

Arrest of cytoplasmic streaming induces the proliferation of symbiotic algae in green paramecium, *Paramecium bursaria*

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SUMMARY

A green ciliate *Paramecium bursaria*, having several hundreds of endosymbiotic algae, demonstrates rotational microtubule-based cytoplasmic streaming, in which cytoplasmic granules and endosymbiotic algae flow in a constant direction in the cell (N. Nishihara, S. Horiike, Y. Oka, T. Takahashi, T. Kosaka and H. Hosoya, *Cell Motil. Cytoskeleton*, 43, 85-98, 1999). , its physiological significance is still unknown. investigated physiological roles of cytoplasmic streaming in *P. bursaria* through the host cell cycle using video-microscopy. Here, we found that, in dividing green paramecia, cytoplasmic streaming was arrested and the endosymbiotic algae proliferated only during the arrest of cytoplasmic streaming. , arrest of cytoplasmic streaming with pressure or a microtubule drug, nocodazole, also induced the proliferation of endosymbiotic algae in interphase cells independently of host cell cycle. These results suggest that cytoplasmic streaming controls the algal proliferation in *P. bursaria*. , confocal microscopic observation revealed that a division septum was formed in the constricted area of a dividing paramecium, producing arrest of cytoplasmic streaming. is a first report to suggest that cytoplasmic streaming controls proliferation of eukaryotic cells. (T.Takahashi, Y. Shirai, T. Kosaka and H. Hosoya, *PLoS ONE*, 12, e1352, 2007)