

TECHNICAL NOTE

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The Distribution of D1S80 and VWA Alleles in a Karen Population from Northern Thailand

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ABSTRACT: The D1S80 and VWA loci were studied in a Karen population from Northern Thailand by the polymerase chain reaction and polyacrylamide gel electrophoresis. Twelve D1S80 and six VWA alleles were found. No deviations from the Hardy-Weinberg and linkage equilibrium were observed. The power of exclusion (PE) from the analysis of the D1S80 and VWA locus is 0.67 and 0.45, respectively, the power of discrimination (PD) is 0.95 and 0.85, respectively, with a combined PD of 0.99 and PE of 0.82.

KEYWORDS: forensic science, DNA typing, population genetics, D1S80, VWA, polymerase chain reaction, Karen, Thailand

The variable number of tandem repeats (VNTR) locus D1S80 (1-3) and short tandem repeat (STR) locus VWA (4,5) have been studied in details in major ethnic groups. Population data for both loci are also available for native northern Thais (6,7). Data on ethnic minorities in Northern Thailand are, however, not at hand. Here we report on results obtained from Karen, the largest of the minority groups in the North.

Materials and Methods

Sample Preparation

Buccal cells were collected from 89 Karens in three villages in the district of Chomtong, Chiang Mai province, Northern Thailand, and DNA was extracted following the Chelex 100 method (8).

Amplification and Allele Typing

D1S80 (9) and VWA (4) alleles were amplified and separated on polyacrylamide gels (10,11); the amplicons were detected by sil-

ver-staining (9). Allele typing was performed using a commercial D1S80 allelic ladder (Perkin-Elmer) and a VWA allelic ladder constructed from alleles which were amplified separately and mixed afterwards.

Statistical Analysis

The Hardy-Weinberg equilibrium (HWE) was based on comparison of observed and expected genotypes according to Dickinson-Gibbons (12). The power of discrimination and power of exclusion in one-parent case were calculated according to Fisher (13) and Garber and Morris (14), respectively. Linkage analysis was done using the computer program SPSS.

Results and Discussion

In this Karen population sample, 12 D1S80 alleles and 30 genotypes were found, allele 18, 24, and 31 are the most common ones with a frequency of 0.219, 0.230, and 0.219, respectively (Table 1). The number of VWA alleles and genotypes was 6 and 12, respectively (Table 2). The high frequency (0.500) of allele 14 is striking. The data of both loci showed no significant deviation from the Hardy-Weinberg-equilibrium (D1S80: $\chi^2 = 1.136$; $0.75 < p < 0.90$, $df = 3$; VWA: $\chi^2 = 1.273$; $0.9 < p < 0.975$, $df = 5$) and no association of alleles of both loci was observed ($\chi^2 = 61.220$; $p = 0.236$; $df = 55$). The power of discrimination (PD) and the power of exclusion (PE) for the D1S80 locus are 0.95 and 0.67, respectively. PD and PE for the VWA locus are 0.85 and 0.45, respectively. The combined PD and PE of both loci is 0.99 and 0.82.

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TABLE 1—D1S80 alleles (n = 178 and genotypes (n = 89) found in Karen.

Allele	Number	Proportion	Genotype	Number	Proportion
18	39	0.219	18/18	5	0.056
19	9	0.051	18/19	3	0.034
20	—	—	18/24	11	0.124
21	—	—	18/25	1	0.011
22	3	0.017	18/28	2	0.023
23	—	—	18/30	4	0.045
24	41	0.230	18/31	8	0.090
25	14	0.079	19/22	1	0.011
26	—	—	19/24	1	0.011
27	—	—	19/31	2	0.023
28	2	0.011	19/32	1	0.011
29	—	—	19/36	1	0.011
30	19	0.107	22/24	1	0.011
31	39	0.219	22/30	1	0.011
32	2	0.011	24/24	3	0.034
33	1	0.006	24/25	5	0.056
34	1	0.006	24/30	4	0.045
35	—	—	24/31	11	0.124
36	8	0.045	24/36	2	0.023
			25/25	1	0.011
			25/30	2	0.023
			25/31	2	0.023
			25/36	2	0.023
			30/31	6	0.067
			30/33	1	0.011
			30/36	1	0.011
			31/31	3	0.034
			31/32	1	0.011
			31/34	1	0.011
			31/36	2	0.023

TABLE 2—VWA alleles (n = 178) and genotypes (n = 89) found in Karen.

Allele	Number	Proportion	Genotype	Number	Proportion
14	89	0.500	14/14	23	0.258
15	2	0.011	14/15	1	0.011
16	40	0.225	14/16	18	0.202
17	14	0.079	14/17	8	0.090
18	21	0.118	14/18	12	0.135
19	12	0.067	14/19	4	0.045
			15/18	1	0.011
			16/16	2	0.023
			16/17	6	0.067
			16/18	6	0.067
			16/19	6	0.067
			18/19	2	0.023

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