

Characterization of Transcription Factors
Regulating Insect Development and Exploration
of Venom Components of a Parasitoid Wasp
Disrupting Host Insect Development

January 2022

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A Dissertation Submitted to
the Graduate School of Life and Environmental Sciences,
the University of Tsukuba
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy in Science
(Doctoral Program in Biological Sciences)

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Abstract

Multicellular organisms develop into mature adults through post-embryonic development. During post-embryonic development, organisms are exposed to various environmental stimuli, such as nutrients, temperature, and humidity. Therefore, post-embryonic development is regulated by a combination of genetic factors and responses to environmental stimuli. On the other hand, such regulatory mechanisms can be disrupted by parasitism by other organisms. The regulatory mechanisms post-embryonic development remains elusive to date due to their complexity.

Here, I studied the mechanisms of regulation and disruption of insect development, mainly using the fruit fly, *Drosophila melanogaster*, and an endoparasitoid wasp, *Asobara japonica*. In Chapter 1, poly(A) binding protein (Pabp) is demonstrated to play an important role in the production of ecdysteroid, a principal steroid hormone in insects, via nuclear localization of a transcription factor Molting defective. In Chapter 2, I characterize a transcription factor, Pdm3, that improves cold resistance by negatively regulating ecdysteroid biosynthesis. In Chapter 3, venom components of *A. japonica* disrupting host development were explored, and 63 venom candidate genes were identified. The findings offer insights that could enhance the understanding of the regulatory mechanisms of homeostasis and disruption of insect development.