

## Mitochondrial DNA Polymorphism and Phylogenetic Relationships of Proto Malays in Peninsular Malaysia

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**Abstract:** This study focus on the phylogenetic relationships among six Proto-Malay tribes (Jakun, Temuan, Semelai, Kuala, Seletar and Kanaq) and the effectiveness of using HVSI D-loop region segment and a 9 bp deletion of the intergenic region of COII/tRNA<sup>Lys</sup> of mtDNA in portraying the phylogenetic relationships. The analysis showed high pairwise differences among Kanaq, Jakun and Semelai. Thirty two haplotypes were formed from 89 D-loop sequences of Proto Malay individuals. Deletion on the 9 bp tandem repeats of COII/tRNA<sup>Lys</sup> was detected in Semelai and Orang Kuala. Neighbor-Joining, Maximum Parsimony and Maximum Likelihood analysis revealed Jakun and Semelai haplotypes are the earliest to split from ingroups and showed that Jakun may be an ancestor for the Malay populations in the Malay Peninsular, which also support the anthropological findings. Nine basepair deletion of COII/tRNA<sup>Lys</sup> intergenic region had occurred in two clades. Results indicates a close relationships among Semelai, Temuan and Jakun. Most Kanaq and Seletar sequences were merged into tribe specific haplotypes, showing close relationships within tribes. The HVS I D-loop region of most Proto Malays are highly variable as 27 of 32 haplotypes were subgroup-specific. The HVS I of D-loop successfully revealed the close relationships among the Proto-Malays but was less effective in discriminating each tribe. Detection of ancestries for the Proto Malays using 9 bp deletion of COII/tRNA<sup>Lys</sup> intergenic region reveals the Asian origins for Kuala and Semelai.

**Key words:** Mitochondrial DNA polymorphism, Proto Malays, HVS I, Orang Asli, COII/tRNA<sup>Lys</sup> intergenic region

### INTRODUCTION

Peninsular Malaysia is a region with a great diversity of human population formed by Malays, Chinese, Indian and the minority aboriginal (Orang Asli) populations (Lye, 2001; Hood, 2006). The Orang Asli of Peninsular Malaysia is separated into three main tribal groups, the Negrito, the Senoi and the Proto Malays based on the physical appearance and sociological differences (Fig. 1) (Nicholas, 2000; Bellwood, 1997; Hood, 2006; JHEOA, 2002).

Negrito is believed to be the earliest to arrive in Peninsular Malaysia, in about 25, 000 years ago. To date, Negrito has the least populations among the three Orang Asli groups. Their settlements are isolated and scattered but mainly distributed in the Northern and middle part of the peninsular. The Negritos are physically similar to Andaman islanders, Aeta in the Philippines, Melanesians and Tasmanians. They were predicted to have originated

from Africa and spread throughout Southeast Asia (Fix, 1995; JHEOA, 2002; Macaulay *et al.*, 2005).

Senoi is the largest Orang Asli group in Peninsular Malaysia (Nicholas, 2000) and mainly settle from the Middle to Northern part of the peninsular. Senoi is estimated to reach Peninsular Malaysia during the second wave of migration in about 8,000 years ago from South Asia, the mountain areas of Cambodia and Vietnam (Nicholas, 1996; Baer, 1999). Senoi has Mongoloid physical characteristics and speaks Khmer dialects (Nicholas, 1996). However, some believe Senoi are descendants of Australoid from Australia and Veddoid from South India (Fix, 1995).

The second largest race of Orang Asli, the Proto Malays were separated into six tribes, including Jakun/Orang Hulu, Temuan, Semelai, Kuala, Kanaq and Seletar (Fig. 1). Fix (1995) had categorized the Proto Malays into three categories: the first category consists of Tribes of Melayu Asli, who speak Malay and wear