Hormonal control of pupal commitment and programmed cell death

1999 Fiscal Year Final Research Report Summary

Hormonal control of pupal commitment and programmed cell death

Research Project

Project/Area Number

09440273

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

一般

Research Field

生物形態・構造

Research Institution

Kanazawa University

Principal Investigator

SAKURAI Sho Department of biology, Kanazawa University, Professor, 理学部, 教授 (80143874)

Co-Investigator(Kenkyū-buntansha)

IWAMI Masafumi Department of biology, Kanazawa University, Associate P., 理学部, 助教授 (40193768)

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ecdysone / juvenile hormone / determination / apoptosis / anterior silk gland / forewing disc / 翅成虫原基

Research Abstract

Present research determined and showed the followings during the propqsed period.
(1) Hormone titer : Hemolymph juvenile hormone and ecdysteroid titers were determined every 12 h for JH during a period from third stadium to pupation and every 2 h for ecdysteroids from 4th stadium through pupation.

(2) Pupal commitment of for wing discs : The change in commitment in wing discs was found to be finished for 16 h after last larval ecdysis. 20-Hydroxyecdyosne did not accelerate the rate of the change and JH failed to suppress the change at a physiological dose. JH also did not affect the change in commitment by. 20E. The change in commitment may be initiated at the time of head capsule slippage (HCS). After HCS, the discs became responsive dramatically to 20E while lost their responsiveness to JH. The discs of early 4th stadium, that were not pupally committed by 20E in vitro, were able to be pupally committed by two step incubation, first with no hormone followed by 20E challenge. In such conditions, the discs were pupally committed and the commitment was strongly suppressed by JH at a concentration lower than physiological one.
(3) Programmed cell death of anterior silk gland : Apoptosis of anterior silk gland is induced by 20E in vitro. After 20E challenge, gene expression and protein synthesis necessary for the death were completed within 8 and 18 h, respectively. Nevertheless, 20E must be present for 42 h for completion of the death. Along with other evidence, 20E was suggested to act after 18 h through a membrane-bound receptor and the second messenger is cyclic AMP. Seven early genes have been cloned and five of them exhibited homology of known genes in other animals but two did not possess open reading frame. Analysis of their function is under progress.

Research Products (18 results)

All | Other

All | Publications (18 results)

[Publications] Niimi S, Sakurai S: "Developmental changes in juvenile hormone and…"J. Insect Physiol.. 43. 875-884 (1997)

[Publications] Oda Y, Iwami M 他: "Dynamics of haemolymph sorbitol-6-phosphate…"Insect Biochem. Mol. Biol.. 27. 461-468 (1997)

[Publications] Sakurai S, Kayama M, 他: "Hemolymph ecdysteroid titer and ecdysteroid…"J. Insect Physiol.. 44. 867-881 (1998)

[Publications] Oda Y, Umerima M, 他: "Role of ecdysteroids in the dynamics of insect…"Zool. Sci. 17. 785-789 (2000)

[Publications] Terashima T.他: "Programmed Cell death triggered by insect…"Dev. Gens Evol.. 210. 545-558 (2000)

[Publications] Tsuzuki, S. 他: "Ecdysteroid-inducible genes in the programmed…"Insect biochem. Mol. Biol.. (印刷中). (2000)

[Publications] Niimi S. and Sakurai S.: "Developmental changes in juvenile hormone and juvenile hormone acid titers in the hemolymph and in vitro juvenile hormone synthesis by corpora allata of the silkworm, Bombyx mori"J.Insect Physiol.. 43. 875-884 (1997)

[Publications] Yoshida I., Tsuzuki S., Salam S.E.A., Ino M., Korayem A.M., Sakurai S. and Iwami M.: "Bombyxin F1 gene : Structure and expression of a new bombyxin family gene that forms a pair with bombyxin B10 gene"Zool Sci.. 14. 615-622 (1997)

[Publications] Oda Y., Iwami M., Osanai M. and Sakurai S.: "Dynamics of haemolymph sorbitol-6-phosphate and its control by ecdysteroid in the larvae of the silkworm, Bombyx mori"Insect Biochem.Mol.Biol.. 27. 461-468 (1997)

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[Publications] Sakurai S., Kaya M. and Satake S.: "Hemolymph ecdysteroid titer and exdysteroid-dependent developmental events in the last-larval stadium of the silkworm, Bombyx mori : role of low ecdysteroid titer in larval-pupal metamorphosis and a reappraisal of the head critical period"J.Insect Physiol.. 44. 867-881 (1998)

[Publications] Moto, K., Salam, S., Sakurai, S. and Iwami, M.: "Gene transfer into insect brain and cell-specific expression of bombyxin gene"Dev.Genes Evol.. 209. 447-450 (1999)

[Publications] Singtripop, T., Wanichacheewa, S., Tsuzuki, S., and Sakurai, S.: "Larval growth and diapause in a tropical moth, Omphisa fuscidentalis Hampson"Zool.Sci.. 16. 725-733 (1999)

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[Publications] Oda, Y., Uejima, M., Iwami, M. and Sakurai, S.: "Role of ecdysteroids in the dynamic of insect haemolymph sugar"Zool.Sci.. 17. 785-789 (2000)

[Publications] Terashima, T., Yasuhara, N., Iwami, M. and Sakurai, S.: "Programmed cell death triggered by insect steroid hormone, 20-hydroxyecdysone, in the anterior silk gland of the silkworm, Bombyx mori"Dev.Genes Evol.. 210. 545-558 (2000)

[Publications] Tsuzuki, S., Iwami M. and Sakurai, S.: "Ecdysteroid-inducible genes in the programmed cell death during insect metamorphosis"Insect Biochem.Mol.Biol.. (in press).

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