

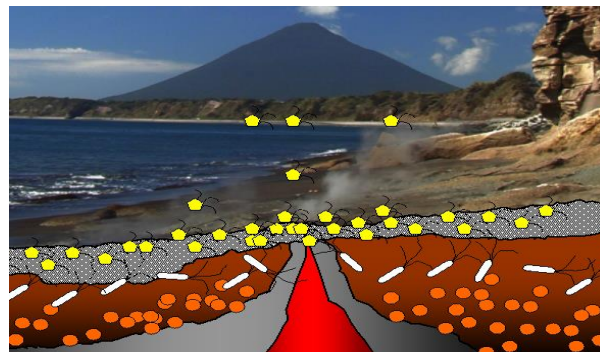
Marine microorganisms: new bio-resources

Division of Applied Biosciences, Laboratory of Marine Microbiology
Prof.; Yoshihiko Sako, Associate Prof.; Takashi Yoshida

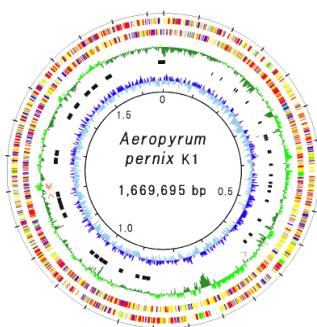
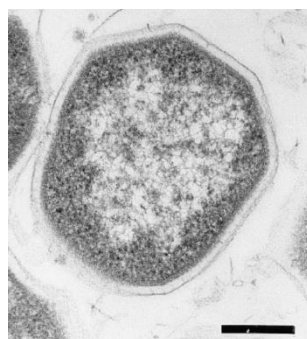
Ocean covers 70% of the Earth surface, and its biomass and bio-diversity overtake those of terrestrial ground. But studies of marine bio-resources have been done in quite few areas. Especially marine extreme environment contain various unknown microorganisms and microbiological ecosystem. Our laboratory focus characterization of novel marine microbes and development of useful genetic resources and genomic studies of harmful microalgae, by using microbiological and molecular biological techniques.

Research of novel microorganisms from marine hydrothermal environments

There are many hot springs and marine hydrothermal vents in Japan. Hyperthermophiles isolated from hydrothermal environments possess quite important bio-resources for genetic engineering and post-bioindustry. We have isolated numerous novel (hyper)thermophiles and thermophilic hydrogen bacteria from various hydrothermal environments and studied useful genes and enzymes.



Distribution of thermophiles in coastal hot spring



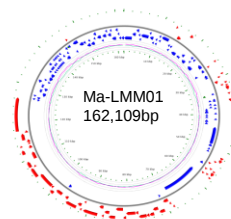
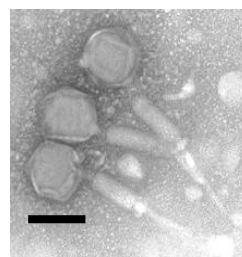
Aeropyrum pernix and Full Genome

Aerobic hyperthermophilic archaeon

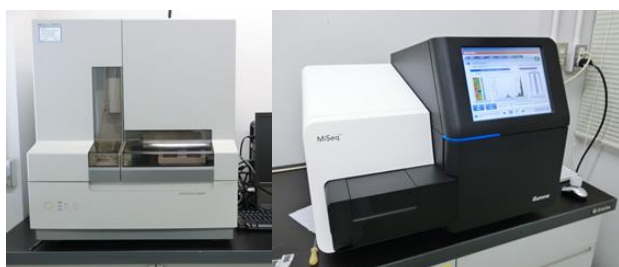
We isolated aerobic hyperthermophilic archaeon *Aeropyrum pernix*, unique organism growing under atmosphere and up to 95 ° C. Full genome sequence data of *A. pernix* K1 was available in 1999 and various useful genes are screening. We investigate thermo-tolerant proteases, site-specific endonucleases and hydrogenase expecting as hydrogen energy catalyst.

Cyanophage

Cyanobacteria are most important primary producer in aquatic ecosystem. Some species has caused many cases of animal and human poisonings over the world. We recently identified a lytic phages infecting *Microcystis aeruginosa* forming toxic blooms. Using the *Microcystis*-cyanophage system now studying infection mechanism, host resistance me, we archanism and ecological interaction between cyanobacteria and phage.



Cyanophage Ma-LMM01 and its genome map



Omics

Ecology, genomics,metabolomics and metagenomics of hydrospheric microbes and their viruses for understanding of their roles in global nutrient cycling and their evolution.

Keywords

Marine Microorganisms, Hyperthermophile, Archaea, Genome Analysis, Thermo-tolerant Enzyme, Homing Endonuclease, Intron, Hydrogenase, CO dehydrogenase, Carboxydrotroph, Toxic Harmful Microalgae, Cyanobacteria, Cyanophage, Nitrogen fixation, Molecular ecology, Metagenomics, Virome, CRISPR

Research Achievements

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