62. STUDIES OF JUVENILE HORMONE BIOSYNTHESIS, D.A. Schooley, F.C. Baker, J. Bergot, and E. Lee, Zoecon Corporation, 975 California Avenue, Palo Alto, California 94304, USA

The chemical structures of three homologous insect juvenile hormones have been determined. We have studied the biosynthesis of the earlier intermediates of the metabolic pathway to juvenile hormones II and III using enzyme systems from corpora allata (CA) of the tobacco hornworm, Manduca sexta. Incubation of CA cytosolic enzymes with acetyl-CoA and propionyl-CoA (one of these substrates being labeled with ^{14}C at C-1) in the absence of NADPH led to formation of 3-hydroxy-3-methylglutaryl-CoA (HMG-CoA) and 3-hydroxy-3-ethylglutaryl-CoA (HEG-CoA). Incubation of the same substrates with CA cytosolic and microsomal enzymes in the presence of NADPH and other additives resulted in formation of mevalonate and homomevalonate. Both of the latter intermediates were demonstrated to have the 3R absolute configuration, and both HMG-CoA and HEG-CoA were shown to have the 3S absolute configuration. Details of the proof of structure and stereochemistry will be presented. These studies demonstrate for the first time the biosynthesis of HEG-CoA and homomevalonate.

We also studied the reduction of 3R,S-[3-^{14}C]HEG-CoA and 3R,S-[methyl-^{3}H]HMG-CoA by CA enzymes. Both substrates are efficiently reduced, but HMG-CoA is the preferred substrate. Isolation of 3R-[^{3}H]mevalonate and 3R-[^{14}C]homomevalonate as products from racemic substrates show that the reductase enzyme(s) is stereospecific.

We intend to investigate the possible importance of these enzmatic processes in regulation of the ratios of the three JHs biosynthesized in various life stages of selected insect species.

63. RECENT STUDIES OF INSECT JUVENILE HORMONES. Karl H. Dahm, Martin G. Peter, Paul D. Shirk, Theresa S. Wai-Lee, Günther Weirich, Govindan Bhaskaran and Herbert Röller. Institute of Developmental Biology, Texas A&M University, College Station, TX 77843.

Normal Juvenile hormone (JH) systems are compared with the deviant ones of *H. cecropia* and *M. sexta* black larval mutant in order to elucidate mechanisms for the regulation of JH-titers on the biochemical level. All postulated intermediates in the biosynthesis of JH-III: farnesol, farnesoic acid, methylfarnesoate, and epoxyfarnesoic acid are easily isolated from cultures of corpora allata (c.a.) of large roaches after application of radiolabeled precursors not more complicated than acetate or methionine. The synthetic activity for each of these compounds changes with the age of the gland. Male *Hyalophora cecropia* lose during metamorphosis the ability to synthesize JH in their corpora allata. The adult corpora allata produce instead the corresponding epoxy acid, which is converted to JH in the male accessory sex gland (MASG) by a specific methyl transferase. The enzyme is first detectable in MASG homogenates in days 15-16 of adult development. This is the same period when MASG *in situ* are able to methylate injected JH-I acid and accumulate JH. When the Herold's organ is transplanted into a female pupa, normal development occurs and results in an adult female that contains a male reproductive tract. This procedure in combination with c.a. transplantations and other surgical procedures allows experimental separation of phenomena due to the corpora allata, the MASG, and their male or female environment in the developing cecropia moth.

WEDNESDAY AFTERNOON - SECTION B - SYMPOSIUM ON BIOLOGICALLY ACTIVE PESTICIDES IN AIR - (CONTINUED) - J. N. Seiber, Presiding

64. METHODOLOGY USED IN A NATIONAL AIR PESTICIDE MONITORING PROGRAM. H. F. Enos. Dept. of Epidemiology and Public Health, University of Miami, School of Medicine, P. O. Box 016069, Miami, FL 33101.

Traditional approaches to the determination of pesticide residues in ambient air have become obsolete with the introduction of less persistent, more polar chemicals in pest management programs. Review of the data base supporting the trapping efficiency of the ethylene glycol Greenburg-Smith impinger system discloses relatively few pesticides of current interest in agricultural practice. The multiresidue procedures which have been interfaced with the pesticide trapping system have been designed for compounds which can be analyzed by gas chromatography (GLC). Because many of the compounds of current importance in pest management programs are not amenable to direct GLC analysis, other techniques must be used for their detection. Although High Pressure Liquid Chromatography (HPLC) is attractive for resolving this analytical dilemma, lack of detector sensitivity precludes its application except in cases where large volumes of air are sampled with an efficient trapping device. Available choices are: (1) the enhancement of sensitivity through preparation of chemical derivatives which are amenable to GLC, and (2) efficient