Actin dependent gliding motion of a diatom, *Bacillaria paradoxa*

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SUMMARY

Bacillaria paradoxa belongs to pinnate diatom and forms a colony consisting of 2-30 cells. Adjacent cells show active sliding each other, but its mechanism and physiological meanings are not understood. We established a culture system of *B. paradoxa* with artificial seawater in our laboratory. From transmission and scaning electron microscope observations, *B. paradoxa* associated with each cells at the face of raphe. Alexa 488-phalloidin staining revealed that actin filaments are present along with the raphe and latrunculin B completely inhibited gliding. After removal of the latrunculin B, gliding motion restored. These results suggest an important role of actin in gliding motion. Electron microscopy revealed the detailed structure of frustules. In the interior of frustules, arch-shaped structures across the raphe. They pass through the cytoplasm. Under the arch-shaped structure, in the cytoplasm near the raphe, microfilament bundles along the raphe were observed with TEM. Under the fiber structure, an electron-dense structure was observed at the plasma membrane. The structure might play a key role in the sliding motion.