

Microbial diversity in Suiyo-Seamount hot vent fluids, using a catheter type in situ incubator samples

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In extremely hot vent fluids from subsurface environment, there is a possibility to exist microorganisms including hyperthermophiles. To clarify this possibility, a heat-tolerant catheter-type in situ incubator was invented. This apparatus establishes direct trap of microorganisms in a spouting hot vent fluid. Using this new incubator, samplings of the microbes in hot vent fluids from subsurface at the Suiyo Sea Mount were conducted in Shinsei-maru/Hakuyo 2000 cruise (2001.7.26-8.11) and Natsushima/Shinkai2000 cruise (NT01-09; 2001.9.28-10.26).

The catheter-type in situ incubator is the stainless cylindrical pipe installed titanium mesh capsule, which wrapped microbial adhesion carrier (inorganic porous grain) near the tip. This apparatus is sharpened the tip, as it is possible to set in a hydrothermal vent. After excavation with a portable sea bed drilling system (BMS) in the Dainihakurei-maru cruise, this incubator was directly thrust into hydrothermal venting points in which water temperature exceeds 100 C. After 2-3 day in situ incubation, it was recovered, which microorganism in the field hot fluids expected to adhere and grow inside of the titanium mesh capsule. To prevent contamination of surface seawater microbes, this incubator was transported in the special sealing box filled with 4% bacteria-free salt water in submersible Hakuyo 2000 and Shinkai 2000. Capsule sample was aseptically removed from the pipe and taken out porous grains with black materials and hydrogen sulfide odor. Acquired grain sample was immediately preserved at -80 C for phylogenetic analysis, while a portion was used as microscopic observation and a cultivation board.

Light and fluorescence microscopic observation of the incubator samples showed that microorganisms adhered to the porous grain surface. Most of environmental clones were assigned to new members of the epsilon group of Proteobacteria within the Bacteria domain. Different microbial clones between a sulfide mound zone and a sandy zone indicated different environmental conditions. Bacterial clones found in Suiyo Sea-Mount hydrothermal field were also different from those of Southern East Pacific Rise (S-EPR). Unknown Archaeal clades were detected, as well as *Methanococcus jannaschii* or its relatives. Further analysis is undergoing.