

## PH 113

SURFACE LIPID AND WATER PROOFING IN A *DROSOPHILA* MUTANT.

T. Shimozawa<sup>1</sup>, K. Kimura<sup>1</sup> and T. Tanimura<sup>2</sup>.  
<sup>1</sup>Zool. Inst. Fac. Sci. Hokkaido Univ. Sapporo,  
<sup>2</sup>Biol. Lab. Fac. Sci. Fukuoka Univ. Fukuoka.

Small terrestrial animals are faced with the danger of evaporation-loss of water. They must have a barrier against evaporation at the body surface. We examined the role of surface lipid for the evaporation barrier in *Drosophila melanogaster*. The parched (pch) mutants lose body water by evaporation 5 times more rapidly than the wild type (Canton-Special:CS) flies. Surface lipid was collected by hexane wash and compared between pch and CS. No difference was observed in the lipid composition between the two. The thickness of the lipid coat on the cuticular surface was estimated as 90 nm in both flies. A desired amount of the surface lipid was removed by a number of short hexane washes. Removal of a half amount of the surface lipid from pch increased the evaporation rate twice as much. In contrast to pch, removal of a large amount of the lipid did not increase the evaporation rate in CS. The CS flies with only 1/20 surface lipid, i.e. 5 nm in thickness, showed the same evaporation rate as in the normal CS.

The results suggest that the principal site of the evaporation barrier mechanism is not the coat of lipid on the external surface but the surface cuticle which provides a substrate for close packing of lipid in mono- or di-molecular layer.

## PH 114

PENETRATING FACTOR FOR EGG DEPOSITION IN CRICKET, *GRYLLUS BIMACULATUS*.

N. Ai, N. Yamaguchi, M. Ishii, T. Chino and N. Yamamoto. Dept. of Biol., Tokyo Gakugei Univ., Koganei, Tokyo.

In penetration of ovipositor for deposition of egg, it is divided from four periods, that is "penetration(P-1)" "pause(P-11)" "egg deposition(P-111)" and "withdrawal(P-1V)".

P-11 had big difference between virgin and mated female. In mated one, P-11 was extremely short rather than virgins. So, we call this "mated pattern". In this experiment, P-11 was used as indicator for copulation. Once mated-female rose mated pattern of P-11 for 8 to 12 days constantly.

And, in this case, oviposited egg showed high average of ratio of hatching out (90% or more). But, in the end of this period, P-11 pattern returned to virgin pattern and hatching ratio to zero. By the observation of spermatheca, size of it was not changed but spermatozoa still remained without mobility. Once mate is not enough to sustain the mated condition. After the taken-out substance from male accessory gland joined with arachidonic acid, these materials were injected virgin female body cavity. P-11 changed to mated pattern from virgin one. But the mated pattern gradually returned to virgin one. We used the spermatozoa for bioassay as PGE<sub>2</sub> appearance. In *G. bimaculatus* male accessory gland seems contain PGE<sub>2</sub> synthetase. Because, extract of accessory gland could not make PGE<sub>2</sub> itself but when arachidonic acid was joined with it, PGE<sub>2</sub> rose.

## PH 115

STRICTURE AND CONTRACTION IN LATERAL OVIDUCT FOR EGG-TRANSPORTATION IN CRICKET, *GRYLLUS BIMACULATUS*.

N. Ai, N. Yamaguchi, M. Ishii, T. Chino, Y. Furuta and S. Endow\*. Dept. of Biol., \*Dept. of Chem., Tokyo Gakugei Univ., Koganei, Tokyo.

Strong stricture of lateral oviductal muscle prevented from egg transportation from ovary to common oviduct. This contraction always rises closely near the common oviduct and the ovary. It seems to be evoked in locally by neurogenic origin. The efferent impulse was originated in lateral root from the terminal ganglion of abdomen.

But, when PGE<sub>2</sub> was treated to the lateral oviduct, neural signals from ganglion were not able to conduct for oviductal muscles. So, the stricture and peristalsis were disappeared instantly. The egg had been easily transported forward to common oviduct. However, it seems to be difficult for rising muscle contraction in the lateral oviduct. PGE<sub>2</sub>, octopamin and proctolin were treated with high concentration. But, there were no effects for origination of muscle contraction.

In this experiment, we examined the act of other PG substance. PGD<sub>2</sub> is none effect substance for egg deposition. However, when PGD<sub>2</sub> was treated to the oviductal muscle after PGE<sub>2</sub> treatment, extremely big contraction was repetitively and rhythmically appeared. PGE<sub>2</sub> action seems to be modulator for neuro-muscular transmission and have blocking effect for egg deposition but PGD<sub>2</sub> action accelerator of contraction.

## PH 116

FINE STRUCTURE OF THE MECHANORECEPTORS IN THE BASE OF THE OVIPOSITOR OF THE CRICKET, *TELEOGRYLLUS COMMODUS*.

T. Sugawara. Dept. Biol., Saitama Med. Sch., Saitama.

Electron microscopic study revealed the topography and the fine structure of type II neurons and scolopidial sensilla in the posterior wall of the genital chamber.

Three to five somata, 15-20  $\mu$ m in diameter, of type II neurons lie together in the haemolymph space near the epithelium of the genital chamber wall. A few dendrites are derived from each soma, and bifurcate many times until they spread in the basement membrane of the epithelium. The naked dendrite tips are 10-30  $\mu$ m long (5-10 % of the dendrite length); some of them terminate in the basement membrane, while others invaginate into the epithelial cells, without any special membrane junction.

The isolated scolopidia, which contain either one or two sensory cells, were found beside the type II neurons. They penetrate obliquely into the epithelium, and terminate in the cuticle. The sensory dendrite and the ciliary segment are 30-40  $\mu$ m and 15-20  $\mu$ m long respectively. In the two-cell type scolopidium, one cilium is of type 1 (Moulins, 1976) and the other is of type 2. The distal part of the cilia is associated with the tube surrounded by an attachment cell. Only the type 2 cilium extends into the cuticle. The single-cell type scolopidium contains a type 1 cilium associated with a tube and extends into the cuticle.