

PHYLOGENETIC RELATIONSHIP OF *CORBICULA* CLAMS IN ASIA

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Due to the decline of the natural resources of *Corbicula japonica* clam, recently the *Corbicula* clams were imported from Asian countries such as China, Korea, and Russia. As the appearances of the shells of the imported clams were similar to the Japanese *C. japonica*, we examined the sequence of 16S rRNA to know the phylogenetic relationship between Japanese *C. japonica* and imported *Corbicula* species. Judging from phylogenetic tree, *Corbicula* clam from China and North Korea was belonging to same group but obviously different from Japanese *C. japonica*.

MORPHOLOGICAL AND GENETIC DIFFERENCES BETWEEN TWO GROUPS OF A FRESHWATER PEARL MUSSEL, *MARGARITIFERA LAEVIS*

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The family Margaritiferidae is one of the most endangered freshwater mussels in the world, and only a single species of the family, *Margaritifera laevis*, has been known from Japan. However, our genetic and morphological analyses disclosed the existence of two divergent groups within the Japanese mussels from Hokkaido. They are clearly distinguishable from each other by an allelic substitution at an allozyme locus (*Gpi**) as well as several nucleotide substitutions at partial mitochondrial DNA sequence (16S rRNA). Moreover, a significant difference in the relative shell morphology is also recognized between them. No genetic evidence of hybridization was detected in three sympatric populations, suggesting their reproductive isolation. These facts strongly suggest that the two groups represent two different species.

PHYLOGENETIC ANALYSIS OF THE JAPANESE CEPHALOPODS BASED ON MITOCHONDRIAL 16S rDNA GENE SEQUENCES

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We determined partial nucleotide sequences of the mitochondrial 16S rDNA gene in 25 species of cephalopod mollusks from Japanese waters to study phylogenetic relationships among these cephalopods. The derived phylogeny supports the traditional separation between two groups (cuttlefish + squid, octopus). The cuttlefish do not form a monophyletic group. It is separated into two clusters, the sepioids and sepiolids. The sepiolids are phylogenetically closer to teuthoids than the sepioids. Among octopod species, close relationships appear between *Octopus fangsiao* and *O. vulgaris*, and *O. areolatus* and *O. aegina*. Thus, the species characterized by the ocellar spots on the web in front of eyes, such as *O. fangsiao* and *O. areolatus*, do not form a monophyletic group. Ocellar spots possibly appeared in various octopus lineages. The octopus species with distinct long arms such as *O. minor* and *O. variabilis* neither form a monophyletic group. Long arms might evolve in various octopus lineages. *Octopus dofleini* is separated from all the other octopus species examined in this study.

GENETIC VARIATION IN *HYNOBIUS NAEVIUS*

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Presence of morphological variations has been reported in *Hynobius naevius* which occurs widely in mountain regions of western Japan. We have already reported that two distinct types (A and B), differing in genetically and morphologically, occur sympatrically in northern part of Kyushu. This time, we conducted an electrophoretic survey at the 20 loci of 30 populations of *Hynobius naevius* collected from all over its distribution ranges. As a result, we obtained relatively large values of Nei's (1978) distance (max = 0.870) among the populations and could recognize several distinct genetic groups. This result indicates that *Hynobius naevius* actually includes several distinct species. Each of sympatric types A and B formed a group with the Chugoku - northern Kyushu populations and Shikoku - southern Kyushu populations, respectively.

INDUCTION OF BLOOD VESSELS FROM UNDIFFERENTIATED *XENOPUS* EXTODERM (ANIMAL CAP) BY ACTIVIN A

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Activin A has potent mesoderm-inducing activity in amphibian embryo. We have previously reported that at low concentration of activin A, blood cells are induced in the explants. Blood vessels are considered to be derived from the same stem cells from which the blood cells derived. However, the induction of blood vessels has not been reported. Thus, we tried to induce blood vessels from *Xenopus* animal cap by treatment with activin A. We found that endothelial-like cells are induced in the explants by treatment with both activin A and VEGF. The expressions of flk-1 and tie-2 were confirmed in the explants by in situ hybridization and RT-PCR. These results suggested that blood vessels are induced in the explants. This study presents a model system suitable for the in vitro analysis of blood vessel induction in vertebrate.

FLEXIBILITY AND SPECIFICITY OF SYMBIOSIS BETWEEN *CASSIOPEA* SP. AND ZOOXANTHELLAE

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Symbiotic dinoflagellates, zooxanthellae, are indispensable for strobilation of the scyphozoan *Cassiopea* sp. To study whether *Cassiopea* sp. prefer a specific algal genotype or whether the predominant algal genotype in the host is determined by environmental conditions, we infected aposymbiotic polyps with zooxanthellae (clade A, B, or C based on RFLP analysis of algal SSrDNA) isolated from four host species and kept them under high or low light conditions. Zooxanthellae of all clades except those from *Zoanthus* were proliferated in the polyps and showed the same RFLP pattern as those before infection. However, when polyps were infected with a mixed population of clade A, B and C algae, clade A algae became the dominant type in the polyps one month after infection. When polyps were infected with clade C algae derived from *Zoanthus*, a cryptic algal type (clade D) became the dominant type in the polyps. The same results were obtained in both high and low light conditions. These results suggest that *Cassiopea* sp. can establish symbiosis with a wide range of zooxanthellae but subsequently the host may select the most suitable algal genotype if more than one genotype is available.

SPERM DANCE OF DEATH IN FEMALE UTERUS IN *DROSOPHILA OBSCURA* SPECIES GROUP

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Male flies produce polymorphic sperm in *Drosophila obscura* species group. Mating plug formation occurs in female uterus in these species. Sperm behaviors was observed in female uterus, spermatheca and seminal receptacle after copulation in three species: *D. bifasciata*, *D. tsukubaensis*, *D. pseudoobscura*. Sperm of *D. melanogaster* already moves in male storage organ. But sperm of these flies did not move immediately after copulation. One hour afterward, they began to move in uterus and some of them were transferred into female storage organs. Seven hours after, when the female storage organs were already filled with sperm, the leftover sperm in uterus began to move rapidly and aggregated each other. This curious behavior "sperm dance of death" lasted until 24 hours after mating, when almost of them were already resolved.

GENETIC VARIATION IN NATURAL POPULATIONS OF JAPANESE LAND SNAILS; *BRADYBAENA SIMILARIS* AND *B. PELLUCIDA*

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A cosmopolitan species of land snails, *Bradybaena similis*, is supposed to be introduced to Japan 200 years ago from Southeast Asia with human activities. Now *B. similis* is widely distributed throughout Japan. Whereas, *B. pellucida*, another popular species of the genus *Bradybaena*, is endemic to Japan and distributed mainly in western part of Japan. Recently this species was recorded from very restricted areas in eastern Japan; Kanagawa, Shizuoka prefectures and southern part of the Bouso