GROSS ANATOMY OF THE PLANARIAN *Dugesia japonica*. I. MUSCULAR SYSTEM.

H.Orii, H.Itoh and K.Watanabe.

Lab. Regeneration Biol., Dept. Life Sci., Himeji Inst. Tech., Harima Science Garden City, Hyogo.

We have isolated two myosin heavy chain genes (*Djmhc-A* and *Djmhc-B*) of the planarian *Dugesia japonica*, belonging to a striated muscle type (Zool. Sci. 15: 861, 1998). In this study, we prepared antisera against each gene product and immuno-histochemically analyzed muscular system of the planarian using them. The anti-DjMHC-A recognized pharynx, circular body-wall, eyes, mouth and intestine muscles. In contrast, the anti-DjMHC-B recognized body-wall (circular, diagonal and longitudinal), transverse and dorso-ventral muscles. Immunohistochemistry with a confocal microscopy revealed gross morphology of the muscular system of the planarian *Dugesia japonica*.

MORPHOLOGICAL VARIATIONS IN HEAD SHAPE IN VERMIFORM STAGES OF DICYEMID MESOZOANS

H. Furuya[1], F. G. Hochberg[2], and K. Tsuneki[1].

[1]Dept. of Biol., Grad. Sch. of Sci., Osaka Univ., Osaka and [2] Dept. of Invert. Zool., Santa Barbara Mus. Nat. Hist. ,Calif., USA.

The kidneys of several species of cephalopod molluscs were examined for the presence of dicyemid mesozoans. Dicyemid species typically are host-specific. In this study two to three species of dicyemids were present in each host species or each host individual examined. In these cases, the shapes of the anterior cephalic swelling or head region were distinctly different in each species of dicyemid. Two patterns of variation in head shapes were detected in each host individual: (A) when two species of dicyemids were present in a single host individual the calottes of one species were cone-shaped while in the second species they were disc-shaped; (B) when three species of dicyemids were present three configurations of head regions were observed, namely, cone-, disc- and cap-shaped (truncated) respectively. In summary, when two or more dicyemid species are present in a single host individual head shapes are always dissimilar. Head shapes of dicyemids in different host species more closely resembled each other than those of dicyemids recovered from individuals of the same host species. Dicyemids with cone-shaped heads attach within convolutions or pits in the renal appendages of the host's kidneys whereas species with disc-shaped heads attach to the flat surfaces of the renal tissue. Adaptations to the structure of the host renal appendages and habitat segregation, thus, appear to have resulted in convergence of dicyemid head morphology between cephalopod hosts.

Localization of symbiotic clostridia in the mixed segment of the termite *Nasutitermes takasagoensis*

G.Tokuda[1,3], I.Yamaoka[2] and H.Noda[3]

[1]Dept. of Chem., Biol., & Mar. Sci., Univ. of Ryukyus, Okinawa, [2]Dept. of Phys., Biol., & Info., Yamaguchi Univ., Yamaguchi, and [3]Natl. Inst. Seri. & Entmol. Sci., Tsukuba, Japan.

The mixed segment is a part of the gut present only in 'higher' termites, where the mesenteric epithelium occupies half of the gut wall and the proctodeal epithelium covers remaining area. We found that two kinds of *Clostridium* species are primarily distributed in the mixed segment as a result of PCR using primers specific for eubacteria. These bacteria were not detected in any other gut regions by PCR and were recognized as short rods in chains by whole cell hybridization using specific probes for these symbionts. *In situ* hybridization showed that they were localized between the mesenteric epithelium and peritrophic membrane in the mixed segment. In addition, an electron microscopy revealed a close association between these bacteria and mesenteric epithelium, suggesting they have some interactions with the gut tissue of the termites.

THE MARGINAL SCALES AND THE MECHANOSENSILLA ALONG THE WING MARGIN OF THE BUTTERFLY, *PIERS RAPAE*

A. Yoshida[1], A. Noda[1], J. Emoto[2] and F. Yokohari[3].

[1]JT Biohistory Res. Hall,Takatsuki, [2]Lab. Biol., Nanzan Univ., Nagoya, [3]Fac. Sci, Fukuoka Univ., Fukuoka.

Lepidopteran insects have a large quantity of long and slender scales along their wing margins; these scales are called marginal scales. Removing the marginal scales of the white cabbage butterfly, Pieris rapae, we found that hairs, which are much shorter and finer than the marginal scales, are distributed along the wing margin; these hairs are completely covered with abundant margainal scales in the intact wing. Air current application makes the marginal scales oscillate. These oscillating scales may consequently make the hairs, covered with them, oscillate. Directly applying the mechanical stimulus to the hair after removal of marginal scales, we recorded the nerve impulse from it. Based on these results of morphology and electrophysiology, we suggest that the butterfly may indirectly perceive the air current through these sensory hairs, which are stimulated by the marginal scale bending induced by the air current.

MORPHOLOGICAL STUDY ON EARLY STAGE MORPHOGENESIS OF HAIR FOLLICLES IN THE DORSAL SKIN OF NEONATAL RATS.

K. Morioka and H. Sakuraba. Dept. Clin. Genet., The Tokyo Metropolitan Inst. Med. Sci., Tokyo.

At least 6 groups of epidermal cells and 2 groups of dermal cells are responsible for the formation of hair follicles. Each type of the cells performs co-ordinated special differentiation according to the timetable of development. We herein present electronmicrographies concerning; 1) differentiation of outer and inner root sheaths in the early stage of hair follicle formation, 2)group-specific modes of keratinization of epidemal cells and their timing, 3)adherence junctions including the relationship between stair-like adherence and desmosomes found in the cells of Henle's layer, 4) changes of cytoplasm especially degradation of organelles in the terminal differentiation stage, 5)cell-to-cell interaction between epidermis and dermis during the formation of dermal papilla.

RAPID MODIFICATION OF THE BRANCHIAL CELLS OF MEDAKA DURING ADAPTATION TO ENVIRONMENTAL SALINITY

K. ICHIKAWA AND T. OGASAWARA

Dept. of Biol., Kanagawa Univ., Hiratsuka, Kanagawa

Medaka adapt to seawater (SW) through short transition to dilute SW. Medaka show similar changes of the branchial chloride cells (mitochondrion-rich cells, MRC) as have been known among the other euryhaline teleosts fishes. Besides, we have reported a tentative covering of the apical surface of MRC with epithelial pavement cells. Proliferation or degeneration of the MRC follows after this modification. We claimed that the rapid response of the pavement cells would refer to a mechanical insulation of the route of active ion transport. Single MRC may change polarity, which meets with a direction of the electrolyte transport in the new environment, during the insulation. In order to study the mode of rapid response we isolated the gills, and transferred to different salinities. After the immediate transfer of the SW-Medaka gills to fresh water, scanning electron microscope revealed expansion of the apical openings of MRC; the SW gills showed no significant shift when immersed in SW. Although all of the *in situ* modifications were not reflected to those of the isolated gills, it is possible that a part of the observed change would not, at least, be under control of osmoregulatory hormones.