【Grant-in-Aid for Scientific Research (S)】

Broad Section A

Title of Project : Social Organization and Funerary Systems of Semi-Sedentary Hunter-Gatherers: reconstruction of prehistoric societies through advanced bio-archaeology

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【Purpose and Background of the Research】

Human civilization has accelerated in complexity after around 10,000 years. This cannot be simply attributed to human biological evolution, nor be explained without the foundation of "human society", which enabled the accumulation, transmission, and utilization of knowledge that made technological innovation possible. Rituals, religions, and marriage systems that unite people with a society have played an important role. We will explore these themes by reconstructing semi-sedentary societies in the Initial Jomon period.

We investigate the social organization, lifestyle, and culture of an Initial Jomon population using human, plant and animal remains (ca. 8200 to 8500calBP) excavated from the Iyai rock shelter site in Gunma Prefecture. The period marked a turning point in the human history of the Japanese archipelago, and saw the development of funerary systems, rituals, and trade, as well as a movement toward sedentary settlement. In this research, we seek to clarify the formation of the society, which changed views of life and death and social ethics, making the development of Jomon culture possible.

【Research Methods】

In order to accomplish the above purposes, we use advanced bio-archaeological techniques. Three teams (archaeology, anthropology, and genetics) will collaborate on the research, which will be conducted over a five-year period.

The archaeology team will: (1) continue excavations at the Iyai site and excavate an estimated 40~50 individuals` human remains, (2) use 3D record of the burials and reconstruct burial practices, and consider the views of life and death of the population, (3) excavate a thick contemporary ash layers deposited on the front slope of the rock shelter to recover animal and plant remains, as well as artifacts and other domestic waste, (4) identify and study the utilization of the excavated floral and faunal resources, (5) estimate the origin of excavated obsidian, and, (6) date the ash layers chronologically.

The anthropology team will conduct the following osteoarchaeological analysis (1) individual identification, and age and sex estimation, (2) examination of taphonomic signatures including cut marks, (3) estimation of kinship based on morphology, (4) paleopathological diagnosis (tooth wear, tooth decay, stress markers, etc.), (5) dietary reconstruction using carbon and nitrogen isotope analysis of bone collagen, and nitrogen analysis of individual amino acids, (6) analysis of life history based on carbon and nitrogen isotope ratios of tooth root collagen, and (8) estimation of migrations using strontium isotope ratio analysis of tooth enamel.

The genetics team will conduct the following: (1) analysis of nuclear and mitochondrial genomes to determine genetic lineages, (2) reconstruction of kinship through matrilineal and patrilineal relationships between individuals, (3) estimation of relationships with other populations based on the genetic diversity, and (4) dietary reconstruction using DNA analysis of dental calculus.

【Expected Achievements and Scientific Significance】

Most studies on Jomon skeletal remains have focused on those dating to latter periods of the Late or Final Jomon period. The present study is significant in that it allows us to reconstruct the social organization and life history of a specific Initial Jomon period population. Advanced osteoarchaeological and genetic analyses allow us to elucidate kinship relationships, sex and age structure, health and disease, and life history of the individuals. By combining this data with archaeological information on burial practices, utilization of resources, and activity, we can reconstruct the social organization, life history, and rituals of the population. The most promising areas of research are: (1) clarification of the genetic lineage of the Initial Jomon, (2) reconstruction of their society (3) reconstruction of their resource use, diet, and life history, and (4) understanding of the origin of the funerary systems in the period. There are no previous studies that have empirically reconstructed the population dynamics and marital systems of the Jomon period. This study will be groundbreaking and may open up new horizons in the field of prehistoric archaeology in Japan.

【Publications Relevant to the Project】

- Taniguchi, Y. (eds) 2021, Initial Jomon Period Human Remains from the Iyai Site and the Results of the Iyai Project, Kokugakuin University Museum
- Mizuno F. *et al.* 2020 A study of 8,300-year-old Jomon human remains in Japan using complete mitogenome sequences obtained by next-generation sequencing. *Annals of Human Biology*, 47(6), pp.555-559
- Kondo O. *et al.* 2018 A female human skeleton from the Initial Jomon period found in the Iyai rock shelter in mountainous Kanto, Japan. *Anthropological Science* 126(3), pp.151-164

【Homepage and Other Contact Information】

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