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Silica biomineralization in diatoms: models and tools

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Silicon biomineralization, which is a widespread mechanism in terrestrial and aquatic environments, is found in several kingdoms that includes both unicellular and multicellular organisms. As a result of genomic and molecular tools, diatoms have emerged as good models to study silica biomineralization and have provided most of the current knowledge on this process. Moreover, it is well established that diatoms are among the main contributors in both carbon and silicon biogeochemical cycles. However, the number of available techniques to study the dynamics of silica-frustule formation at the cellular level is still rather limited. We have recently extended the number of probes to specifically label the pre-existing or the newly synthesized frustule of several diatoms species. Such tools that are found to be very useful to understand the biology of the biomineralization process might also be of interest for more environmentally-related studies. We will also present evidences showing that the control of the pH is a key issue and that the formation of the frustule is a robust process.