

海底下のメタン生成補酵素 430 を用いたメタン生成アーキア菌数密度の推定 Detection of coenzyme F430 in deep sea sediments: A key molecule for biological methanogenesis

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We report the presence of coenzyme factor 430 (F430), a prosthetic group of methyl coenzyme M reductase for archaeal methanogenesis, in the deep sub-seafloor biosphere. At 106.7 m depth in sediment collected off Shimokita Peninsula, northwestern Pacific, its concentration was estimated to be at least 40 fmol g sediment⁻¹ (i.e. 36 pg g⁻¹ wet sediment). This is about three orders of magnitude lower than typical concentrations of archaeal intact polar lipids in similar sub-seafloor sediments. On the basis of the concentration of F430 in methanogens and conversion to biomass composed of typical sub-seafloor microbial cells, we estimated that ca. 2×10^6 cells g⁻¹ could be methanogens in the deeply buried marine sediment.

To our knowledge, this is the first study reporting F430 in a methanogenic environment of deep sub-seafloor biosphere. Further studies on the spatial and vertical distributions of F430 in the sedimentary column could potentially provide crucial information on sub-seafloor biological methanogenic processes.

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Reference:

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