

FOR THE RECORD

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Y-STR Concordance Study Between Y-PlexTM5, Y-PlexTM6, Y-PlexTM12, Powerplex[®]Y, Y-FilerTM, MPI, and MP2

POPULATION: Minnesota Hispanics and Minnesota Asians.

KEYWORDS: forensic science, DNA profiling, short tandem repeats, Y-chromosome, concordance, DYS19, DYS385a/b, DYS389I, DYS389II, DYS390, DYS391, DYS392, DYS393, DYS437, DYS438, DYS439, DYS448, DYS456, DYS458, DYS635 (Y GATA C4), Y GATA H4, Y-GATA A7.2 (DYS461), DYS425, DYS388, DYS434, Y-GATA A7.1 (DYS460)

DNA was previously extracted by the method of Dykes (1) from 200 unrelated individuals from Minnesota, which were obtained from the Minneapolis Memorial Blood Center. These population samples were divided into Asian (100) and Hispanic (100) racial groups based on self-reporting. Samples were quantified by slot-blot analysis.

Amplification of between 0.5 and 1.0 ng of DNA was performed using Y-PlexTM5 (Reliagene, New Orleans, LA), Y-PlexTM6 (Reliagene), Y-PlexTM12 (Reliagene), Powerplex[®]Y (Promega, Madison, WI), and YFilerTM (Applied Biosystems, Foster City, CA)

kits as well as in-house primer sets Multiplex I (MPI) and MP2 (University of Central Florida, Orlando, FL). Amplification was performed as previously described (1–6), except that the reaction volume for some of the samples was 12.5 µL. Table 1 demonstrates the loci that are typed with each kit/primer set.

Amplified product was analyzed on either an ABI 310 Genetic Analyzer (Applied Biosystems) or an ABI 3100 Genetic Analyzer following the manufacturer's recommendations (5,7–10) or as previously described (6). GeneScan and Genotyper software was used to generate allele calls for Y-PlexTM5, Y-PlexTM6,

TABLE 1—Loci typed in the various amplification kits/primer sets.

Locus	Y-Plex 5	Y-Plex 6	Y-Plex 12	Powerplex Y	YFiler	MPI	MP2
DYS19		X	X	X	X		X
DYS385		X	X	X	X	X	
DYS388							X
DYS389I	X		X	X	X	X	
DYS389II	X	X	X	X	X	X	
DYS390		X	X	X	X		X
DYS391		X	X	X	X	X	
DYS392	X		X	X	X	X	
DYS393		X	X	X	X	X	
DYS425							X
DYS434							X
DYS437	X		X	X	X		X
DYS438	X		X	X	X	X	
DYS439				X	X		X
DYS448					X		
DYS456					X		
DYS458					X		
DYS635					X		X
Y GATA H4					X		X
Y-GATA A7.1							X
Y-GATA A7.2						X	

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TABLE 2—Haplotypes for 200 population samples from Minnesota Hispanics and Minnesota Asians.

Sample ID	Ethnic group	DYS19	DYS385	DYS388	DYS389I	DYS389II	DYS390	DYS391	DYS392	DYS393	DYS425	DYS434	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	Y-GATA C4 (DYS635)	Y-GATA A7.1	Y-GATA A7.2	Y-GATA H4
PA0001	Asian	15	13, 16	13	13	29	24	10	13	13	12	11	14	10	13	19	15	16	24	9	13	12
PA0004	Asian	16	13, 20	12	13	29	26	11	13	15	11	11	14	10	12	18	15	19	22	10	11	11
PA0005	Asian	15	11, 15	12	13	29	24	10	13	13	12	11	15	12	12	19	15	17	23	11	13	12
PA0006	Asian	17	14, 22	12	12	28	24	11	12	12	11	11	15	10	11	19	16	15	22	10	11	12
PA0008	Asian	14	14, 17	10	12	28	25	10	14	12	12	11	15	11	14	20	15	17	20	9	12	12
PA0009	Asian	16	12, 19	12	13	30	25	10	13	14	11	11	14	10	13	18	15	19	22	9	11	11
PA0010	Asian	14	14, 20	12	13	29	25	10	13	13	10, 11	11	14	10	13	19	14	15	21	10	11	11
PA0015	Asian	14	15, 19	10	12	28	23	10	14	12	12	11	15	11	12	20	15	18	20	9	12	12
PA0016	Asian	15	12, 17	12	15	32	24	10	13	14	11	11	14	10	11	18	15	16	21	11	10	12
PA0017	Asian	15	16, 21	12	13	29	25	10	13	14	10, 11	13	14	10	12	18	16	15	21	10	11	11
PA0019	Asian	17	13, 18	12	11	28	25	11	13	14	11	11	14	11	12	18	14	18	21	10	11	10
PA0021	Asian	15	15, 18	12	14	30	25	10	13	14	12	11	14	8	12	18	16	15	21	11	11	11
PA0022	Asian	16	14, 16	15	13	30	20	10	12	14	13	13	14	11	14	21	15	18	24	9	11	12
PA0023	Asian	15	11, 12	12	12	29	24	10	13	13	12	11	14	11	12	17	16	15	21	10	12	11
PA0024	Asian	15	15, 16	13	13	30	24	10	12	15	12	11	14	10	11	20	14	16	21	10	12	11
PA0026	Asian	13	17, 18	12	13	31	24	11	11	14	**	11	14	10	11	20	18	15	21	10	12	11
PA0027	Asian	15	15, 19	12	14	30	25	11	14	13	11, 12	11	14	10	12	17	15	15	22	10	11	11
PA0028	Asian	15	12, 13	12	12	29	22	10	14	13	11, 12	11	14	10	13	18	15	16	22	11	12	12
PA0031	Asian	14	11, 11	13	14	31	23	11	14	13	12	10	14	11	13	20	16	15	25	11	11	11
PA0032	Asian	15	12, 16	13	12	27	24	10	12	12	12	11	15	10	13	19	15	18	22	10	13	11
PA0033	Asian	16	18, 18	13	13	30	21	10	11	14	12	12	14	11	12	21	16	16	21	10	13	11
PA0037	Asian	14	13, 13	12	12	29	23	11	14	13	11, 12	11	14	10	12	19	17	14	19	10	13	12
PA0038	Asian	14	11, 14	12	14	31	24	11	13	13	12	11	15	12	12	20	16	16	23	11	12	12
PA0039	Asian	14	11, 12	13	14	31	23	11	14	13	12	10	14	11	11	19	15	15	24	11	11	12
PA0040	Asian	16	12, 20	12	13	29	25	10	13	12	11, 12	11	15	11	11	19	17	17	21	9	12	12
PA0041	Asian	15	15, 19	12	12	28	23	11	13	12	11, 12	11	15	11	11	21	16	17	21	9	10	12
PA0045	Asian	15	11, 11	13	13	29	24	10	11	15	12	13	14	10	11	21	15	15	21	11	12	11
PA0048	Asian	16	13, 14	12	12	28	23	10	14	13	11, 12	11	14	10	12	16	15	17	21	10	12	12
PA0049	Asian	15	11, 19	13	14	33	23	10	11	15	12	13	14	10	14	22	15	15	20	11	12	11
PA0050	Asian	15	17, 18	16	13	29	24	10	11	12	12	11	14	9	13	19	14	19	21	11	10	9
PA0051	Asian	14	13, 19	12	12	27	25	10	13	12	11, 13	11	15	10	13	20	15	15	22	10	13	12
PA0052	Asian	15	13, 15	12	14	31	23	10	15	12	12	11	14	10	11	18	14	18	23	12	10	11
PA0053	Asian	15	13, 13	12	12	29	23	11	14	13	11, 12	11	14	10	11	18	17	15	19	10	12	12
PA0054	Asian	14	11, 14	12	13	29	24	11	13	14	12	11	15	12	13	19	14	16	23	11	13	12
PA0056	Asian	15	14, 15	12	14	30	24	10	13	13	12	11	14	12	14	19	16	16	23	11	13	12
PA0057	Asian	14	13, 17	10	12	29	24	10	14	11	12	11	15	11	13	20	15	20	20	9	12	12
PA0059	Asian	15	13, 13	12	12	30	23	10	15	13	11, 12	11	14	10	13	18	16	15	21	11	13	12
PA0060	Asian	15	11, 19	12	13	29	22	10	14	13	12	11	15	10	12	20	15	15	25	10	12	12
PA0063	Asian	15	14, 21	10	12	28	24	10	14	12	12	11	15	11	12	20	15	18	20	9	12	12
PA0064	Asian	16	13, 18	12	13	29	25	11	13	14	11	11	14	10	13	18	15	16	22	10	11	11
PA0066	Asian	15	13, 13	12	12	28	23	10	14	13	12	11	14	10	13	16	17	17	20	10	13	12
PA0067	Asian	15	13, 13	12	12	29	23	10	13	13	11, 12	11	14	10	13	17	15	15	19	10	11	12
PA0070	Asian	14	11, 12	13	13	30	23	11	14	13	12	10	14	11	13	19	15	15	23	10	11	12
PA0071	Asian	14	15, 16	14	12	28	24	10	11	13	12	11	15	11	13	19	14	16	19	11	14	12
PA0073	Asian	14	13, 13	14	13	31	22	10	11	14	12	11	16	10	11	20	14	15	22	10	12	11
PA0074	Asian	15	19, 21	12	13	28	25	10	13	14	10, 11	11	14	9	11	18	17	16	21	10	11	11
PA0075	Asian	13	16, 18	12	13	30	24	10	11	13	**	11	14	10	11	19	15	17	22	9	12	13
PA0077	Asian	16	13, 14	12	14	30	24	11	13	14	11	11	14	10	12	18	15	18	23	12	12	12
PA0079	Asian	15	13, 19	17	13	30	23	11	11	12	12	11	14	10	12	20	15	18	21	10	11	11
PA0080	Asian	14	15, 18	10	12	28	23	10	14	12	12	11	15	11	11	20	15	19	20	9	12	12
PA0081	Asian	16	14, 20	12	12	28	24	10	13	12	11, 12	11	14	11	12	20	14	17	23	10	11	12
PA0082	Asian	17	15, 22	12	12	28	24	10	13	12	11, 12	11	15	10	11	20	15	18	23	9	12	12
PA0083	Asian	16	11, 11	12	14	32	25	11	12	13	12	11	15	11	10	20	15	16	23	11	11	12

TABLE 2—Continued.

Sample ID	Ethnic group	DYS19	DYS385	DYS388	DYS389I	DYS389II	DYS390	DYS391	DYS392	DYS393	DYS425	DYS434	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	Y-GATA C4 (DYS635)	Y-GATA A7.1	Y-GATA A7.2	Y-GATA H4
PA0084	Asian	14	13, 16	12	13	26	23	10	10	13	12	11	16	11	10	19	15	19	24	10	11	12
PA0085	Asian	15	14, 18	11	12	29	24	9	13	12	11, 12	11	14	10	11	20	14	18	22	10	12	13
PA0086	Asian	15	12, 17	13	12	28	24	10	13	13	12	11	15	10	12	19	16	17	22	9	13	12
PA0088	Asian	15	10, 20	12	14	30	22	10	13	13	11	11	14	13	12	18	15	17	20	11	12	12
PA0089	Asian	15	15, 19	12	14	30	24	10	13	13	11	11	14	10	14	18	16	16	21	11	11	11
PA0090	Asian	16	14, 19	12	12	28	24	10	13	12	11, 12	11	15	11	12	20	15	16	21	9	10	11
PA0091	Asian	15	14, 19	12	13	29	24	10	11	12	12	10	15	10	10	17	15	18	21	10	12	11
PA0092	Asian	17	13, 22	12	12	28	24	10	13	12	11, 12	11	15	10	11	20	15	19	23	9	12	12
PA0094	Asian	15	13, 20	12	13	29	24	10	13	12	11, 12	11	15	10	12	19	15	18	21	9	13	11
PA0095	Asian	14	13, 21	10	12	27	25	11	14	12	12	11	14	11	12	20	15	16	20	9	12	12
PA0099	Asian	14	13, 17	12	13	29	23	10	10	14	12	11	16	11	12	19	15	19	25	10	12	12
PA0100	Asian	14	15, 19	10	12	28	23	10	14	12	12	11	15	11	13	20	15	18	20	9	12	13
PA0102	Asian	15	11, 14	12	13	30	24	11	13	13	12	11	15	12	12	18	15	19	23	11	12	12
PA0104	Asian	15	13, 17	12	14	30	24	10	13	13	11	11	14	10	12	18	14	21	10	11	10	10
PA0106	Asian	15	10, 21	12	14	30	22	10	13	13	11	11	14	14	12	18	15	17	20	11	13	12
PA0109	Asian	14	15, 17	12	12	28	22	10	14	11	13	11	15	11	13	19	17	16	23	11	11	12
PA0110	Asian	15	13, 19	12	13	30	24	10	12	12	11, 12	11	15	10	12	21	13	17	20	9	12	13
PA0114	Asian	14	14, 14	12	12	28	25	10	9	13	**	11	15	11	11	19	15	17	23	10	12	11
PA0115	Asian	16	15, 22	12	14	30	25	11	13	13	11	11	14	10	13	18	15	17	24	10	12	11
PA0118	Asian	14	11, 15	12	12	28	23	10	12	12	12	11	15	10	12	19	18	18	20	11	12	12
PA0123	Asian	15	15, 20	12	13	29	24	10	13	14	10, 11	11	14	10	12	18	15	17	21	10	11	11
PA0127	Asian	14	13, 19	10	12	28	23	10	14	12	12	11	14	11	12	20	15	17	20	9	12	12
PA0128	Asian	14	13, 16	12	13	29	23	10	14	13	11, 12	11	14	10	12	18	15	16	19	11	12	12
PA0131	Asian	17	13, 20	12	13	30	24	11	13	14	11, 12	11	14	10	12	17	15	17	21	10	11	11
PA0133	Asian	15	11, 18	13	13	30	23	10	11	14	12	13	14	10	12	22	15	16	22	11	13	11
PA0135	Asian	14	14, 17	10	12	28	22	10	14	12	12	11	14	11	11	20	15	18	21	9	12	12
PA0136	Asian	15	11, 15	12	13	29	24	11	13	13	12	11	15	12	12	20	15	18	23	11	13	11
PA0137	Asian	15	10, 19	12	14	29	22	10	13	13	11	11	14	13	13	18	15	18	21	11	12	12
PA0138	Asian	16	15, 18	12	13	29	23	10	13	12	11, 12	11	15	10	11	20	15	18	21	9	10	13
PA0139	Asian	16	14, 17	12	12	28	24	10	13	12	11, 12	11	13	10	11	20	15	18	23	10	12	12
PA0140	Asian	15	13, 13	12	12	29	23	11	14	14	11, 12	11	14	10	11	18	16	15	19	10	12	12
PA0141	Asian	14	15, 21	13	12	28	25	10	13	14	10, 11	11	14	10	11	18	15	16	21	10	11	11
PA0142	Asian	17	13, 22	12	13	29	24	10	13	12	11, 12	11	15	10	11	20	15	19	22	9	12	12
PA0144	Asian	17	13, 18	12	14	30	25	10	13	14	11	11	14	10	14	18	15	19	21	10	11	11
PA0146	Asian	15	15, 21	12	13	30	25	11	12	15	10, 11	11	14	10	10	18	16	12	20	10	11	11
PA0149	Asian	15	15, 19	12	14	30	24	11	13	14	10, 11	11	14	10	12	18	14	16	21	10	11	11
PA0150	Asian	17	13, 22	12	12	28	24	10	13	12	11, 12	11	15	10	11	20	15	19	23	9	12	13
PA0151	Asian	16	12, 19	12	12	28	25	9	13	12	11, 12	11	14	10	11	19	14	18	22	10	13	12
PA0152	Asian	16	13, 14	12	13	30	23	10	14	13	11	11	14	10	12	16	17	15	21	10	12	12
PA0153	Asian	16	13, 19	12	13	29	24	10	13	14	11	11	14	11	13	18	15	18	22	10	11	11
PA0155	Asian	15	11, 11	13	13	29	24	10	11	15	12	13	14	10	11	21	15	15	21	11	13	11
PA0156	Asian	15	12, 17	13	12	28	24	12	13	12	12	11	14	10	12	19	15	16	21	9	13	13
PA0158	Asian	17	13, 21	12	12	29	24	10	13	12	11, 12	11	15	10	10	20	14	17	23	10	12	12
PA0160	Asian	15	13, 13	12	12	29	23	11	14	13	11, 12	11	14	10	11	18	17	15	19	11	12	12
PA0162	Asian	15	15, 19	12	12	28	23	11	13	12	11, 12	11	15	11	11	21	16	17	21	9	10	12
PA0163	Asian	14	15, 19	10	12	28	23	10	14	12	12	11	15	11	12	20	15	19	20	9	12	12
PA0164	Asian	14	13, 13	12	13	30	23	10	14	13	11, 12	12	15	10	13	18	15	15	11	12	12	12
PA0167	Asian	14	11, 13	12	13	30	25	11	13	12	12	11	15	12	13	19	16	19	23	10	12	11
PH0001	Hispanic	14	10, 15	12	13	29	24	10	13	13	12	11	15	12	12	19	16	18	23	11	12	12
PH0004	Hispanic	13	13, 14	12	14	32	24	10	14	13	12	10	13	11	11	21	15	15	22	10	12	12
PH0005	Hispanic	14	11, 15	12	14	30	25	11	13	13	**	11	14	12	13	18	16	17	23	12	13	11
PH0006	Hispanic	15	12, 13	12	13	29	25	11	13	13	**	11	15	12	12	19	17	18	22	11	12	12
PH0007	Hispanic	13	14, 17	12	13	31	24	10	15	13	12	11	14	12	12	21	15	18	23	9	11	11
PH0009	Hispanic	15	11, 14	12	14	30	24	10	14	13	12	11	14	12	12	18	15	18	23	10	13	11
PH0010	Hispanic	13	17, 19	12	13	30	24	10	11	13	**	11	14	10	11	20	18	14	9	12	12	13

TABLE 2—Continued.

Sample ID	Ethnic group	DYS19	DYS385	DYS388	DYS389I	DYS389II	DYS390	DYS39I	DYS392	DYS393	DYS425	DYS434	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	Y-GATA C4 (DYS635)	Y-GATA A7.1	Y-GATA A7.2	Y-GATA H4
PH0011	Hispanic	14	11, 14	12	14	30	25	11	13	13	12	11	15	12	12	19	15	17	23	9	12	12
PH0012	Hispanic	14	13, 14	14	12	28	22	10	11	13	12	11	16	10	11	20	14	16	22	10	12	11
PH0013	Hispanic	15	15, 17*	15	12	28	24	10	11	12	12	11	16	9	13	18	13	16	21	11	10	11
PH0015	Hispanic	14	14, 16	13	14	30	23	10	12	15	12	11	14	10	11	19	14	16	22	11	12	11
PH0017	Hispanic	14	11, 15	12	13	30	24	11	13	13	12	11	15	12	12	19	16	16	23	11	11	12
PH0018	Hispanic	15	14, 15	13	12	29	22	7	11	14	14	11	15	10	11	21	15	16	20	10	11	12
PH0019	Hispanic	15	14, 16	12	13	30	23	10	13	13	12	11	14	9	11	20	15	18	21	10	11	11
PH0020	Hispanic	14	11, 15	12	13	28	24	10	13	13	12	11	15	12	12	19	15	19	23	12	12	12
PH0022	Hispanic	16	11, 15	12	13	29	23	11	14	13	12	11	15	12	12	18	15	14	23	11	12	11
PH0023	Hispanic	14	11, 15	12	13	29	23	11	13	13	12	11	15	12	11	18	16	18	23	11	12	12
PH0024	Hispanic	14	14, 14	12	13	29	24	11	13	13	12	11	14	12	10	19	14	17	23	11	12	12
PH0025	Hispanic	14	11, 14	12	13	29	24	11	13	13	12	11	15	12	11	20	15	17	23	11	13	13
PH0026	Hispanic	14	11, 14	12	13	29	23	11	13	13	12	11	15	12	13	19	16	16	23	11	12	12
PH0027	Hispanic	14	11, 14	12	13	30	24	11	13	13	12	11	15	12	12	19	15	18	24	11	12	12
PH0031	Hispanic	14	15, 17	12	13	29	23, 24	10	15	13	12	11	14	11	11	20	16	16	22	11	13	12
PH0032	Hispanic	14	15, 17	12	13	31	24	10	14	13	12	11	15	11	11	18	14	20, 2	20	10	12	11
PH0034	Hispanic	14	12, 20	13	13	29	23	10	11	12	12	11	14	10	13	21	15	17	23	10	16	11
PH0035	Hispanic	14	11, 14	12	13	30	24	11	13	13	12	11	15	12	12	19	16	17	23	11	11	13
PH0036	Hispanic	14	11, 15	12	13	29	25	11	13	13	12	11	15	12	12	19	15	18	23	11	12	12
PH0039	Hispanic	15	14, 16	12	13	29	23	10	13	13	12	11	14	9	11	19	15	18	22	10	11	11
PH0040	Hispanic	17	18, 18	13	14	31	21	10	11	15	12	11	14	11	12	21	15	16	20	11	13	10
PH0041	Hispanic	15	11, 14	12	13	29	24	10	13	13	12	11	15	12	12	19	17	17	23	11	12	12
PH0042	Hispanic	16	16, 17	12	13	31	21	11	11	13	12	11	14	11	11	21	15	15	21	10	14	12
PH0044	Hispanic	15	16, 17	13	13	30	24	10	12	14	12	11	14	10	13	20	13	17	22	12	13	11
PH0046	Hispanic	13	14, 17	13	13	30	24	10	17	13	12	11	14	10	11	20	15	16	22	11	12	12
PH0048	Hispanic	14	11, 14	12	13	28	25	11	13	13	12	11	15	12	12	19	15	17	23	11	12	12
PH0049	Hispanic	14	11, 15	12	11	27	24	10	13	13	12	11	15	12	12	19	15	19	23	12	12	12
PH0050	Hispanic	14	11, 14	12	14	30	24	11	13	13	12	11	14	12	11	18	16	17	23	11	12	11
PH0053	Hispanic	15	14, 17*	15	12	31	23	10	11	12	12	11	15	9	13	19	13	16	21	10	10	11
PH0055	Hispanic	14	11, 15	12	13	29	24	11	13	13	12	11	15	12	12	19	16	16	23	11	13	12
PH0056	Hispanic	15	16, 17	12	14	32	21	10	11	13	12	11	14	11	11	23	16	15	23	10	14	12
PH0057	Hispanic	14	11, 14	12	13	28	24	10	13	13	10	11	15	12	12	20	16	18	23	11	12	12
PH0058	Hispanic	16	11, 14	12	13	29	25	10	11	13	12	11	14	11	10	20	16	16	24	11	11	13
PH0060	Hispanic	14	11, 14	12	13	29	25	11	13	13	12	11	14	13	11	18	17	17	23	11	12	11
PH0062	Hispanic	13	16, 16	12	14	31	24	10	15	13	12	11	14	11	12	20	16	16	22	11	13	12
PH0063	Hispanic	14	12, 13	12	13, 14	29, 31	23	11	13	13	12	11	15, 16	12	10, 11	19	15	16	23	10	13	11
PH0064	Hispanic	14	11, 11	12	13	30	25	10	13	13	12	11	15	12	12	19	16	19	24	10	10	11
PH0065	Hispanic	13	14, 17	12	13	30	25	10	14	13	12	11	14	11	10	19	15	16	23	11	12	11
PH0066	Hispanic	14	11, 11	12	13	29	23	10	13	13	12	11	15	12	13	19	18	19	23	11	12	12
PH0067	Hispanic	13	15, 17	12	14	31	24	10	15	13	12	11	14	11	11	20	17	16	22	11	13	12
PH0069	Hispanic	14	11, 15	12	13	30	24	11	13	13	12	11	15	12	13	19	16	18	23	11	12	12
PH0070	Hispanic	15	15, 19	14	13	29	23	10	11	12	12	11	14	9	11	20	15	19	23	10	13	11
PH0071	Hispanic	14	11, 14	12	15	32	24	11	12	13	12	11	14	12	11	18	15	17	23	10	12	12
PH0072	Hispanic	16	11, 13	13	13	30	24	11	13	13	12	11	16	12	12	19	16	17	23	11	13	12
PH0075	Hispanic	15	15, 15	12	12	28	22	10	11	14	14	11	16	10	12	21	17	16	21	11	12	12
PH0081	Hispanic	13	15, 18	12	12	28	24	9	13	14	14	11	14	11	12	20	15	19	22	10	12	12
PH0082	Hispanic	15	16, 18	12	13	30	23	11	15	13	12	11	14	9	11	19	15	15	22	10	11	11
PH0083	Hispanic	16	11, 11	12	13	30	25	10	11	13	12	11	14	11	10	20	16	15	24	10	12	12
PH0087	Hispanic	14	11, 14	12	13	29	23	10	13	13	12	11	15	12	11	19	15	17	23	11	13	12
PH0088	Hispanic	15	11, 14	12	14	30	24	11	13	13	12	11	14	12	12	18	15	17	23	10	12	11
PH0089	Hispanic	14	11, 14	12	14	30	23	11	13	13	12	11	15	13	12	19	17	16	24	11	11	12
PH0091	Hispanic	13	14, 17	12	12	28	22	10	16	13	12	11	14	11	11	20	16	16	22	10	13	11
PH0093	Hispanic	14	11, 15	12	13	30	24	11	13	13	12	11	14	11	12	19	16	20	23	11	13	11
PH0095	Hispanic	13	14, 15	12	13	29	23	10	15	12	12	11	14	11	10	21	15	15	22	10	12	12
PH0096	Hispanic	15	14, 15	13	12	28	21	10	11	15	14	11	15	10	11	24	16	16	21	10	11	11

TABLE 2—Continued.

Sample ID	Ethnic group	DYS19	DYS385	DYS388	DYS389I	DYS389I	DYS390	DYS391	DYS392	DYS393	DYS425	DYS434	DYS437	DYS438	DYS439	DYS448	DYS456	DYS458	Y-GATA C4 (DYS635)	Y-GATA A7.1	Y-GATA A7.2	Y-GATA H4
PH0099	Hispanic	15	13, 16	13	14	30	23	10	13	14	12	11	14	10	12	20	14	17	21	11	12	11
PH0100	Hispanic	13	13, 16	15	13	29	24	10	9	12	12	11	15	9	12	20	15	15	22	11	14	12
PH0101	Hispanic	16	13, 15	12	13	30	22	9	11	13	**	11	14	10	11	21	13	16	22	12	11	11
PH0102	Hispanic	14	14, 17	16	13	31	22	10	11	12	12	11	14	10	12	20	15	17.2	22	11	11	11
PH0103	Hispanic	14	17, 17	13	14	31	24	10	14	13	**	11	14	10	12	20	15	16	22	11	12	12
PH0104	Hispanic	15	11, 13	12	13	29	24	11	13	12	12	11	15	12	12	19	15	17	23	10	12	12
PH0109	Hispanic	14	11, 15	12	14	30	24	11	13	13	12	11	15	12	13	19	15	18	23	10	12	13
PH0110	Hispanic	14	11, 14	12	14	31	24	10	13	13	12	11	14	11	12	18	15	17	23	10	12	11
PH0111	Hispanic	14	13, 14	15	13	31	22	10	11	12	**	11	15	9	11	20	15	15	21	10	13	11
PH0114	Hispanic	14	11, 14	12	13	29	24	11	13	13	12	11	15	12	11	20	15	17	23	11	13	13
PH0115	Hispanic	14	14, 15	12	14	30	23	10	13	13	12	11	15	12	13	19	15	17	21	10	11	11
PH0116	Hispanic	15	11, 14	12	13	29	24	11	13	13	12	11	15	12	13	19	15	17	24	11	12	12
PH0117	Hispanic	14	14, 15	12	13	29	23	10	14	11	12	11	14	11	11	18	16	15	22	11	12	12
PH0120	Hispanic	14	14, 14	15	12	29	23	10	11	13	12	11	16	10	12	21	14	15	22	10	12	11
PH0122	Hispanic	14	11, 14	12	13	29	23	11	13	13	**	11	15	12	12	19	16	16	23	11	11	12
PH0125	Hispanic	13	13, 18	12	14	32	25	10	16	13	12	11	14	11	12	20	17	16	22	11	12	12
PH0130	Hispanic	13	16, 18	12	13	30	24	10	11	13	**	11	14	10	13	20	16	17	22	9	12	12
PH0132	Hispanic	13	16, 17	12	13	30	23	10	18	13	12	11	14	11	12	19	15	17	22	11	13	11
PH0134	Hispanic	16	12, 16	13	13	30	24	10	11	13	12	11	15	10	10	21	17	15	22	10	11	12
PH0135	Hispanic	14	11, 14	12	13	29	24	11	13	13	12	11	15	12	12	19	16	16	23	11	12	12
PH0136	Hispanic	14	11, 14	13	13	29	24	11	13	13	12	11	15	12	12	19	15	19	24	10	13	12
PH0137	Hispanic	15	11, 14	12	13	29	26	10	14	13	**	11	15	12	12	19	15	17	23	10	12	11
PH0141	Hispanic	16	12, 12	13	13	29	23	10	11	13	12	11	14	10	13	22	14	17	21	11	11	12
PH0142	Hispanic	14	11, 14	12	13	29	23	11	13	13	12	11	15	12	12	19	14	16	24	12	14	12
PH0145	Hispanic	15	12, 17	15	12	29	25	10	11	12	12	11	16	9	11	19	13	18	21	11	10	11
PH0146	Hispanic	14	11, 14	12	13	29	24	10	13	13	12	11	15	12	12	19	15	18	24	11	12	12
PH0148	Hispanic	15	13, 18	15	13	32	23	10	11	12	12	11	14	10	11	20	14	17.2	21	10	11	11
PH0149	Hispanic	17	12, 13	13	13	28	24	10	13	13	12	11	15	10	11	22	14	17	22	11	11	13
PH0150	Hispanic	14	11, 14	12	13	29	24	11	13	13	12	11	14	12	13	19	16	17	24	10	12	11
PH0153	Hispanic	15	11, 15	12	13	29	24	10	13	13	12	11	15	12	11	19	15	17	23	11	12	12
PH0157	Hispanic	14	12, 14	12	13	28	24	11	14	13	12	11	15	12	12	19	15	17	23	10	12	12
PH0161	Hispanic	14	11, 14	12	14	30	23	11	13	13	12	11	15	12	11	19	15	17	23	10	12	12
PH0163	Hispanic	14	11, 15	12	13	29	24	10	13	13	12	11	15	12	11	20	15	17	23	11	12	11
PH0164	Hispanic	14	11, 15	12	13	29	23	11	13	13	12	11	16	12	12	19	18	17	23	11	12	11
PH0168	Hispanic	15	15, 16	13	13	31	21	10	11	13	12	11	14	11	13	20	16	17	22	10	14	12
PH0170	Hispanic	13	16, 17	12	14	32	25	10	14	13	12	11	14	11	12	19	17	16	22	10	13	12
PH0171	Hispanic	15	14, 15	13	12	28	21	10	11	14	14	11	15	10	11	24	16	16	21	10	11	11
PH0172	Hispanic	14	11, 14	12	13	30	24	11	13	13	12	11	15	12	12	19	17	17	23	11	12	12
PH0176	Hispanic	15	13, 17*	15	12	27	24	10	11	12	12	11	16	9	12	19	13	16	22	11	10	11

17* typed as 16.3 using Y-Plex 6 and MP1.

**Null allele—verified using singleplex primers.

Y-PlexTM12, Powerplex[®]Y, and YfilerTM. Allele calls were generated based on an empirically determined sizing window (~ 0.5 bp) for MPI and MPIL. Y-STR haplotypes generated for the 200 samples are listed in Table 2.

Eight of the 21 loci typed were typed using only one kit; thus no concordance data are available (DYS388, DYS425, DYS434, DYS448, DYS456, DYS458, Y-GATA A7.1, and Y-GATA A7.2). The remaining 13 loci were typed by at least two kits/primer sets or as many as six different kits/primer sets. A total of 11,600 Y-STR allele calls were made (the biallelic DYS385 locus was counted as one allele call). Concordance was observed for 99.96% (11595/11600) of the allele calls.

There were four samples that were typed at DYS385 as a 16.3 allele using the Y-PlexTM6 kit and MP1 primer set. These four samples were typed at DYS385 as a 17 allele using the Y-PlexTM12, Powerplex[®]Y, and YfilerTM kits. This difference has previously been reported and explained by Schoske et al. (11) in that there can be a 1 bp deletion that is located outside of the repeat region but within the region amplified using the primers in Y-PlexTM6 and MPI. This deletion is not within the region amplified using the primers in the Y-PlexTM12, Powerplex[®]Y, or YfilerTM kits.

There was one sample that was typed at DYS389II as a 28, 31 using Y-PlexTM6, Powerplex[®]Y, and YfilerTM, whereas it was typed as a 28, 30, and 31 using the primer set MPI. The gene triplication was verified for the MPI primer set by amplifying this sample with a single-plex amplification. This sample demonstrated duplication at several other loci in addition to DYS389II (DYS389I, DYS439, DYS 437). This difference was attributed to primer sequence differences.

This study demonstrates, except for the noted discrepancies described above, that all primer sets currently available will yield concordant results. Significantly, there was 100% concordance between the typing results obtained from the two most commonly used commercial Y-STR systems, namely Powerplex[®]Y and YfilerTM. Thus, results obtained for forensic samples can be compared even when using different amplification kits. In addition, databases constructed using one amplification kit may be used to determine the frequency of a particular haplotype obtained using a different amplification kit.

The complete dataset is available to any interested parties upon request to corresponding author Ann Marie Gross at ann.gross@state.mn.us

Acknowledgments

The authors would like to thank the following individuals for contributing to this work: Amy A. Liberty, Staci A. Bennett, Richard Blaaid, Angie Yoch, and Heather Wheeler from the Minnesota BCA Forensic Science Laboratory. Parts of this work were supported under Award number 1998-IJ-CX-K003 from the Office of Justice Programs, National Institute of Justice, Department of Justice. Points of view in this document are those of the authors and do not necessarily represent the official position of the U.S. Department of Justice.

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