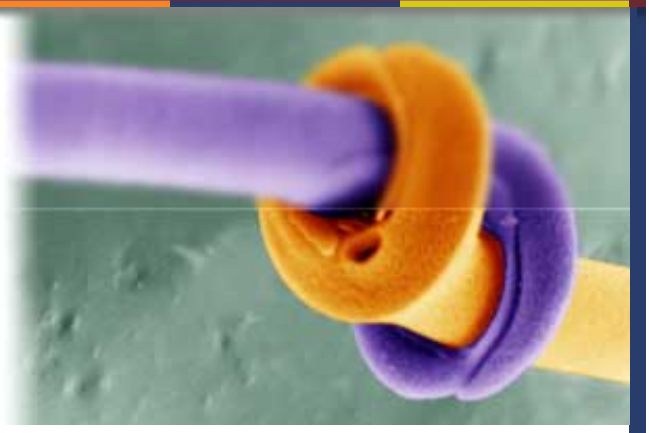

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Mini Nano-engineers

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Certainly silica is a brilliant "choice" from the point of view of its availability, strength and transparency (remember these are photosynthetic organisms), but it also has to allow the passage in and out of solutes and dissolved gasses. This is a subject that has hardly been touched on yet it is an area of study that is desperately in need of a team of physiologists and physicists. For almost the whole of the history of diatom study we have been aware that the wall is full of holes. In point of fact, what appear in the light microscope as holes have been established from electron microscopy as thin areas (areolae) of the valve in which there are pores of a very much finer dimension and, if anything, even more precisely arranged. It is through these that dissolved nutrients and gasses must pass.

This also brings us to another aspect of the diatoms that has intrigued and fascinated diatomists over the years - their precise organisation. How do diatoms create and reproduce such precision when they form new wall components? As a seminal review of the subject of diatom morphogenesis has pointed out, several processes are expressed at different scales and extend from the gross form which may be brought about by the parent frustule outside the new cell, by larger or smaller vesicles or even mitochondria within the cells or even within the deposition vesicle by the chemically arranged building blocks of the template and for an up-to-date picture of events at this scale. Macro- and micro-processes of diatom morphogenesis are receiving special attention today because of their potential in nanotechnology.

More information on these and other subjects you can find in the printed version of our journal.