P031 Thaumarchaeota: a highly diversified and ancient archaeal phylum

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The archaeal domain is currently divided into two major phyla, the Euryarchaeota and the Crenarchaeota. Until recently, cultivated Crenarchaeota only included thermophiles/hyperthermophiles. However, many uncultivated mesophilic archaeal lineages have been discovered, some classified as 'mesophilic crenarchaeota' since they form a monophyletic group that appears related to hyperthermophilic crenarchaeota in rRNA trees. It is now growingly recognized that 'mesophilic crenarchaeota' are a major component in some biotopes and may play an important role in global nitrogen and carbon cycles. We have analysed the first genomic sequence of one of their representatives, *Cenarchaeum symbiosum*. We found that *C.symbiosum* is not closely related to hyperthermophilic crenarchaeota and may branch deeper in the archaeal phylogeny than was previously assumed. Moreover, *C.symbiosum* presents important differences with hyperthermophilic crenarchaeota in terms of gene content (including genes involved in main cellular processes). We thus suggest that *C.symbiosum* and by extension 'mesophilic crenarchaeota' should be considered as a new archaeal phylum, which we propose to name Thaumarchaeota. We anticipate that future studies on Thaumarchaeota will provide crucial information on the diversity and evolution of the third domain of life.