Genetic variation of 15 autosomal STRs in a population sample of Bedouins residing in the area of the Fourth Nile Cataract, Sudan

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With 1 figure and 1 table

Abstract: The purpose of the paper was to report allelic frequencies of 15 autosomal STR markers (AmpFISTR NGM PCR Amplification Kit) for Bedouin inhabitants in the area of the Fourth Nile Cataract in Sudan, and compute commonly used population and forensic biostatistical parameters. Buccal swabs were collected from 117 unrelated individuals. DNA was extracted using DNA QIAamp® DNA Mini Kit, and quantitated with Quantifiler Human Quantification Kit in a 7500 Real-Time PCR System. Amplification of 15 AmpFISTR NGM PCR Kit loci was performed in PCR System 9700. Electrophoresis and typing were performed in 3130 Genetic Analyzer. Arlequin v3.5 software and PowerStats v1.2 spreadsheet were used for statistical calculations. The STR frequency distributions showed no deviations from HWE. The combined values of Matching Probability and Power of Exclusion are $1.77 \times 10^{-18}$ and 0.9999996, respectively. The average observed heterozygosity over 15 loci is 0.8069. Five different allelic microvariants were found. A significant linkage disequilibrium was observed in five pairs of loci. A 15 STR population database has been established for Sudanese Bedouins. The systems studied have been shown to be useful tool for personal identification in this population.

Keywords: Autosomal STRs; Population genetics; Bedouins; Sudan

Introduction

Sudan had been the largest country in the continent (until split into two countries – North Sudan and South Sudan in July 2011), often referred to as “Little Africa” not only because of its geographical location but also due to the large number of ethnicities and tribes that inhabit the area (Hirschberg 1965). The population of Sudan, particularly in the Nile valley, has been formed by several waves of migration from the north-western Africa and Asia across the Sinai peninsula and Yemen. The migration climaxed in Neolithic Period along with the simultaneous migration from the south. Islamisation and arabisation of Sudan resulted in the intermixture of the indigenous Christian population that originated from ancient Meroe and Nubia (Pudlo 1999). These past migration patterns remain to be fully examined by the estimation of genetic parameters.

In this paper we present genetic data on 15 AmpFISTR NGM markers for a population sample comprising four indigenous Bedouin groups: Shaghiya, Manasir, Ababda and Hassaniya, which inhabit Dar al-Manasir – the area of the Fourth Nile Cataract, the most impassable of all rapids of the river (Fig. 1). Dar al-Manasir is among the most neglected areas in North Sudan. The tribes are concentrated in villages...