

A711 Molecular phylogenetic evidence for the arthropod
radiation deduced from 18S rDNA sequences

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To clarify the phylogeny of arthropods, the 18S rDNA sequences of 87 arthropods and related phyla were taken from Genbank and were analyzed. The phylogenetic tree was constructed from minimum evolution method with Jukes-Cantor distance. In the phylogenetic tree inferred from 18S rDNA sequences, phyla Pentastomida, Onychophora, and Tardigrada are included in the arthropod lineage. We obtained strong support for the monophylies of Chelicerata, Myriapoda, Pterygota of Insecta, and Apterygota of Insecta. Also, Phylum Tardigrada formed a monophyletic cluster. The branching pattern among the classes of the arthropods during the evolutionary process is unstable. When all the internal branches in the phylogenetic tree are short and bootstrap proportions are low, a radiation in the evolutionary process of arthropods can be expected. From this molecular phylogenetic evidence, we propose that the arthropod radiation has occurred during the "Cambrian explosion". The proposition for this radiation supports the hypothesis deduced from the fossil records.

A712 Molecular phylogenetic evidence for the mollusk-annelid
radiation deduced from 18S rDNA sequences

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To clarify the phylogenetic relationships within/among mollusks and annelids, the 18S rDNA sequences of 61 mollusks, annelids, and related Phyla were taken from Genbank and were analyzed. The phylogenetic tree was constructed by the minimum evolution method using the Jukes-Cantor distance. In the phylogenetic tree inferred from 18S rDNA sequences, Phyla Pogonophora, Vestimentifera, Sipuncula, Echiura, Brachiopoda, Phoronida, Entoprocta, and Nemertea are included in the mollusk and annelid lineage. Also, it may be impossible that Phyla Mollusca and Annelida form monophyletic clusters, respectively. The branching pattern among Phyla and/or Classes in mollusk and annelid lineage during evolutionary process is unstable. When all the internal branches in the phylogenetic tree are short and bootstrap proportions are low, a radiation in evolutionary process can be expected. From this molecular phylogenetic evidence, we propose that the mollusk-annelid radiated simultaneously during the "Cambrian explosion". The proposition for this radiation supports the hypothesis deduced from the fossil records.