

Nerve ring of cnidarians: Is it a CNS(central nervous system)-like neuronal structure?

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The nerve ring of hydra is a ring of neurons whose neurites make a bundle running circumferentially around the hypostome. The nerve ring was demonstrated to be composed of a nerve bundle containing about 30 neurites by electron microscopy. The nerve ring shows static developmental characters in contrast to the dynamic features of hydra nerve net. Functions of the hydra nerve ring correspond to the function of the inner nerve ring of hydrozoan jellyfish. The jellyfish nerve ring is considered to be a primitive central nervous system of radiates. Moreover, its structure and location are similar to the nerve ring of other animals such as nematodes and starfishes. Hydra has many abilities to perform neural functions comparable to CNS (central nervous system) of bilaterians

Considering these facts, we proposed a hypothesis “the nerve ring of hydra is a CNS-like nerve structure”. In the present study, we examined the presence of the nerve ring in marine cnidarians (hydrozoan, jellyfish, sea anemone, and coral) to test the hypothesis described above. The results show the nerve ring is ubiquitous in polyps of marine cnidarians as well as hydromedusae.