



GTR Seminar

The unique metabolism of Archaea

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on Web or Lec. Room 2 in Sch. Agriculture



Archaea are phylogenetically distinct to bacteria and eukaryotes and represent the third domain of life. Archaea, like bacteria, are prokaryotes and both share common features such as the use of polycistronic gene expression. They however also display stark differences in the structure of their membrane lipids and machinery involved in DNA replication and transcription. Archaea also utilize metabolic enzymes and pathways that differ to their counterparts in bacteria and eukaryotes. Based on the archaeal genome sequences, there are many cases in which metabolic pathways established in bacteria and eukaryotes seem to be absent or incomplete. There are also cases in which predicted enzymes apparently do not have metabolic links to other enzymes. Our strategy is to search for enzymes or pathways that replace the “missing” enzymes or function with the “lonely” enzymes.

We have been focused on the metabolism of the hyperthermophilic archaeon *Thermococcus kodakarensis*. This archaeon was isolated from Kodakara Island, Japan, and displays an optimal growth temperature of 85°C. It is an obligate anaerobe and heterotroph. Genome sequencing revealed that the *T. kodakarensis* genome consists of 2,088,737 bp and contains a predicted 2,306 genes. We have also developed an efficient genetic system in this archaeon, enabling us to evaluate the roles of genes *in vivo*. The organism provides an ideal opportunity to study archaeal metabolism through the strategies mentioned above. Here I will introduce some of the enzymes and pathways unique to Archaea along with the strategies used for their identification.

Sponsored by Hideo NAKANO(Grad. Sch.Bioagricultural Sciences (hnakano@agr.nagoya-u.ac.jp ex. 4142))

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Please register this seminar from the following Google form by Dec 13. (<https://forms.gle/CcgqyVS2NH7Ld2Fm9> or the QR code). The Zoom link is informed by Dec 15

Please note that this seminar will be held as a part of the intensive course in the Graduate School of Bioagricultural Sciences, so graduate students who wish to obtain credits should apply for the intensive course "Genomes of archaea and extremophiles: What they tell us and how to use them".

