

Construction of Secretory System of Foreign Proteins using *Tetrahymena thermophila*

Chika NAKASHIMA and Hiroshi ENDOH (Dept. Biol., Fac. Sci., Kanazawa Univ.)

SUMMARY

Lower termites harbor many kinds of protists and bacteria in their hindgut. They digest cellulose with cellulases secreted from termite salivary glands and from symbiotic protists. The former cellulases work in the foregut, whereas the latter work in the hindgut; the termites have developed dual cellulose-digesting system. Using this system, lower termites digest more than 80% of the cellulosic biomass that is taken up. This system is highly efficient, but it is unusable in vitro because of the difficulty of culturing the symbiotic protists under an aerobic environment. *Tetrahymena thermophila* has many attributes of an ideal expression host of foreign proteins, such as a rapid growth rate, growth on inexpensive media, high cell density, and the ease of culturing large volumes. In this study, we intend to introduce cellulase genes from both the termite and symbionts into the *T. thermophila* genome, by which they can secrete cellulases extracellularly. Our goal is to construct a new cellulose-digesting system under an aerobic environment, combining *Tetrahymena* cells with foreign cellulase genes of different origins. Now, we are constructing a secretion system of foreign proteins such as GFP, using a prepro-peptide derived from several cysteine proteases of *T. thermophila*, and changing codons of a few cellulase genes to optimize the codon usage.