

Branching pattern and morphogenesis of medusa tentacles in the jellyfish, *Cladonema pacificum*

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The medusa tentacles in *Cladonema pacificum*, unlike those in many other jellyfishes, are branched with branches bearing nematocyst clusters and those having adhesive organs. Therefore, this particular species provides us unique opportunities to study mechanisms by which branched structures are created while different tissue types are differentiated within the structure. It could also help us to understand how a new trait such as the jellyfish branch might have been acquired during evolution by comparing the mechanisms with other jellyfish species. To tackle with these rather big questions, we started our analyses by describing how the tentacle branches of *C. pacificum* are established. We found that new branches are successively created one by one at the proximal region of the main tentacle, which extends from the edge of the medusa umbrella, while the main tentacle grows its length. We also found that the tentacle branches created undergo a functional transition from branches used for landing with adhesive organs to those for hunting with nematocyst clusters. Our tentacle ablation experiments further showed that the nematocyst clusters can be formed on normal schedule without forming the adhesive organs, suggesting that nematocyst clusters differentiate independently of adhesive organs despite the fact that these two tissue types appear in the same branch. Taken together, our current studies suggest that branching morphogenesis of the *C. pacificum* medusa tentacles might be quite unique when compared to other branching systems such as lungs and mammary glands, and were able to provide basic information for the future study on the tentacle branch morphogenesis.