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POSTER ABSTRACT PRESENTATIONS

SESSION TITLE: COMPLEX AND EMERGING TECHNIQUES IN STRUCTURAL BIOLOGY

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**Abstract P-46: Role of Hexamerin in Regulation of Pupa Development in
Holometabolous Insects**

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Background: Hexamerins are the most abundant proteins in the haemolymph of larvae and pupae of honeybee (*Apis mellifera*) and red flour beetle (*Tribolium castaneum*). They serve as a source of aminoacids for development in non-feeding pupal stage. Furthermore, they act as juvenile hormone-binding proteins, however, the details of this interaction remain unknown.

Methods: We have isolated hexamerins from honeybee and tribolium pupae and solved their structures by X-ray crystallography and cryoelectron microscopy, respectively.

Results: The structure of honeybee and tribolium hexamerins were resolved to 2.0 Å and 3.2 Å resolution, respectively. They are composed of six identical subunits with sizes around 70 kDa and possess 3 2 symmetry. The honeybee hexamerin structure revealed that each subunit contains an enclosed hydrophobic cavity occupied by one molecule of putative juvenile hormone. Electron density map of tribolium hexamerin was not of sufficient quality to observe juvenile hormone molecules, however we were able to identify hydrophobic cavity similar to that in honeybee hexamerin.

Conclusion: We hypothesize that proteolytic digestion of hexamerin leads to release of juvenile hormone. Therefore, the consumption of hexamerin is linked to level of free juvenile hormone in haemolymph, affecting the development of pupa. Since both, honeybee and tribolium hexamerins possess similar hydrophobic cavities, possibly occupied by juvenile hormone, we propose this mechanism to be conserved among holometabolous insects.

Key Words: hexamerin • juvenile hormone • honeybee tribolium