

Neuropeptide hormone of insect : molecular mechanisms and tissue responses

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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

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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)

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] Yang, W.J.: "Amino acid sequence of a peptide with moltinhibiting activity from the kuruma prawn Penaeus japonicus." Peptides. 17. 197-202 (1996) ▼
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