

Comparative anatomy of the muscular system in marine bryozoans

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Muscular system of the marine bryozoans remains understudied, with only a few species examined by the light and transmission electron microscopy. Besides, reconstruction of the muscular system with these methods is a difficult task because of its complexity and small size of the zooids.

To address this issue we used confocal laser scanning microscopy to examine representatives of all three known clades of marine Bryozoa: 11 species of cheilostomes, 4 species of cyclostomes and started to work on ctenostomes. Among Cheilostomata we focused on three major suborders: Malacostegina, Scrupariina and Flustrina (superfamilies Calloporoidea, Flustroidea, Buguloidea, Cribrilinoidea, Lepralioidea and Smittinoidea) representing major phylogenetic lineages of this order. In all species studied we identified five main muscle groups: apertural (including those of the operculum, vestibule and diaphragm), parietal muscles, lophophoral muscles, retractors of the polypide and muscles of the digestive tract. The muscular system of the digestive tract, tentacles and operculum is relatively uniform in the studied species. Other muscle groups (vestibular and diaphragmal, parietal and retractors) are highly variable: we found differences in the number of muscle fibers, length and width of individual bundles, their position and attachment sites.

Cylostome bryozoans possess apertural and lophophoral muscles, retractors of the polypide and muscles of the digestive tract. Instead of the parietal muscles, the polypide protrusion is performed by the ring muscles of the membranous sac.

Revealed differences in musculature correspond to the differences in the skeleton structure, representing different trajectories in the morpho-fuctional evolution in marine bryozoans.