brain has inhibitory roles in JH biosynthesis under short-day conditions, and neurons in the PI or PL projecting to the CC-CA might be involved in its inhibitory roles.