frontiers | Frontiers in Genetics

BRIEF RESEARCH REPORT
published: 26 April 2022
doi: 10.3389/fgene.2022.796979

Analysis of World-Scale Mitochondrial DNA Reveals the Origin and Migration Route of East Asia Goats

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Specialty section:
This article was submitted to Livestock Genomics, a section of the journal Frontiers in Genetics

Received: 18 October 2021
Accepted: 09 March 2022
Published: 26 April 2022

Citation:
Peng W, Zhang Y, Gao L, Feng C, Yang Y, Li B, Wu L, Wu A, Wang S, Ren X, Chen Z, Zhang M, Cai D, Wang X, Lv M, Zhang Y, Li S, Zhang Y, Huang L and Li S (2022) Analysis of World-Scale Mitochondrial DNA Reveals the Origin and Migration Route of East Asia Goats. Front. Genet. 13:796979. doi: 10.3389/fgene.2022.796979

Despite much attention on the history of goat evolution, information on origin, demographic history, and expansion route remains controversial. To address these questions, we collected 4,189 published goat DNA sequences including 1,228 sequences from 57 breeds in China and 2,961 sequences including 193 goat breeds from 71 other countries and carried out an integrated analysis. We found goat breeds from South China had the highest genetic diversity of lineage B, and subclades B2 only were found in Southwest China, suggesting that lineage B (particularly, subclade B2) probably originated from Southwest China and its surrounding areas. In addition, in this study, we found that lineage A from South China also presented higher genetic diversity and earlier expansion time (10,606 years ago), even earlier than breeds from the Middle East. Hence, we speculated that South China and surrounding areas were the origin of lineage B and also the transportation hub for lineage A spreading to North China and Southwest Asia. Furthermore, according to the analysis of correlation between genetic differentiation value λ1 and λ2 and geographical distance, we further confirmed two phases of migration in goat breeds of North China. These results will contribute to a better understanding of the origin and migration history of domestic goat.

Keywords: goat, genetic diversity, migration, origin, evolution

INTRODUCTION

The domestic goat (*Capra hircus*) was an important globally distributed farm animal that provided indispensable animal products such as meat, milk, hides, and fiber for humans and also played important roles in agriculture and culture for human civilizations (Parma, et al., 2003). Archaeological evidence showed that the Fertile Crescent region of the Near East was the domestication center of domestic goats at about 10,000 years ago (Zeder and Hesse 2000). Meanwhile, recent studies suggest Pakistan was the second, independent domestication center for Cashmere-like goat breeds. Mitochondrial DNA (mtDNA) surveys revealed that goats present different maternal lineages and had undergone population expansion at different times (Naderi,