Transcriptomes of giant sea anemones from Okinawa as a tool for understanding their phylogeny and symbiotic relationships with anemonefish.

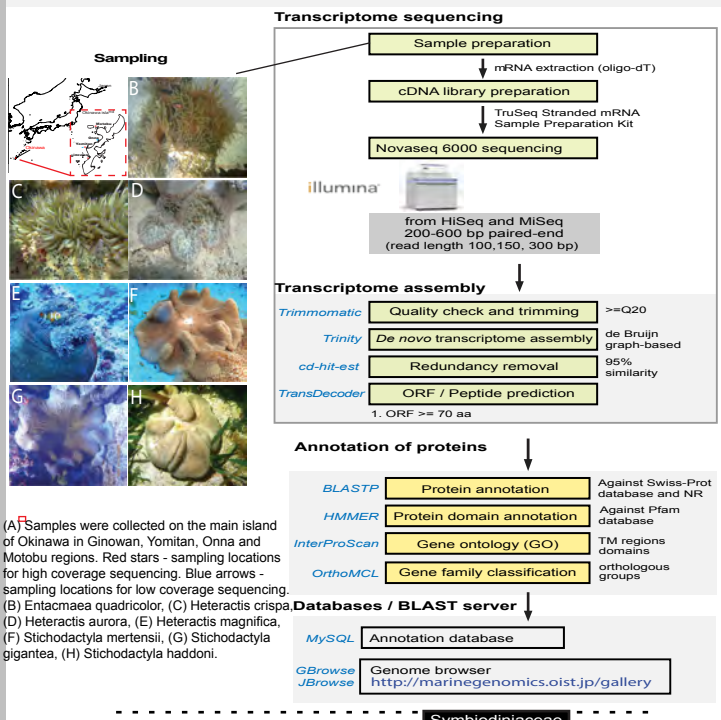
Rio Kashimoto1,2, Miyako Tanimoto3, Saori Miura1, Noriyuki Satoh2*, Vincent Laudet1,4* and Konstantin Khalturin2*

1 Marine Eco-Evo-Devo Unit. Okinawa Institute of Science and Technology. 1919-1 Tancha, Onna-son, 904-0495 Okinawa, Japan.
2 Marine Genomics Unit. Okinawa Institute of Science and Technology. 1919-1 Tancha, Onna-son, 904-0495 Okinawa, Japan.
3 Okinawa Churaumi Aquarium, 424 Ishikawa, Motobu, Kunigami District, Okinawa 905-0206, Okinawa, Japan
4Marine Research Station, Institute of Cellular and Organismic Biology (ICOB), Academia Sinica, 23-10, Dah-Uen Rd, Jiau Shi, I-Lan 262, Taiwan

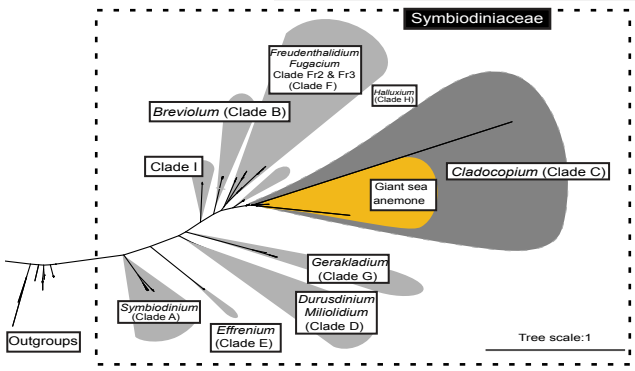
Abstract

The relationship between anemonefish and sea anemones is one of the most emblemat c examples of mutualistic symbios -is in coral reefs. Although this is a textbook example, the ma -jor aspects of this symbiosis are still not fully understood in mechanistic terms. Moreover, since studies of this relationsh -ip have usually been focused on anemonefish, much less is known about giant sea anemones, their similarities, their phy logenetic relationships, and their differences at the molecular level. Since both partners of the symbiotic relationship are im -portant, we decided to explore this well-known phenomenon from the perspective of giant sea anemones. Here, we report reference transcriptomesfor all seven species of giant sea an -emones that inhabit fringing reefs of Okinawa (Japan) and serve as hosts for six species of local anemonefish. Transcrip -tomes were used to investigate their phylogenetic relations, genetic differences and repertoires of nematocyte-specific proteins.

Methods

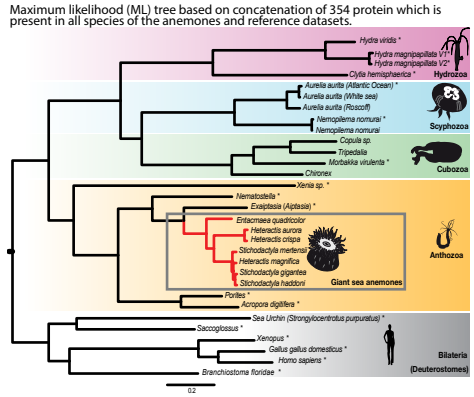


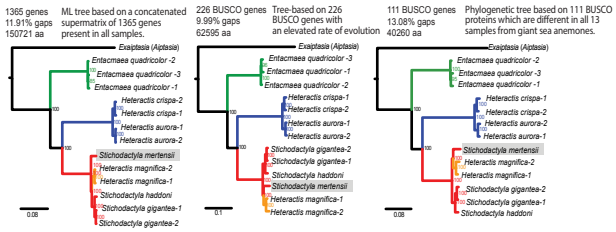
(A) Samples were collected on the main island of Okinawa in Ginowan, Yomitan, Onna and Motobu regions. Red stars - sampling locations for high coverage sequencing. Blue arrows - sampling locations for low coverage sequencing. (B) Entacmaea quadricolor, (C) Heteractis crispa, (D) Heteractis aurora, (E) Heteractis magnifica, (F) Stichodactyla mertensii, (G) Stichodactyla gigantea, (H) Stichodactyla haddoni.

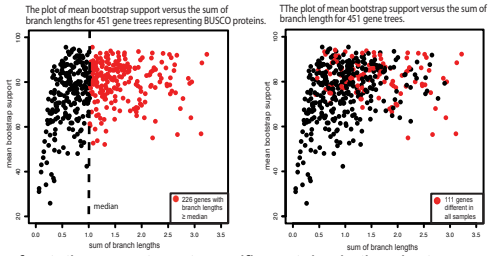


Result

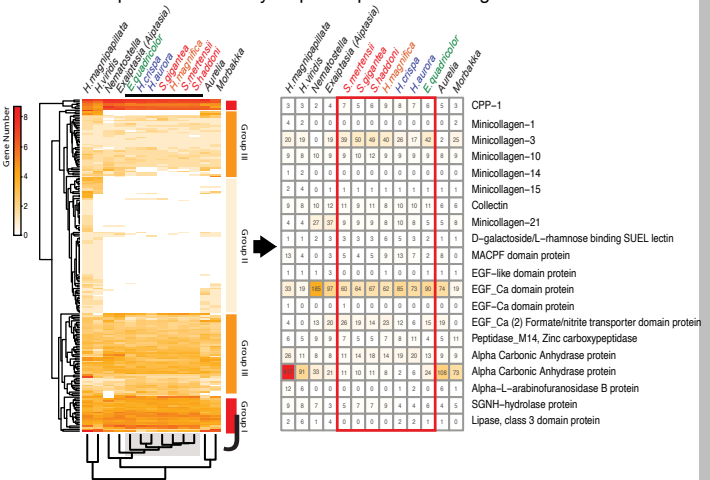
Phylogenetic relationships of seven species of giant sea anemones from Okinawa.







Identification of putative nematocyst-specific proteins in the giant sea anemones.



We performed transcriptomic analyses of seven giant anemone species native to Okinawa, Japan, to obtain key information on these important partners of the mutualistic symbiosis with anemonefish and to gain insight into their genetic makeup and relationships. As a result, we obtained high-quality transcriptomes for all seven species (over 90% complete based on BUSCO values), which can serve as the references for future research on giant sea anemones.

Reference

Kashimoto, R., Tanimoto, M., Miura, S., Satoh, N., Laudet, V., Khalturin, K. Transcriptomes of giant sea anemones from Okinawa as a tool for understanding their phylogeny and symbiotic relationships with anemonefish Zoological Science, in press
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