

**Dr. Aparna Dutta-Gupta, FNASc. (Ph.D: BHU, Varanasi)**

Professor, Department of Animal Sciences  
School of Life Sciences  
University of Hyderabad  
Hyderabad - 500 046, India  
Tel: Office + 91- 40-23010052; 23134560  
Residence: +91-40-23010348  
Fax: + 91- 40-23010120; 23010145  
Email: apdgs1@uohyd.ernet.in;  
aparnaduttagupta@gmail.com



**Professional exposure:**

- **Fulbright Scholar & Visiting Scientist (1984-1985)- Department of Biology, Marquette University, USA**
- **DST Young Scientist Project (1987-1989)**
- **Indo-German Exchange Prog. Fellow (1991)- Department of Developmental Biology and Physiology, University of Tübingen, Germany**
- **Visiting Scientist (1993)- Department of Biology, Marquette University, USA**
- **INSA Exchange Fellow (2000)- Institute of Entomology, Czech Acad. Sci., Brno, Czech Republic**
- **DST-DAAD Exchange Program Fellow (1999-2001), Department of Cell & Developmental Biology, Würzburg University, Germany**
- **Visiting Scientist, Würzburg University, Germany (2003)**
- **Editorial Board Member of Entomol. exp. appl. (From 1995)**
- **Editorial Board Member of Arch. of Insect Biochemistry and Physiology- Wiley-Liss Press (From 1997)**
- **Guest Editor, 2005, Special issue, Fish Physiology and Biochemistry, Springer, The Netherlands**

**Areas of Research:**

**Molecular physiology and biotechnology, bio-intensive integrated insect pest management, antibacterial properties of metal nanoparticles and peptides/proteins:**

The primary focus of our research is to understand the hormonal regulation of various genes during development and reproduction of insects as well as spiders. Extensive studies from our group revealed that the hexamerins (larval storage proteins) which are known to play crucial role during metamorphic development, also play important role in adult reproduction. For the first time we have demonstrated that in the male insects they are sequestered and secreted in the seminal fluid and make a major (40%) exogenous component. These are transferred to females during mating, deposited in eggs and play vital role the early embryonic development. My group has successfully demonstrated the receptor mediated selective uptake of hexamerins in various tissues of lepidopteran insects, which is regulated by and steroid hormone (ecdysteroids). We have also identified and characterized a novel small molecular weight (19 kDa) protein (HP 19) in the blood (haemolymph) of insects, which plays crucial role in regulating the rapid, non-genomic action of steroids. It regulates the ecdysteroid dependent activation the hexamerin receptors during larval-pupal transformation and neutralization of this protein using specific antibodies blocks the postembryonic development leading to either larval-pupal or pupal-adult intermediates, which are non-viable. We are capitalizing on hexamerins and their receptors for designing novel strategies for site directed delivery of growth regulators/control agents.

We are also focusing on the identification and characterization of novel *cry* genes from the local isolates of *Bacillus thuringiensis* (microbial biopesticide) which are effective against variety of lepidopteran pests. Recently we have identified a Cry toxin binding receptor in the fat body membrane, which is a novel aminopeptidase, and suggest that the insect fat body could be an alternate target for the action of Cry toxins. We have also identified low molecular weight protease inhibitors from various plants which have fairly good insecticidal property. A long term goal of our research is to identify novel molecules and molecular targets which could be exploited for biointensive integrated pest management.

Recently we are also emphasizing on silk genes of lepidoptera as well as spiders and trying to study their regulation, evolutionary pattern with a view to exploit them for production of novel products.

### Research Group:

**Dr. (Mrs.) C.C. Sudhakumari (Scientist), K.Vijaya Prasada Rao (Ph.D), D. Manohar (Ph.D), G. Damodara Rao (Ph.D), R.K. Chaitanya (Ph.D), T. Jacob Ningshen (Ph.D)**

### Ten best publications:

1. N. Kiran Kumar, S. M. Ismail and **Aparna Dutta-Gupta** (1997) Uptake of storage protein in rice moth *Corcyra cephalonica* : identification of storage protein binding proteins in the fat body cell membranes. **Insect Biochem and Mol. Biol.**, **27**, 671-679.
2. A. Shanavas, **Aparna Dutta-Gupta** and Ch. R. K. Murthy (1998) Identification, characterization, immunocytochemical localization and developmental changes in activity of Ca<sup>2+</sup>/calmodulin dependent protein kinase II in the CNS of silk worm, *Bombyx mori*. **J. Neurochem.**, **70**, 1644-1651.
3. A. Arif, A. Shanavas, Ch. R. K. Murthy and **Aparna Dutta-Gupta** (2002). Juvenile hormone stimulated tyrosine kinase mediated protein phosphorylation in the CNS of the silk worm, *Bombyx mori*. **Archives of Insect Biochem. and Physiol.** **50**, 139-146.
4. A. Arif, K. Scheller and **Aparna Dutta-Gupta** (2003) Tyrosine kinase mediated phosphorylation of the hexamerin receptor in the rice moth *Corcyra cephalonica* by ecdysteroids. **Insect Biochem. Mol. Biol.** **33**, 921-928.
5. P. Nagamanju, I. Hansen, T. Burmester, S. R. Mayer, K. Scheller and **Aparna Dutta-Gupta** (2003) Complete sequence, expression and evolution of two members of the hexamerin protein family during the larval development of rice moth, *Corcyra cephalonica*. **Insect Biochem. Mol. Biol.** **33**, 73-80.
6. A. Arif, Palaniappan Vasanthi, Immo Alex Hansen, Klaus Scheller and **Aparna Dutta-Gupta**. (2004). The insect haemolymph protein HP19 mediates the nongenomic effect of ecdysteroids on acid phosphatase activity. **J. Biol. Chem.** **27**, 28000-28008.
7. Ch. Surekha, M.R. Beena, A. Arundhati, P.K. Singh, R. Tuli, **A. Dutta-Gupta** and P.B. Kirti (2005) *Agrobacterium*-mediated genetic transformation of pigeon pea (*Cajanus cajan* (L.) Millsp.) using embryonal segments and development of transgenic plants for resistance against *Spodoptera*. **Plant Science**, **169**, 1074-1080.
8. Swapna I., Sathyasaikumar K.V., Murthy, Ch.R.K, **Dutta Gupta, A.** and Senthilkumaran, B. (2007) Alteration in kinetic and thermotropic properties of cerebral membrane bound acetylcholine esterase during thioacetamide-induced hepatic encephalopathy: correlation with membrane lipid changes. **Brain Research**, **1153**, 188-195.
9. Madhusudhan Budatha, Gargi Meur, **Aparna Dutta-Gupta** (2007) A novel aminopeptidase in the fat body of the moth *Achaea janata* as a receptor for *Bacillus thuringiensis* Cry toxins and its comparison with midgut aminopeptidase **Biochemical J.**, **405** (2), 287-297.
10. A. Arif, Damodar G., Scheller K. and **Dutta-Gupta A.** (2007) Significance of the 19 kDa hemolymph protein HP19 for the development of the rice moth *Corcyra cephalonica*: Morphological and biochemical effects caused by antibody application. **Archives of Insect Biochemistry and Physiology** **65**, 000-000 (In press).