

EVOLUTION OF COMMONOTE (LUCA): HISTOTY REVEALED BY GENETIC ENGINEERING

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All of the living species on Earth have been evolved from the organism called LUCA (Last Universal Common Ancestor), senancestor or Commonote (Yamagishi et al. 1998). We defined the Commonote as the last and the latest common ancestral species, which shared the gene pool, of all the extent organisms. The Commonote has separated into the two groups: Bacteria and Archaea + Eucarya.

We have analyzed the genes of the translation system. Because the system is essential and possessed by all species, it is ideal to analyze the evolution of species. From the analysis of the genes of the translation system following points were revealed. 1) Commonote was split into two groups: Bacteria and Archaea + Eucarya. 2) Archae and Eucarya were not clearly separated one another and the later was included in the former.

We have also inferred and reproduced ancestral protein, NDK (nucleoside di-phosphate kinase), possessed by the common ancestors of Bacteria and Archaea, and by Commonote. Analysis of the reproduced ancient NDKs showed extremely high thermal stability. The thermal stability of NDK has high correlation index to the growth temperature of the species. Accordingly, the common ancestors of Bacteria and Archaea, and Commonote were inferred to be the species once lived in very high temperature environment (Akanuma et al. 2013).

The combination of the analysis of genetic information and genetic engineering technology is a powerful tool to elucidate the characteristics of the ancestral life forms. Our results suggest that the Commonote was living in very hot environment.

References

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