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Main pathways of evolution of spermatozoa of acoelomorpha and free-living plathelminthes

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Abstract

© INVERTEBRATE ZOOLOGY, 2017. On the basis of original and literary data on ultrastructure of spermatozoa and their formation the reconstruction of main pathways of evolution of male gametes of Acoelomorpha and free-living Plathelminthes is proposed. Two species of Acoela — Archaphanostoma agile and Convoluta convoluta — and five species of free-living flatworms from different taxa — Monocelis fusca, M. lineata (Proseriata), Uteriporus vulgaris (Tricladida, Maricola), Provortex karlingi (Rhabdocoela, Dalytyphloplanoida) and Macrorhynchus croceus (Rhabdocoela, Kalyptorhynchia) — have been investigated. Specimens were collected on the littoral zone of various islands of Keretskii Archipelago (White Sea), fixed in the 1% glutaraldehyde and studied with transmission electron microscope JEM 100 CX by the standard methodics. During the evolution of Acoela the axoneme formula of spermatozoa is modified and the position of free microtubules is reorganized. Evolutionary changes of spermatozoa of Plathelminthes are represented firstly by the locomotory apparatus (incorporation of flagellae, change of an axoneme formula and configurations of free microtubules), then by organization of nuclear material. And finally in specialized groups the oligomerization of mitochondria and additional inclusions occurs. In the spermiogenesis of Acoela and the advanced flatworms the specific peculiarities of ancestral forms, representing the examples of recapitulation on the cellular level, are described. The similarities and the differences of the sperm ultrastructure and spermiogenesis in Acoelomorpha and Plathelminthes are discussed in evolutionary-morphological aspect

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Keywords

Acoelomorpha, Phylogeny, Plathelminthes, Spermatozoa, Ultrastructure

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