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## **Conservative gene analyses of thermophilic and hyperthermophilic bacteria**

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Totally 16,299 conservative genes, commonly found in 13 thermophilic and hyperthermophilic bacteria, were analyzed. All genes were belong to 167 COGs (clusters of orthologous groups of proteins). COG related to protein metabolism were 80 among 167 COGs. Conservative gene was none limiting only thermophiles and hyperthermophiles, meaning thermal stability is independent of specific protein. However reverse gyrase was only found in all hyperthermophilic archaeobacteria and eubacteria, meaning DNA stability is important in hyperthermophiles. Hyperthermophilic eubacteria and thermophilic archaeobacteria had different position between phylogenetic tree of gene content and 16S rRNA. Thermophilic archaeobacteria, hyperthermophilic eubacteria and archaeobacteria had similar values by the statistical analysis of distance values with 167 COGs in each organism.

### **Acknowledgement**

This work was supported by the Marine and Extreme Genome Research Center Program, Ministry of Maritime Affairs & Fisheries, Republic of Korea.

Ok Soo Kim and Nam Young Kim were supported by the program for the Training of Graduate Students in Regional Innovation which was conducted by the Ministry of Commerce, Industry and Energy of the Korean Government (2004).