

Specific expression of heat shock-related genes in the initial stage of conjugation in *Paramecium caudatum*

Sanae NAKAYAMA^{1,3}, Manabu HORI², Hiroki SUGIMOTO¹ and Hiroshi ENDOH¹ (¹Grad. Sch. of Natural Sci. & Technol., Kanazawa Univ., ²Fac. of Sci., Yamaguchi Univ., ³Aichi Cancer Center)

SUMMARY

The heat-shock protein 90 (HSP90) family is classified into two categories based on the location of the protein in the organism: cytosolic and organellar-resident types. Each protein's expression is regulated by distinct stresses. The cytosolic Hsp90 is expressed at a basal level in various organisms, while the glucose-regulated protein 94 (GRP94, which is related to the ER-resident Hsp90 family) is usually only expressed under ER stress. In this study, we identified a novel gene in *Paramecium caudatum* that encodes a putative GRP94-like protein of 92 kDa, and named it *PcGRP92*. As expected from the sequence characteristics, this gene was expressed under ER stress induced by treatment with tunicamycin. The gene was also expressed immediately after the initiation of conjugation. Treatment with geldanamycin, a specific inhibitor of Hsp90, also blocked pair formation (holdfast union) in the early stage of conjugation without disturbing initial agglutination (mating reaction), suggesting an inhibition of the pairing process. Promoter analysis using an injected expression vector revealed that a short segment (~45 bp) of the *PcGRP92* gene is regulating the conjugation-specific expression. This segment is located within the coding region near 5' end, but not in the canonical upstream region. Our observations show that multiple expression profiles of the *PcGRP92* gene are possible under different stresses, and that this gene is involved in the early stage of conjugation.