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POSTER PRESENTATION – P30

THE CONTRIBUTION OF ANCIENT GENOMES TO THE VARIATION OF BROWN FAT THERMOGENESIS IN THE MODERN JAPANESE

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Background: Brown adipose tissue (BAT) plays a role in non-shivering thermogenesis, yet its activity varies significantly among individuals and across seasons. We previously reported that BAT thermogenesis is lower and more seasonally plastic in Japanese individuals compared with continental East Asians.

Objective: Given the unique genetic ancestry of the Japanese, we hypothesized that genome variation inherited from the Jomon people, prehistoric hunter-gatherers living in the Japanese archipelago 16,000 – 2,350 years before present, contributes to the diversity of BAT activity in modern Japanese people.

Subjects and methods: We analysed genome-wide data from 416 healthy Japanese adults with BAT activity measured by FDG-PET/CT. After genotyping, imputation, and quality control, PCA was used to assess genetic similarity with East Asian populations, and ADMIXTURE analysis estimated Jomon ancestry using ancient Japanese genomes.

Results: As a result, PCA clearly distinguished modern Japanese individuals from continental populations and showed that BAT activity in our participants decreased with increasing genetic distance from continental East Asians ($p=0.036$, $\beta=-0.108$). ADMIXTURE analysis showed that Jomon ancestry was prevalent only among Japanese individuals and was strongly correlated with their PCA scores. Interestingly, individuals with higher Jomon ancestry showed significantly lower BAT activity ($p=0.018$, $\beta=-0.124$). Our findings suggest that this trait may have been an adaptation to the hunter-gatherer lifestyle and warmer climate of the Jomon period, providing an advantage against starvation by minimizing thermogenic energy expenditure.

Keywords: Cold adaptation; Brown adipose tissues; Ancient Japanese genomes; Physiological adaptation.

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