

Sex Pheromone Biosynthesis and Insect Neuropeptide: From Basic Researches to the Application

Jaemin Lee

School of Agricultural Biotechnology Seoul National University

Most animals including insects use chemicals to communicate or interact with other organisms. Among these chemicals (semiochemicals), sex pheromone, chemical for communication between males and female, has been broadly studied in insects, especially moths. At present, sex pheromone is conventionally used for insect pest management by monitoring, mating disruption, and mass trapping. Insect physiology and chemical ecology lab in Seoul National University has studied chemical communication of insects for several years in ecological and physiological level. In this presentation, physiological and molecular biological studies about regulation of pheromone production on the smaller tea tortrix, *Adoxophyes* sp. would be presented.

Mating behavior and pheromone production in *Adoxophyes* sp. showed diel rhythm. As in noctuid moths, the diel rhythm of pheromone production of *Adoxophyes* sp. is regulated by a neuropeptide, PBAN (pheromone biosynthesis activating neuropeptide), produced from the head. A cDNA encoding PBAN of *Adoxophyes* sp. is a 750 bp-long and contains a predicted open reading frame (ORF) of 576 nucleotides. *Adoxophyes* sp. PBAN cDNA is proposed to encode an 192-amino acid long polypeptide and this polypeptide is predicted to be cleaved into 5 putative peptides including PBAN by endoproteolytic processing. PBAN of *Adoxophyes* sp. is a 31-amino acid long neuropeptide and has 35-48% homology with PBANs from other moths. Other four putative peptides are 24-amino acid, 7-amino acid, 20-amino acid, and 8-amino acid long. Through immunocytochemical studies, neuronal cells producing PBAN-like peptides were identified. Immunoreactive cells were located in the brain, suboesophageal ganglion (SG), and some ganglia in the ventral nerve cord (VNC) in adults and 5th instar larvae.

Various application approaches with insect neuropeptides have been tried by several researchers although their application in pest control has not so far been implemented. Among these approaches, studies about insect neuropeptide mimics have been continuously progressed.