Zinc isotope analysis on human tooth enamel samples to reconstruct diet of the Jomon period.

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This study investigates zinc isotope ratios in tooth enamels of human skeletal remains of the Jomon period in Japan. Carbon and nitrogen isotope analysis on bone collagen were traditionary used to reconstruct diet and trophic levels on prehistoric people. The progress of isotope measurements using MC-ICP-MS enables us to analyze isotope ratios of zinc and other metals. Some researches report that the zinc isotope ratios of animals reflect dietary sources and vary according to trophic levels. This study newly develops zinc isotope analysis on human tooth enamels. The zinc isotope analysis has great potential to reconstruct dietary information from inorganic materials of archaeological bones or fossils.

The material used in this study is SRM1400 (bone ash), six samples of human tooth enamels from the Yoshigo and Inariyama shell mounds of Aichi prefecture, and faunal remains (six deer enamels, three boar enamels, six marine fish bones, and six modern plant leaves). Zinc was purified from these samples using anion exchange resin. Zinc isotope ratios were measured by MC-ICP-MS with the zinc standard solution of AA-ETH. The mass bias was corrected with Cu standard solution added to all standards and samples. The zinc isotope ratios of SRM1400 showed similar value with the value previously reported. The difference of zinc isotope ratios between washed and unwashed samples with acetic acids were very small, suggesting no significant diagenetic alteration. The deer and marine fish samples showed the value expected from their dietary ecology. The zinc isotope ratios of Jomon skeletal remains was higher than those of plants, but lower than deer and marine fish. This result indicates that sources of zinc for humans were terrestrial and marine meat as well as terrestrial plants.

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