

Occurrence and role of N- -alanyldopamine in the cuticle and pigments of insects

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1987 Fiscal Year Final Research Report Summary

Occurrence and role of N- β -alanyldopamine in the cuticle and pigments of insects

Research Project

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60540457

Research Category

Grant-in-Aid for General Scientific Research (C)

Allocation Type

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動物発生・生理学

Research Institution

Kanazawa University

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N β -Alanyldopamine / β -Alanine / Dopamine / Kynurenine / Papiliochrome / Papilio / Drosophila / 昆虫クチクラの硬化

Research Abstract

The following five researches were carried out. (1) Level changes of β -alanine, dopamine, and N- β -alanyldopamine (NBAD) during the pupal stage of *Papilio xuthus* (Lepidoptera) were investigated. The accumulation and excretion of β -alanine at the emergence of butterfly were also studied. Judging from both the present results and the results of previous papers, it is probable that both kynurenine and NBAD are incorporated from haemolymph into the wings or scales and there combine to each other to form the pale yellow pigment (Papiliochrome II). (2) Some chemical properties of the deep yellow pigment (Papiliochrome M) in the wings of *Papilio machaon* was studied. The results have clearly shown that the pigment is also composed of both kynurenine and NBAD. (3) The red pigment of the wings of *Pachlioptera aristolochiae* was confirmed to be a β -alanine-containing quinone pigment. It is probable that the red pigment is an oxidation product of NBAD or N- β -alanyl noradrenaline by phenol oxidase. (4) Chemical properties of the

pupal cuticle of yellow (y), black (b), and ebony (e) of *Drosophila melanogaster* were investigated. The cuticle of y is yellowish brown and hard, and produces much more β -alanine and a little less ketocatechol than in b and e. The protein content is lower than in b and e. On the other hand, the cuticles of b and e are white and plastic, and the β -alanine content is only a little or zero, and the release of ketocatechol on acid hydrolysis is larger. The protein content is higher. For further study of chemical properties of these cuticles, 4% HCL-methanol extract has been confirmed to be suitable. And (5) the accumulation of insoluble-bound form of β -alanine during the pupal stage of *Papilio xuthus* was investigated. Apart from the accumulation of soluble-bound form of β -alanine (Papiliochrome II) shortly before emergence, the insoluble-bound form of β -alanine accumulates in the body wall and wing-membrane of pharate adult at the late pupal stage when the body wall and wing-membrane are soft. This may represent the stage of pre-sclerotization.▲ Less

Research Products (10 results)

All Other

All Publications (10 results)

- [Publications] Umebachi, Y.: Zool.Sci.2. 163-174 (1985) ▼
- [Publications] Umebachi, Y.: Comp.Biochem.Physiol.82B. 763-766 (1985) ▼
- [Publications] Umebachi, Y.: Comp.Biochem.Physiol.85B. 503-506 (1986) ▼
- [Publications] Umebachi, Y.: Progress in Tryptophan and Serotonin Research. 1986. 405-408 (1987) ▼
- [Publications] Ishizaki, Y.: Comp.Biochem.Physiol.89B. (1988) ▼
- [Publications] Umebachi, Y.: "Papiliochrome, a new pigment group of butterfly" Zool. Sci.2. 163-174 (1985) ▼
- [Publications] Umebachi, Y.: "Xanthurenic acid in the mutant strain scarlet of *Drosophila melanogaster*" Comp. Biochem. Physiol.82B. 763-766 (1985) ▼
- [Publications] Umebachi, Y.: "Accumulation and excretion of β -alanine in *Papilio xuthus* (Lepidoptera: Papilionidae)" Comp. Biochem. Physiol.85B. 503-506 (1986) ▼
- [Publications] Umebachi, Y.: "Some chemical properties of the deep yellow pigment of *Papilio xuthus* (Lepidoptera: Papilionidae)" Progress in Tryptophan and Serotonin Research. 1986. 405-408 (1987) ▼
- [Publications] Ishizaki, Y.: "Level changes of β -alanine, dopamine, and N- β -alanyldopamine during the pupal stage of *Papilio xuthus* (Lepidoptera: Papilionidae)" Comp. Biochem. Physiol.89B. (1988) ▼

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