

昆虫の神経ペプチドホルモン：分子と組織応答

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| 著者 | 桜井 勝 |
| 著者別表示 | Sakurai Sho |
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1996 Fiscal Year Final Research Report Summary

Neuropeptide hormone of insect : molecular mechanisms and tissue responses

Research Project

Project/Area Number

06304005

Research Category

Grant-in-Aid for Scientific Research (A)

Allocation Type

Single-year Grants

Section

総合

Research Field

生物形態・構造

Research Institution

Kanazawa University

Principal Investigator

SAKURAI Sho Kanazawa U., Dep.Biology, Professor, 理学部, 教授 (80143874)

Co-Investigator(Kenkyū-buntansha)

YAMASHITA Okitsugu Nagoya U., Dep.Sericulture, Professor, 農学部, 教授 (50023411)

MIZOGUCHI Akira Nagoya U., Dep.Biology, Asso.Professor, 理学部, 助教授 (60183109)

HAYAKAWA Yoichi Hokkaido U., Inst.Low Temperature, Asso.Professor, 低温科学研究所, 助教授 (50164926)

KATAOKA Hiroshi Univ.Tokyo, Dep.Agricultural Chemistry, Asso.Professor, 農学部, 助教授 (60202008)

IWAMI Masafumi Kanazawa U., Dep.Biology, Asso.Professor, 理学部, 助教授 (40193768)

Project Period (FY)

1994 - 1996

Keywords

Research Abstract

The present scientific research project has been carried out over 3 years from the 1996 to 1998 fiscal year. The initial objective was elucidation of the molecular mechanisms underlying insect metamorphosis and embryonic diapause in respect to the expression of neuropeptide hormones and their physiological effects and we consider to have reached the goal at an appreciable level.

Bombyxin, an insulin-related neuropeptide, consists of 30 gene copies and their expression pattern in *Bombyx* genome and the nucleotide sequences of upstream region of all the 30 genes have been accomplished. Bombyxin receptor has also been elucidated by cDNA cloning to possess the tyrosine kinase domain similar to insulin receptor. Ultra-micro assay method of bombyxin was developed using time-resolved fluoroimmunoassay (TR-FIA) which enabled to quantify a very small amount of the hormone as low as few atto-moles and to determine the detailed changes in hemolymph bombyxin concentrations through the larval-pupal-adult period. The same method became applicable to measurement of hemolymph PTTH titer, which showed a daily secretion of PTTH even before head critical period (HCP). PTTH secretion is stimulated by a neurotransmitter, acetylcholine, indicating that acetylcholine neuron may be involved in the regulation of PTTH cells. As a part of elucidation of molecular mechanisms of PTTH stimulation of prothoracic glands, purification of PTTH receptor and elucidation of its physical properties are in progress. Expression dynamics of diapause hormone (DH) mRNA showed to be different in embryonic and larval stages of animals that are destined to produce diapausing eggs from those to produce non-diapausing eggs. One of the major DH effects was involved in the expression of trehalase gene in ovary. DH gene was expressed in 3 clusters of neurosecretory cells in suboesophageal ganglion. DH is processed and secreted from the posterior cluster while pheromone biosynthesis activating neurohormone which is processed from the same precursor molecule as DH is secreted from the anterior and middle clusters. As described above, the present research project succeeded to give fundamental knowledge on understanding the molecular mechanisms of neuropeptide hormones involved in insect metamorphosis. ▲ Less

Research Products (21 results)

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| All | Other |
|-----|-------|

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| All | Publications (21 results) |
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- [Publications] Y. Nomura et al.: "Purification and characterization of hemolymph 3-dehydro-eedysone 3b-reductase of the silkworm, *Bombyx mori*." Insect Biochem. Mol. Biol.26. 249-257 (1996) ▼
- [Publications] H. Kondo et al.: "Multiple gene copies for bombyxin, an insulin-related peptide of the silkworm *Bombyx mori* : structural signs for..." J. Mol. Biol.259. 926-937 (1996) ▼
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- [Publications] A. Ohnishi et al.: "Growth-blocking peptide titer during larval development of parasitized and cold-stressed armyworm." Insect Biochem. Mol. Biol.25. 1121-1127 (1995) ▼
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- [Publications] Y. Yagi et al.: "The brain neurosecretory cells of the moth *Samia cynthia ricini* : immunohistochemical localization and developmental..." Dev. Growth Differ.37. 505-516 (1995) ▼
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