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Lateral gene transfer occurs from the micronucleus-specific bacterium *Holospora elegans* to the host *Paramecium caudatum*

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The bacterium *Holospora elegans* is a micronucleus-specific symbiont of the ciliate *Paramecium caudatum*. *Holospora*-bearing paramecia survive well compared with *Holospora*-free paramecia under heat-shock conditions. Furthermore, aposymbiotic cells (paramecia treated with penicillin to remove *H. elegans*) retain this tolerance. We therefore looked for a substance originating from *H. elegans* in aposymbiotic cells. We found that a 16S rDNA of *Holospora* remained in the macronucleus of the aposymbiotic cells. This suggests that the stress response of the host would be enhanced irreversibly, because of lateral transfer of bacterial genes to the macronucleus. The result further suggests that infection with *Holospora* enables the host to adapt to a hot environment.