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Taste Responses and Biogenic Amine Levels in the Central Nervous System Under Different Fed Conditions in Larvae of the Silkworm, *Bombyx mori*

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Animals respond to particular taste stimuli for selecting foods and determine whether the foods should be fed or not. Either feeding experiences or nutritional conditions generally affect the feeding motivation. The decision making for feeding may depend on the sensitivities of taste cells and/or the neural modulation in the central nervous system. To explore the neural mechanisms underlying the behavioral motivation for feeding, the response of taste cells in the maxillay styloconic sensilla and the biogenic amine levels in brains and suboesophageal ganglia (SOG) were determined in the larvae under different fed conditions.

The taste responses to sucrose or strychnine nitrate, that were determined by extracellular tip-recordings from the sensilla, seemed to be different between the larvae under starvation and normally fed conditions. The responses to both sucrose and strychnine nitrate in the fed larvae were varied among individuals, whereas the responses in the starved larvae were less varied. Individuals with high sensitivities to sucrose have high sensitivities to strychnine nitrate. The variance of sensitivities of taste cells can be modified by feeding experiences or nutritional conditions.

The levels of biogenic amines in the brains and SOG, that were measured by HPLC-ECD, showed differences between the larvae under starvation and fed conditions. Serotonin levels in the brains and SOG did not differ between them in spite of the higher levels of the precursor of serotonin, tryptophan, in the fed larvae. The levels of dopamine and its metabolite, *N*-acetyldopamine, in the brains and SOG were higher in the fed larvae, suggesting that dopamine may be more released within the central nervous system and act on the neural circuits for the feeding. Taste responses can be changed by these functional amines and the associations of the amines with taste tesponses should be investigated.