Observation of single cells of *Tetrahymena thermophila* cultured in a microchamber

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SUMMARY

We have developed a new method that enables us to use a microscope to conduct continuous observation of living motile ciliate cells at single-cell level. Direct information on timescales or individual differences, which are obscured by the ensemble-averaging inherent in conventional observation, can be obtained, and synchronization of the cell cycle in a population is not required. Indirect observations of the intracellular organelle dynamics have been made on chemically fixed cells of motile ciliates in conventional studies. Continuous observations of individual cells have been impossible, and only snapshot information or the ensemble-average of the population could be obtained. So to observe living motile ciliates at single-cell level, we constructed a new system using a microchamber made of polydimethylsiloxane (PDMS). The device can confine a single ciliate cell in each microwell, restricting the area it can swim around to within the microscopic field. In this study, we used *Tetrahymena thermophila* and we confirmed that *T. thermophila* showed stable exponential growth independent of the size of the microwell in a range from 200μm to 4mm diameter. Moreover, the generation time of *T. thermophila* could be measured. There was very little variance in generation time in *T. thermophila* growing in the microchamber.