



Paleolithic genetic link between Southern China and Mainland Southeast Asia revealed by ancient mitochondrial genomes

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Abstract

The genetic history of Southern East Asians is not well-known, especially prior to the Neolithic period. To address this, we successfully sequenced two complete mitochondrial genomes of 11,000-year-old human individuals from Southern China, thus generating the oldest ancient DNA sequences from this area. Integrating published mitochondrial genomes, we characterized M71d, a new subhaplogroup of haplogroup M71. Our results suggest a possible early migration between Southern China and mainland Southeast Asia by at least 22,000 BP.

Introduction

Since Southern China connects to Northern China and Southeast Asia, it is a critical geographic crossroads for early human migrations [1]. In recent years, the analysis of

ancient DNA (aDNA) has been employed to investigate population history. Multiple waves of migrations have been reported from East Asia into Southeast Asia since the Middle Holocene [2–4]. The hot and humid climate of Southern China and Southeast Asia is detrimental to the preservation of DNA, which contributes to the poor success rate in recovering genetic information from ancient remains in this region. As a consequence, the genetic connections between East and Southeast Asia before the Neolithic period are still poorly characterized.

To investigate the genetic characteristics of modern humans in Southern China before the Neolithic period, we obtained and sequenced the mitochondrial genomes of two 11,000-year-old ancient humans found in Southern China. Their complete mitochondrial genomes were analyzed together with the associated 4784 present-day sequences retrieved from GenBank and 82 ancient individuals from Southern China and Southeast Asia [2–4]. We aimed to identify the genetic relationship between early modern humans in Southern China and present-day Southeast/East Asians.

Materials and methods

The bone powder of two individuals over 11,000 years old were obtained from Longlin Laomocao Cave (24°38′31″N, 105°09′56″E, 11,510 Before Present (BP)) of Guangxi Zhuang Autonomous Region and Qingshuiyuan Dadong (QSYDD) (26°04′31.8″N, 106°49′53.8″E, 11,201–11,079

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