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Announcement of Population Data

Population genetic data for 15 STR loci (Identifiler™ kit) in Bolivia

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ABSTRACT

Allele frequencies for 15 STR autosomal loci (D8S1179, D21S11, D7S820, CSF1PO, D3S1358, TH01, D13S317, D16S539, D2S1338, D19S433, VWA, TPOX, D18S51, D5S818 and FGA) were obtained from a sample of 200 unrelated individuals from Bolivia, South America.

Population: Samples in this study were collected from 200 unrelated healthy individuals of Amerindian (Aymara) and mestizo populations of the metropolitan area of the city of La Paz, northwest area of Bolivia, previous informed consent.

Extraction: DNA was extracted by organic phenol–chloroform–isoamyl alcohol method.

PCR: PCR amplifications were performed using the AmpFlSTR Identifiler PCR Amplification kit (Applied Biosystems, Foster City, CA, USA) according to the manufacturers' recommendations.

Typing: Amplified products were analyzed using an ABI 3100 Avant DNA sequencer (Applied Biosystems, Foster City, CA, USA). Allele designations were made according to recommendations of the DNA Commission of the ISFG [1] with the aid of allelic ladders provided by the manufacturers.

Quality control: Proficiency testing of the Spanish–Portuguese Speaking Working Group of International Society for Forensic Genetics (GEP-ISFG) (http://www.gep-isfg.org).

Results: See Tables 1 and 2.

Analysis of data: Statistical evaluations were carried out with the aid of GDA and PowerStats software packages [2,3]. Statistical parameters such as power of discrimination (PD) and a priori chance of exclusion (CE) for each loci were estimated as described by Huston [4]. Also we calculated the polymorphic information content (PIC) according to Botstein et al. [5]. The Hardy–Weinberg equilibrium for each loci were verified using the GDA program. AMOVA and population differentiation exact test were calculated with the Arlequin program [6], using the Bonferroni's correction [7].

Access of data: Available upon request to orocabadoc@hotmail.com.

Other remarks: No significant deviations from Hardy–Weinberg expectations based on the exact test (in all cases, the data were shuffled 2000 times) were found. The combined power of discrimination (PD) and the combined chance of exclusion (CE) for the 15 studied loci were >0.999999999 and 0.999984, respectively.

The allelic frequencies for each locus in Bolivia were compared with those in other Central and South American populations [8–16]. AMOVA results revealed that most of the molecular variation was due to variation within populations rather than among them, with all fixation indexes (Fst) below 0.044 (see Table 2).

In the exact test of population differentiation, statistically significant differences (after Bonferroni's correction; $P < 0.0033$) were found with the populations of Costa Rica [8], El Salvador [9], Venezuela [10], Honduras [11], Argentina [13], Brazil [14] and Mexico [15]. No differences were observed with the population of Peru [12]. Moreover, the results of this study have been also compared with other populations of Bolivia [16]. Statistically significant differences were found with the Beni population whereas no differences were observed with the Quechua and Aymara populations.

In conclusion, a Bolivian population database has been established for the 15 STR systems studied. These systems have been shown to be useful tool for personal identification.

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Table 1
Observed allele frequencies for 15 STR loci in the Bolivian population.

Allele	D8S1179	D21S11	D7S820	CSF1PO	D3S1358	TH01	D13S317	D16S539	D2S1338	D19S433	VWA	TPOX	D18S51	D5S818	FGA
6						0.226						0.003			
7			0.003			0.563								0.158	
8			0.040	0.005		0.015	0.013	0.005				0.663	0.003		
9	0.003		0.050	0.008		0.028	0.345	0.318				0.020		0.088	
9.3						0.168									
10	0.058		0.253	0.223		0.003	0.138	0.238				0.010	0.005	0.028	
10.2										0.003					
11	0.065		0.398	0.328			0.160	0.170		0.008		0.200	0.008	0.540	
12	0.130		0.230	0.370			0.123	0.190		0.028		0.105	0.095	0.153	
12.2										0.013					
13	0.290		0.028	0.060			0.143	0.073		0.163	0.008		0.170	0.035	
13.2										0.163					
14	0.225			0.008	0.025		0.073	0.008		0.330	0.013		0.250		
14.2										0.060					
15	0.213				0.510		0.008			0.148	0.045		0.173		
15.2										0.040					
16	0.015				0.310				0.010	0.035	0.348		0.115		
16.2										0.008					
17	0.003				0.123				0.178	0.003	0.400		0.118		
17.2										0.003					
18					0.030				0.068		0.138		0.030		0.013
19					0.003				0.343		0.048		0.020		0.145
20									0.135		0.003		0.008		0.050
21									0.028				0.005		0.085
22									0.045						0.065
23									0.138				0.003		0.068
24									0.045						0.163
25									0.010						0.233
26															0.145
27									0.003						0.033
28		0.045													0.003
29		0.215													
30		0.188													
30.2		0.020													
31		0.030													
31.2		0.220													
32		0.010													
32.2		0.195													
33.2		0.060													
34.2		0.013													
35		0.003													
35.2		0.003													
N	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
H	0.765	0.860	0.735	0.745	0.610	0.615	0.800	0.775	0.755	0.825	0.710	0.495	0.840	0.635	0.840
PD	0.930	0.940	0.874	0.850	0.793	0.792	0.929	0.912	0.939	0.937	0.856	0.716	0.953	0.834	0.962
CE	0.536	0.716	0.485	0.501	0.303	0.309	0.599	0.554	0.518	0.646	0.444	0.183	0.675	0.335	0.675
PIC	0.766	0.802	0.674	0.647	0.565	0.551	0.770	0.736	0.782	0.786	0.644	0.463	0.822	0.615	0.842
p	0.794	0.379	0.283	0.514	0.544	0.627	0.345	0.536	0.518	0.487	0.823	0.704	0.942	0.636	0.153

N, sample size; H, observed heterozygosity; PD, power of discrimination; CE, probability of paternity exclusion; PIC, polymorphic information content; p, Hardy–Weinberg equilibrium. Exact test based on 2000 shufflings.

Table 2
P values of population differentiation tested for each locus by an exact test and result for variation, for each locus, among populations (Fst) between this sample of Bolivia (BO) and other neighboring populations: Costa Rica (CR) [8], El Salvador (ES) [9], Venezuela (VE) [10], Honduras (HO) [11], Peru (PE) [12], Argentina (AR) [13], Brazil (BR) [14], Mexico (ME) [15] and other population of Bolivia (Beni -BO2-, Quechua -BO3- and Aymara -BO4-) [16].

Locus	BO vs. CR	BO vs. ES	BO vs. VE	BO vs. HO	BO vs. PE	BO vs. AR	HO vs. BR	BO vs. ME	BO vs. BO2	BO vs. BO3	BO vs. BO4	Fst**
D8S1179	0.0000*	0.2600	0.1594	0.7863	0.3636	0.7335	0.8306	0.1306				0.0006
D21S11	0.0000*	0.0340	0.0000*	0.0139	0.6752	0.0018*	0.0000*	0.0196				0.0048
D7S820	0.0005*	0.0682	0.0005*	0.0266	0.5718	0.0000*	0.0000*	0.0107				0.0035
CSF1PO	0.5950	0.6603	0.8141	0.6230	0.5028	0.6728	0.1235	0.7352	0.3632	0.7330	0.9578	0.0011
D3S1358	0.0000*	0.0122	0.0000*	0.0023*	0.9594	0.0000*		0.0000*				0.0113
TH01	0.0000*	0.0000*	0.0000*	0.0000*	0.0642	0.0000*	0.0000*	0.0000*	0.0000*	0.9050	0.6746	0.0441
D13S317	0.0000*	0.0002*	0.0000*	0.0001*	0.4231	0.0000*	0.0000*	0.0000*				0.0127
D16S539	0.0000*	0.0000*	0.0000*	0.0003*	0.5406	0.0000*	0.0000*	0.0000*				0.0074
D2S1338	0.0000*		0.0000*	0.0005*				0.0278				0.0109
D19S433	0.0000*		0.0029*	0.7614				0.0466				0.0053
VWA	0.0000*	0.0532	0.0000*	0.0077	0.4785	0.0000*	0.0003*	0.0000*	0.0000*	0.0811	0.3482	0.0201
TPOX	0.0000*	0.0003*	0.0000*	0.0022*	0.0091	0.0000*	0.0000*	0.0029*	0.0000*	0.0345	0.5755	0.0158
D18S51	0.0000*	0.0094	0.1997	0.0139	0.9437	0.1163	0.0055	0.4185				0.0009
D5S818	0.0000*	0.0000*	0.0000*	0.0000*	0.1288	0.0000*		0.0000*				0.0118
FGA	0.0009*	0.0659	0.0001*	0.0018*	0.7015	0.0000*	0.0000*					0.0031

* Significant differentiation test *P*-values, after Bonferroni correction.
** Variation among populations.

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