

## A novel *Thermococcus* isolated from Suiyo Seamount

# Tomohiko Kuwabara[1]; Masaomi Minaba[2]; Masahiro Kamekura[3]; Isao Inouye[4]; Chiwaka Miyako[5]; Miwako Nakashima[6]; Akihiko Maruyama[5]; Katsumi Marumo[7]; Tetsuro Urabe[8]

[1] Inst. Biol. Sci., Univ. Tsukuba; [2] Biosystem studies, University of Tsukuba; [3] Noda Inst. Sci. Res.; [4] Inst. Biological Sciences, Univ. Tsukuba; [5] AIST-IBRF; [6] AIST,Marine; [7] AIST, GSJ; [8] Earth and Planetary Science,

Univ. of Tokyo,

*Thermococcus* is a hyperthermophilic anaerobic archaeon generally observed in hydrothermal vents and belongs to Euryarchaeota. It is chemoorganotrophic and its growth is accelerated by elemental sulfur. In the present study, *Thermococcus* sp. TS1, was isolated from Suiyo Seamount. The characteristics of TS1 were described.

TS1 was irregular coccus of 0.5-3 micro m in diameter that has polar flagella, but sometimes formed cells as large as 5 micro m in diameter. The large coccus was frequently observed when elemental sulfur was added in culture medium. We developed a culturing method by which all cells in culture became large. When we observed the cells with phase-contrast microscope at room temperature immediately after culture at 90C, the cells in the form of diplococci and aggregate fused in a hour or more. This finding suggests that the large cells in the culture were formed by the spontaneous fusion. The large cells fluoresced with TRITC-EURY 498 probe in fluorescent in-situ hybridization, confirming that they are actually Euryarchaeota. Transmission electron microscopy showed that there was no cell wall in the cell surface. This finding is consistent with the fact that the cells fuse. The cell fusion suggests the possibility of lateral gene transfer. As for microorganisms devoid of cell wall, *Thermoplasma* in Archaea and *Mycoplasma* in Bacteria are well known, but no other genera have been shown to have such cell surface structure. TS1 seems to be the first example of the cell wall-less *Thermococcus*.

TS1 grew in the range of pH 5.2-8.7, 60-93C, and NaCl concentration of 1.5-4.5%, with the optima of pH 6.5, 90C, and 2.5% NaCl. The isolate could utilize yeast extract and tryptone as carbon source, but did not feed on glucose, maltose, sucrose, starch, casamino acids, acetate, and lactate. The growth of TS1 was inhibited by rifampicin and novobiocin, but not by ampicillin, chloramphenicol, streptomycin, and tetracycline at 0.1 mg/ml.

The G+C content of the genome DNA was 53.9%. By phylogenetic analysis based on 16S rDNA sequence, the new isolate was near to *T. celer*, *T. stetteri*, and *T. profundus*. In DNA-DNA hybridization with these strains, the homology was less than 70%, and TS1 was thought to represent a novel species.