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## Nitrogen isotopic signature of amino acids in microbes: a novel tool for studying biogeochemical cycles in sub-seafloor

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The microbial roles in biogeochemical cycles remain largely unknown (especially in sub-seafloor environment), mainly because of the lack of tools to explore in situ metabolic activities of microbes. The compound-specific nitrogen isotopic composition of amino acids had been demonstrated as a promising tool for estimating the food sources of organisms in the grazing food web (e.g., Chikaraishi et al. 2009). Applicability of this "amino acids method" to microbes or detritus food web, however, remains uncertain, because the method has been constructed based on the analytical results of aquatic photoautotrophs (cyanobacteria and algae), terrestrial higher plants, and animals, but not chemotrophic microbes. In this study, the nitrogen isotopic compositions of amino acids were investigated in five cultured microbes covering the three domains (Eukarya, Bacteria, and Archaea) with controlling their nitrogen sources. The results suggest that the common rule can be applied for producing nitrogen isotopic signatures of amino acids among various organisms. This would potentially be a powerful tool to clarify in situ microbial metabolism (amino acids synthesis or decomposition) and their biogeochemical roles (especially in nitrogen cycle and in organic-matter diagenesis). In this presentation, we will also report preliminary results of nitrogen isotopic composition of amino acids in sub-seafloor sediment.

Chikaraishi, Y. et al. (2009) *Limnol. Oceanogr.: Methods*, 7, 740-750.

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