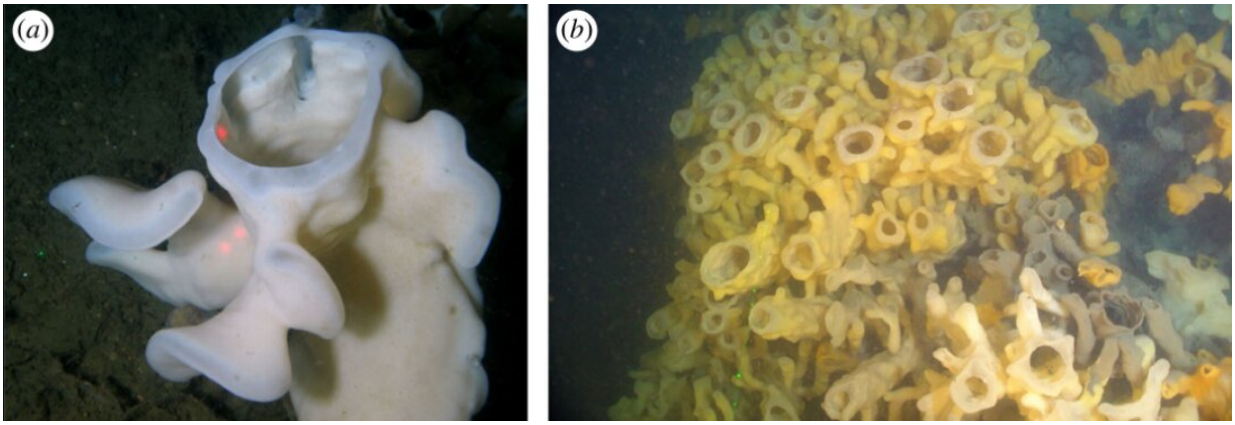
Glass sponge genome furnishes insights into evolution of biomineralization

June 22 2023



Aphrocallistes vastus: habitus, genomic overview and phylogenetic grouping in the Hexactinellida. (a) Photograph of Aphrocallistes vastus at 170 m depth on the Hecate Strait and Queen Charlotte Sound glass sponge reefs. Lasers top to bottom right are 10 cm apart (photo by James Pegg, the ROV pilot). The single red laser dot marks the oscular region ("tip") and the two laser dots the main "body," the two regions from which differentially expressed genes were assessed. (b) Photograph taken by ROV of the sponge reefs at Fraser Ridge in the Salish Sea, BC, Canada. Oscula (round openings) are about 5 cm in diameter. Credit: *Royal Society Open Science* (2023). DOI: 10.1098/rsos.230423

Researchers led by geobiologist Professor Gert Wörheide have decoded the genome of Aphrocallistes vastus, a reef-building glass sponge found off the coast of British Columbia. The sponge possesses a unique skeletal structure of amorphous silicon dioxide, from which the class of

glass sponges gets its technical name—Hexactinellida.

Well-annotated and contiguous genomes are an indispensable resource for understanding the evolution, development, and metabolic capacities of organisms. However, the ecologically important sponges are underrepresented with respect to available genome resources.

As the researchers report in the journal *Royal Society Open Science*, the sponge species possesses a compact genome with numerous nested genes. The study identified several genes connected with the growth of the animals, and in particular with the formation of their mineral skeleton.

Its results suggest that the biomineralization of silicon dioxide developed independently in different sponge classes. "Our investigations shed a new light on the biology of glass sponges, provide valuable insights into their evolutionary history, and highlight their ecological significance, deepening our understanding of these mysterious organisms and their important role in marine ecosystems," says Wörheide.

More information: Warren R. Francis et al, The genome of the reef-building glass sponge Aphrocallistes vastus provides insights into silica biomineralization, *Royal Society Open Science* (2023). DOI: 10.1098/rsos.230423

Provided by Ludwig Maximilian University of Munich