Microinjection studies on the cytoplasmic factors responsible for low-temperature tolerance in *Paramecium caudatum*

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In previous studies we have found remarkable differences in the ability of wild stock of *P. caudatum* to survive under low-temperature conditions. To test the presence of cytoplasmic factors that are associated with low-temperature tolerance, we performed cytoplasm transplantation experiments among stocks showing high survival rate at 5°C and stocks showing low survival rate. As a result, we have found an increase of survival rate in low survival stocks after microinjection of cytoplasm from high survival stocks. The microinjection of fractions prepared from a high survival stock by preparative centrifugation showed that the cytoplasmic factor was predominantly fractionated in the supernatant. Preliminary characterization suggests that the factor is heat stable. Our study provides a new opportunity for understanding of molecular mechanisms underlying low-temperature tolerance in unicellular organisms.