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PROBLEM OF PHYLOGENETIC POSITION OF DICYEMIDS

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Key words: *Dicyemida, Orthonectida, Spiralia, Gastrotricha, Plathelminthes, Gnathostomulida, Rotifera, transcriptome assembly, ortholog groups, multiple sequence allignment, phylogeny reconstruction*

Motivation and Aim: The continuing challenge of the identification of the phyla Dicyemida and Orthonectida on the phylogenetic tree of Spiralia was addressed.

Methods and Algorithms: We considered 93 species from 16 spiralian phyla. Four ecdysozoan species were used as the outgroup. The 102 proteomes of 97 species were in part extracted from public sources and in part (33 proteomes) assembled from the Sequence Read Archive or own sequencing data. The proteome assembly included cleaning (using the Sequence Cleaner program and the UniVec and rRNA databases), transcript assembly (Trinity), and ORF predictions (the TransDecoder program and the Pfam and UniProtKB/Swiss-Prot databases). Orthologous families were identified by OrthoMCL-DB. The results presented in [1] were used as the basis. Alignments of amino acid sequences were generated by the MUSCLE program.

Results: The phylogeny reconstructed using the maximum likelihood method suggested that dicyemids are close to the phyla Gastrotricha and Plathelminthes. Our data allow that Dicyemida can neighbor Gnathostomulida and Syndermata (rotifers and acanthocephalans) but reject the position of the phylum within or adjacent to the clade Lophotrochozoa. According to our data, dicyemids are not regressed annelids, mollusks, flatworms, rotifers, or other extant phyla. It was also confirmed that Micrognathozoa, the newest-described animal phylum, is the sister group of Rotifera. Low support of certain clades and long branch effects suggest finer phylogenetic reconstruction methods to be applied, and this work is currently in progress.

Conclusion: Data on the taxonomic position of dicyemids have been obtained.

Availability: Currently obtained results are presented on the following Web page: http://lab6.iitp.ru/en/dicyemida/.

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References:

1. T.H. Struck, A.R. Wey-Fabrizius, A. Golombek, L. Hering, A. Weigert et al. (2014) Platyzoan Paraphyly Based on Phylogenomic Data Supports a Noncoelomate Ancestry of Spiralia, Mol Biol Evol, 31(7):1833–1849.