

(様式5)

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学 位 （ 博 士 ） 論 文 要 旨

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論文題目	Mechanisms of nodule-specific melanization in the hemocoel of the silkworm, <i>Bombyx mori</i> カイコガ, <i>Bombyx mori</i> のノジュール特異的メラニン化反応の分子機構				
論文要旨 (和文要旨(2000字程度)または英文要旨(500words)) The most famous immune response corresponding to microbial infection of insects is melanization reaction via the prophenoloxidase activation cascade. This immune response occurs after recognition of pathogen-associated molecular patterns (PAMPs) by its recognition proteins. Beyond that, nodule formation (a cellular response) in which blood cells co-aggregate with microorganisms to defend self-body from microbial spread and sterilize bacteria by melanization reaction, and are considered as may be a preferential target for melanization. Bactericidal activity produced in the process is derived from the reactive oxygen species (ROS), however, ROS do injury not only microorganisms but self-tissues. Thus, it is conceivable for insects to have a cunning strategy to melanize specifically microorganisms in the formed nodules. However, the mechanism of nodule-preferential melanization remains to be explored. In this study, we identified several mechanisms of nodule-preferential melanization by analyzing congregation and the activation of several factors involved in the prophenoloxidase (proPO)-activating system in the silkworm, <i>Bombyx mori</i> . Microorganism-binding assays revealed that <i>B. mori</i> larval plasma have an effective invading microorganism-surveillance network consisting of at least six pattern-recognition receptors (PRRs). We also found that a hemolymph serine proteinase, BmHP14, can bind to <i>S. cerevisiae</i> . Pull-down assays showed that PRR C-type lectins form protein complexes with serine proteinase homologs, BmSPH1 and BmSPH2, which leads to the activated forms of BmSPH1 and BmSPH2 being gathered on microorganisms and trapped in nodules. Immunostaining analysis revealed that most factors in the proPO-activating system and irritating to antimicrobial peptide-producing system exist in the granules of hemocytes which can gather in nodules. Western blot analysis showed that factors in the proPO-activating system are congregated in formed nodules by their concentration in plasma and aggregating hemocytes.					