DEVELOPMENTAL PATTERNS OF INFUSORIFORM EMBRYOS IN THE PHYLUM DICYEMIDA

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Developmental patterns and cell lineages of infusoriform embryos were studied in several species of dicyemid mesozoans, namely, *Dicyema acuticephalum*, *D. apollyoni*, *D. misakiense* and *D. typoides*. The numbers of cells in infusoriform embryos are fixed and species-specific. Infusoriform embryos typically consist of 35, 37 or 39 cells. Differences in cell numbers are attributed to the number of terminal divisions in cell lineages. During early development, the following common features were noted among several species. 1) Early cleavages are holoblastic and spiral. After the 24-cell stage the cleavage pattern changes from spiral to bilateral. 2) Blastomeres situated in the animal hemisphere give rise to ciliated cells that cover the posterior part of the embryo whereas those situated in the vegetal hemisphere give rise to anterior and ventral cells plus all internal cells of the embryo. 3) Early developmental processes were almost identical in all infusoriform embryos examined. Species-specific differences appear during later stages of embryogenesis.

EXPRESSION OF ZOOTYPE GENES IN DICYEMID MESOZOANS

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The body plan of dicyemid mesozoans, which consist of only 10 to 40 cells, is amongst the simplest of all multicellular animals. They lack body cavities and almost all recognizable organs such as a gut or nervous system. Because of their extremely simple body plan, dicyemids have long been the subject of phylogenetic controversy; whether their simple body pian reflects their primitiveness or degeneration from progeny of higher metazoa. We have already shown that the central type Hox gene of the dicyemid has diagnostic peptide motif for spiralian protostomes. Therefore, the simple body plan of dicyemids are likely to be secondarily state from higher lophotrochozoan animals, as a result of their endoparasitic lifestyle. In order to understand how the simple body plan has evolved we have investigated the expression pattern of Zootype genes, Hox and Otx in dicyemid mesozoans.

COLONIAL FORM OF A SOLITARY CORAL, *FUNGIA* SP. DEVELOPED FROM TISSUE FRAGMENTS

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Most scleractinian corals are colonial, while most *Fungia* species are known as solitary corals. In colonial corals, clonemates always fuse if they are brought into contact, while in solitary corals, two individuals do not fuse even if they are clonemates. It is important to know when colonial or solitary character develops during the course of development for understanding the underlying mechanism of the difference between the colonial and solitary forms. In this study we tried to elucidate when solitary character develops during the regeneration process of a solitary coral, *Fungia* sp. Planula-like tissue balls were formed from dissociated cells or tissue fragments. When two tissue balls derived from the same individual were brought into contact, they fused. When individuals of Fungia sp. were broken into pieces, residual tissue developed into a new polyp, but sometimes more than one polyp developed from a tissue fragment, resulting in a colonial form of a solitary coral. The present observation suggests that, in the early phase of regeneration, *Fungia* sp. does not show characteristics of solitary animals and can assume a colonial form at least for some period.

AN UNKNOWN MOUTHLESS NEMATODE FOUND FROM A MANGROVE FOREST IN THAILAND

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During faunal surveys of free-living marine nematodes in Thailand, an unknown mouthless species was found from the Klong Klone mangrove forest, Samut Songkhram Province. The present species has a degenerated alimental canal and contains micro-organisms in the body as in species of the mouthless genera, *Astomonema* and *Parastomonema*, hitherto known in the Family Siphonolaimidae. It is placed in the *Parastomonema* in having the generic characteristics, the arrangement of cephalic sensilla in a 0 + 0 + 4 configuration and paired testes. This species is similar to the type species *P. fijiense* but differs from it by the short body (1.4 - 2.2 mm), short cephalic setae (about 2 μm), absence of subcephalic setae, and the conical tail (3.3 - 3.7 a.b.d. long) and subventral caudal setae on cuticular swellings in male; in *P. fijiense*, long body (6.1-13.0 mm), long cephalic setae (8-13 μm), presence of subcephalic setae, slender tail (6.9-7.8 a.b.d. long), and no peculiar caudal setae. This study concludes that the present mouthless nematode is a new species of the *Parastomonema*.

MORPHOLOGICAL, PHYSIOLOGICAL AND ECOLOGICAL STUDY OF THE BEARD WORM, POGONOPHORA (*OLIGOBRACHIA MASHIKOI*)

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Beard worms lack mouth, digestive tract and anus. This animal group has been reported from various cold seas and abyssal seas in the world. In the Tsukumo Bay of the Noto Peninsula in Ishikawa Pref., where the sea bottom is shallow and warm seawater current flows into, one species of beard worms (*Oligobrachia mashikoi*) inhabits exceptionally there. We investigated this species from various viewpoints of biology using various techniques. As a result, we succeeded in collecting the whole length of the body by a devising dredger. Therefore, the specimen had the body end (opisthosoma) that has not been known so far. This is the first record in this genus. We also confirmed the histological situation how symbiotic bacteria is present in the body of this species. Moreover, we could know the maturating season of this species. Besides, we succeeded in taking actual pictures of this worm, by placing a video camera there.

ASIAN SPECIES OF THE GENUS *AMPHIOCTOPUS*

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The genus *Amphioctopus* Fischer, 1882, has long been regarded as a junior synonym of the genus *Octopus* Cuvier, 1797. The type species, *Octopus membranaceus* Quoy & Gaimard, 1832, has been described recently as a *nomen dubium*, largely because of the poor condition of the type specimen. Detailed examination of the type specimen confirms that *Amphioctopus* is a valid genus, distinguished from *Octopus* by (a) generally shorter arms, with the ventral arms relatively longer; (b) a very short interbrachial membrane between the dorsal arms; and (c) the presence of dark stripes along the anterior surface of the arms. The known species of *Amphioctopus* include *A. fangsiao* (d'Orbigny) and *A. ovulum* (Sasaki) from Japanese waters. *Amphioctopus fangsiao* (the senior synonym of *Octopus ocellatus* Gray and *Octopus areolatus* De Haan in d'Orbigny) is common from Aomori to Hong Kong. *A. ovulum* is more rare, occurring from Shikoku to the Philippines. The distribution of *Amphioctopus robsoni* (Adam), recorded previously only from the Red Sea, is here extended: it is an Indo-West Pacific species and one of the most common commercially important species of *Amphioctopus*.

PHYLOGENETIC RELATIONSHIPS OF DEEP-SEA MUSSELS (BATHYMODIOLUS, MYTILIDAE, BIVALVIA)

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There are unique biological communities in deep-sea hydrothermal vents and cold-water seeps throughout the world. Mussels of the genus Bathymodiolus (Bivalvia, Mytilidae) are one of the dominant macroorganisms in these communities. Bathymodiolus mussels live in a reductive environment, depending primarily on energy supplied by the chemosynthesis of bacterial endosymbionts. Bathymodiolus species are classified by conchological traits, but their phylogenetic relationships are poorly understood. In this study, phylogenetic relationships of Bathymodiolus species were investigated worldwide by nucleotide sequencing of mitochondrial cytochrome oxidase subunit I and NADH dehydrogenase subunit 4 genes. The result showed that they were divided into 2 groups comprising B. japonicus, B. platifrons, B. sp. (Kuroshima Knoll, short-type), and B. sp. (Kuroshima Knoll, long-type) on the one hand and B. septemdierum, B. aduloides, B. marisindicus, B. puteoserpentis, B. azoricus, B. thermophilus, B. sp. (Mariana Back Arc Basin), and B. sp. (Manus Basin) on the other. The former contains methanotrophic endosymbiotic bacteria and the latter thioautotrophic endosymbionts.

A GIANT SEA HARE, *APLYSIA* SP., KNOWN FROM THE PACIFIC OCEAN COAST OF MID AND SOUTHERN JAPAN

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A large species of *Aplysia* (over 600 mm in body length) has been known from the Pacific Ocean coast of middle Japan, Izu-Oshima Island, Hachijyo-jima Island