

Arrest of cytoplasmic streaming induces algal proliferation in *Paramecium bursaria*

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SUMMARY

The green ciliate, *Paramecium bursaria*, which bears several hundred endosymbiotic algae, demonstrates rotational microtubule-based cytoplasmic streaming, in which cytoplasmic granules and endosymbiotic algae flow in a constant direction. However, the physiological significance of this streaming is still unknown. We investigated physiological roles of cytoplasmic streaming in *P. bursaria* through the host cell cycle using video microscopy. We found that cytoplasmic streaming was arrested in dividing green paramecia, and the endosymbiotic algae proliferated only during this arrest. Interestingly, arrest of cytoplasmic streaming by pressure or a microtubule drug, nocodazole, also induced proliferation of the algae independently of the host cell cycle. Thus, cytoplasmic streaming may control algal proliferation in *P. bursaria*. This is the first report to suggest that cytoplasmic streaming controls proliferation of eukaryotic cells.