



Juvenile hormone action inducing neotenic differentiation in the damp-wood termite

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Termite castes exhibit distinctive morphologies specialized in colony tasks. In basal termite species, working immatures termed “pseudergates” differentiate into castes depending on extrinsic factors such as social interactions. When reproductives in a colony die, pseudergates differentiate into supplementary or replacement reproductives called neotenics. Despite juvenile morphological characteristics, neotenics develop reproductive organs and genital structures as primary reproductives. Juvenile hormone (JH) is known to be responsible for the caste differentiation in termites, although the patterns of JH titer and downstream factors have yet to be elucidated in the neotenic differentiation. A recent previous study in the damp-wood termite *Hodotermopsis sjostedti*, established a method inducing neotenic differentiation by artificially manipulating sex ratio of reproductives in experimental colonies. In this study, therefore, JH quantification and expression analyses on the putative downstream genes were carried out during the neotenic differentiation. JH titer and the downstream genes (*Met*, *Kr-h1*) were shown to be temporarily lowered, but increased just prior to the molt into neotenics. In contrast, a transcription factor *E93* that acts downstream of ecdysone was up-regulated at earlier stage of the neotenic differentiation, suggesting that the activation of *E93* under low JH titer may lead the neotenic differentiation. Furthermore, it was predicted that the downstream factors of JH were regulated in the body part-specific manner, since the body part-specific morphogenesis in the caste differentiation is induced by JH, which is a global factor carried throughout the body by circulatory systems. Comparisons of expression levels among body parts

showed that the downstream genes were highly expressed in abdomens, suggesting that the downstream responses of JH lead developments of gonads and genital structures in the neotenic differentiation.

