

Supplementary Information S02

Distribution of HLA allele or sequence frequencies and basic statistics based on PCR-SSO (left), NGS-454 (middle) and NGS-MiSeq (right) typings in the Mandenka population

All frequencies and statistics have been estimated using the Gene[RATE] computer tools (<http://hla-net.eu/tools/>).

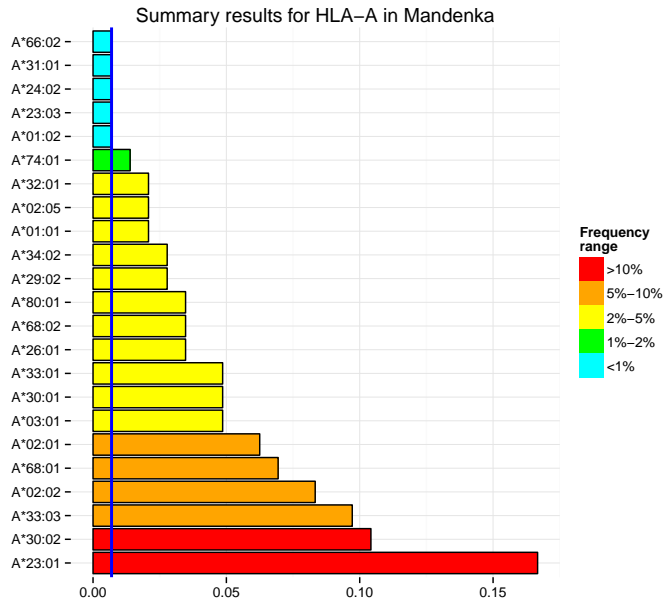
When a given locus has not been typed by a given technique, the corresponding column has been left empty.

For NGS-454, sequence numbers correspond to the lists of possible alleles given in **Supplementary Information S03**.

PCR-SSO

NGS-454

NGS-MiSeq



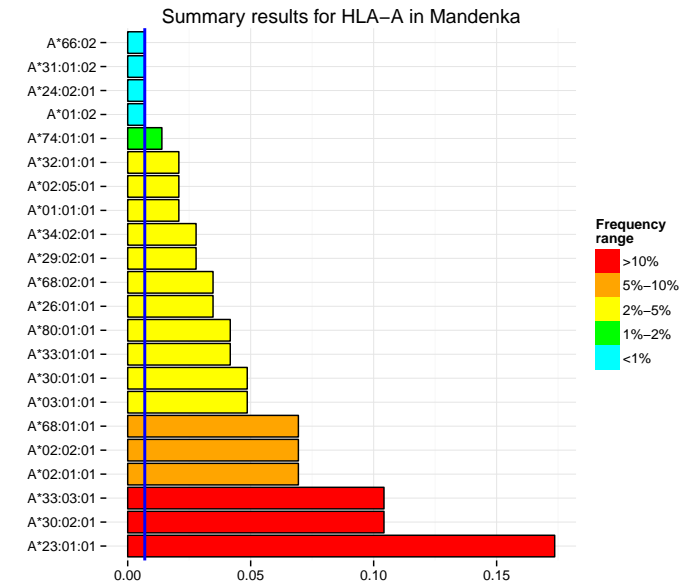
Sample size: 72

Estimated heterozygosity: 0.9223

Hardy-Weinberg equilibrium test p-value: 0.7857777

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.007 max: 0.382

Follows the complete list of alleles, including those with lower and null frequencies not shown before.



Sample size: 72

Estimated heterozygosity: 0.9199

Hardy-Weinberg equilibrium test p-value: 0.3310911

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.005 max: 0.452

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

PCR-SSO

NGS-454

NGS-MiSeq

	Allele or Haplotype Name	Frequency Estimate
1	A*23:03	0.0069
2	A*66:02	0.0069
3	A*01:02	0.0069
4	A*31:01	0.0069
5	A*24:02	0.0069
6	A*74:01	0.0139
7	A*01:01	0.0208
8	A*32:01	0.0208
9	A*02:05	0.0208
10	A*29:02	0.0278
11	A*34:02	0.0278
12	A*68:02	0.0347
13	A*80:01	0.0347
14	A*26:01	0.0347
15	A*30:01	0.0486
16	A*33:01	0.0486
17	A*03:01	0.0486
18	A*02:01	0.0625
19	A*68:01	0.0694
20	A*02:02	0.0833
21	A*33:03	0.0972
22	A*30:02	0.1042
23	A*23:01	0.1667

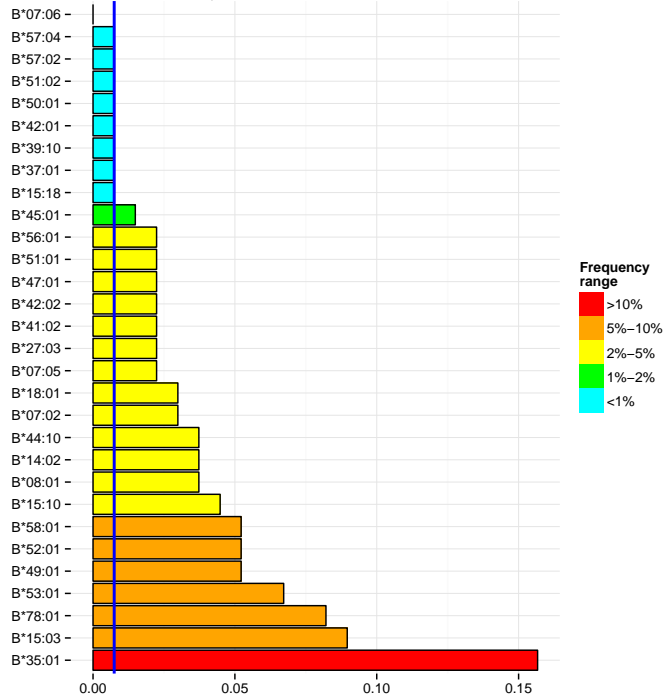
	Allele or Haplotype Name	Frequency Estimate
1	A*66:02	0.0069
2	A*01:02	0.0069
3	A*31:01:02	0.0069
4	A*24:02:01	0.0069
5	A*74:01:01	0.0139
6	A*01:01:01	0.0208
7	A*32:01:01	0.0208
8	A*02:05:01	0.0208
9	A*29:02:01	0.0278
10	A*34:02:01	0.0278
11	A*68:02:01	0.0347
12	A*26:01:01	0.0347
13	A*33:01:01	0.0417
14	A*80:01:01	0.0417
15	A*30:01:01	0.0486
16	A*03:01:01	0.0486
17	A*68:01:01	0.0694
18	A*02:01:01	0.0694
19	A*02:02:01	0.0694
20	A*30:02:01	0.1042
21	A*33:03:01	0.1042
22	A*23:01:01	0.1736

PCR-SSO

NGS-454

NGS-MiSeq

Summary results for HLA-B in Mandenka



Sample size: 67

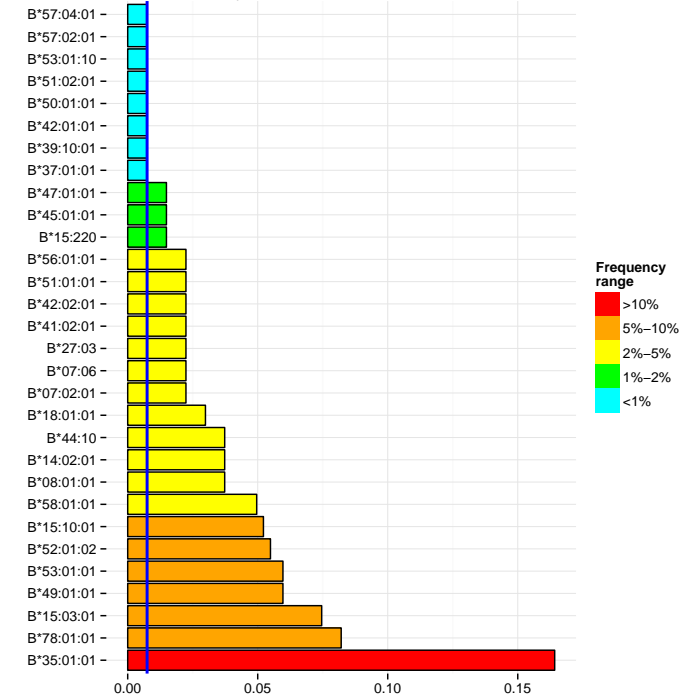
Estimated heterozygosity: 0.9358

Hardy-Weinberg equilibrium test p-value: 1

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.008 max: 0.562

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

Summary results for HLA-B in Mandenka



Sample size: 67

Estimated heterozygosity: 0.9357

Hardy-Weinberg equilibrium test p-value: 0.5237272

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.013 max: 0.684

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

PCR-SSO

NGS-454

NGS-MiSeq

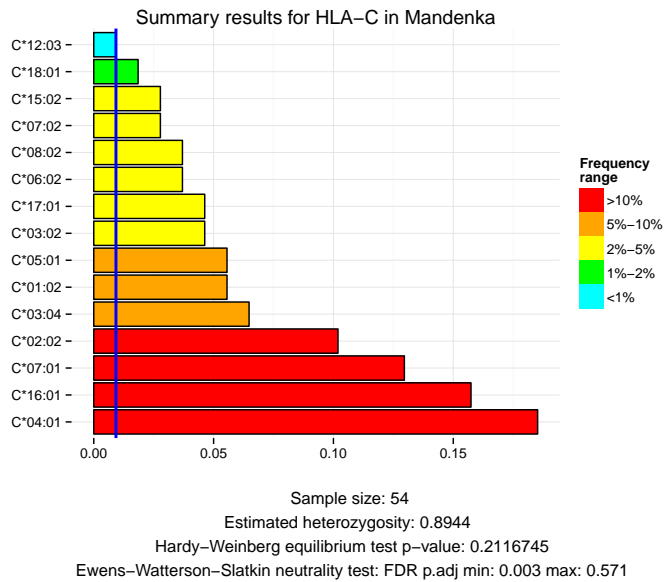
	Allele or Haplotype Name	Frequency Estimate
1	B*07:06	0.0000
2	B*15:18	0.0075
3	B*37:01	0.0075
4	B*39:10	0.0075
5	B*50:01	0.0075
6	B*57:02	0.0075
7	B*42:01	0.0075
8	B*51:02	0.0075
9	B*57:04	0.0075
10	B*45:01	0.0149
11	B*07:05	0.0224
12	B*41:02	0.0224
13	B*42:02	0.0224
14	B*47:01	0.0224
15	B*51:01	0.0224
16	B*56:01	0.0224
17	B*27:03	0.0224
18	B*07:02	0.0299
19	B*18:01	0.0299
20	B*14:02	0.0373
21	B*44:10	0.0373
22	B*08:01	0.0373
23	B*15:10	0.0448
24	B*49:01	0.0522
25	B*58:01	0.0522
26	B*52:01	0.0522
27	B*53:01	0.0672
28	B*78:01	0.0821
29	B*15:03	0.0896
30	B*35:01	0.1567

	Allele or Haplotype Name	Frequency Estimate
1	B*37:01:01	0.0075
2	B*39:10:01	0.0075
3	B*50:01:01	0.0075
4	B*57:02:01	0.0075
5	B*53:01:10	0.0075
6	B*42:01:01	0.0075
7	B*51:02:01	0.0075
8	B*57:04:01	0.0075
9	B*15:220	0.0149
10	B*45:01:01	0.0149
11	B*47:01:01	0.0149
12	B*07:06	0.0224
13	B*41:02:01	0.0224
14	B*42:02:01	0.0224
15	B*07:02:01	0.0224
16	B*51:01:01	0.0224
17	B*56:01:01	0.0224
18	B*27:03	0.0224
19	B*18:01:01	0.0299
20	B*14:02:01	0.0373
21	B*44:10	0.0373
22	B*08:01:01	0.0373
23	B*58:01:01	0.0496
24	B*15:10:01	0.0522
25	B*52:01:02	0.0549
26	B*53:01:01	0.0597
27	B*49:01:01	0.0597
28	B*15:03:01	0.0746
29	B*78:01:01	0.0821
30	B*35:01:01	0.1642

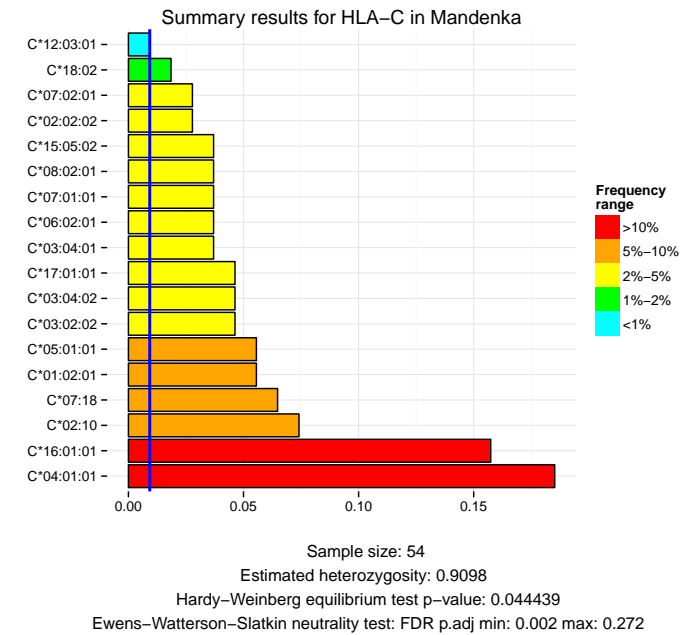
PCR-SSO

NGS-454

NGS-MiSeq



Follows the complete list of alleles, including those with lower and null frequencies not shown before.



Follows the complete list of alleles, including those with lower and null frequencies not shown before.

PCR-SSO

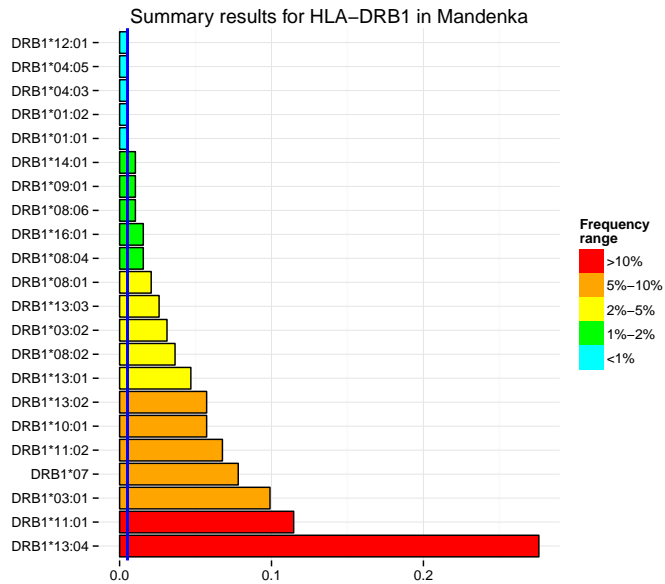
NGS-454

NGS-MiSeq

	Allele or Haplotype Name	Frequency Estimate
1	C*12:03	0.0093
2	C*18:01	0.0185
3	C*15:02	0.0278
4	C*07:02	0.0278
5	C*08:02	0.0370
6	C*06:02	0.0370
7	C*17:01	0.0463
8	C*03:02	0.0463
9	C*01:02	0.0556
10	C*05:01	0.0556
11	C*03:04	0.0648
12	C*02:02	0.1019
13	C*07:01	0.1296
14	C*16:01	0.1574
15	C*04:01	0.1852

	Allele or Haplotype Name	Frequency Estimate
1	C*12:03:01	0.0093
2	C*18:02	0.0185
3	C*02:02:02	0.0278
4	C*07:02:01	0.0278
5	C*08:02:01	0.0370
6	C*15:05:02	0.0370
7	C*03:04:01	0.0370
8	C*06:02:01	0.0370
9	C*07:01:01	0.0370
10	C*17:01:01	0.0463
11	C*03:02:02	0.0463
12	C*03:04:02	0.0463
13	C*01:02:01	0.0556
14	C*05:01:01	0.0556
15	C*07:18	0.0648
16	C*02:10	0.0741
17	C*16:01:01	0.1574
18	C*04:01:01	0.1852

PCR-SSO



Sample size: 96

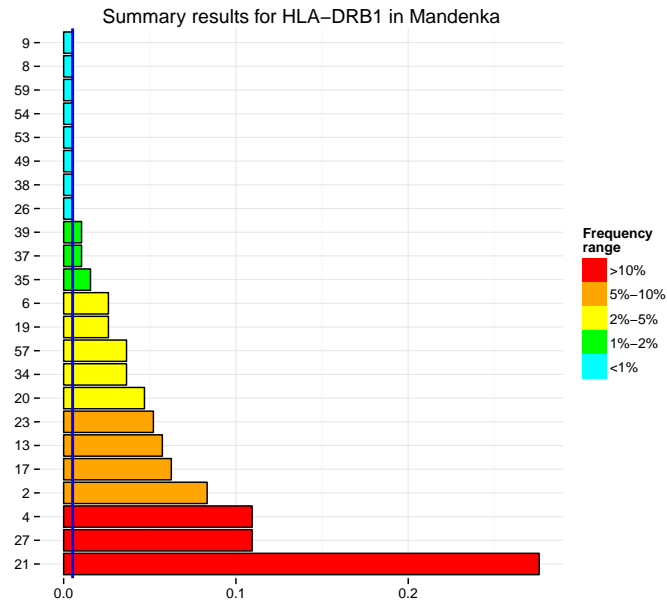
Estimated heterozygosity: 0.8771

Hardy-Weinberg equilibrium test p-value: 0.1631775

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.213 max: 0.736

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

NGS-454



Sample size: 96

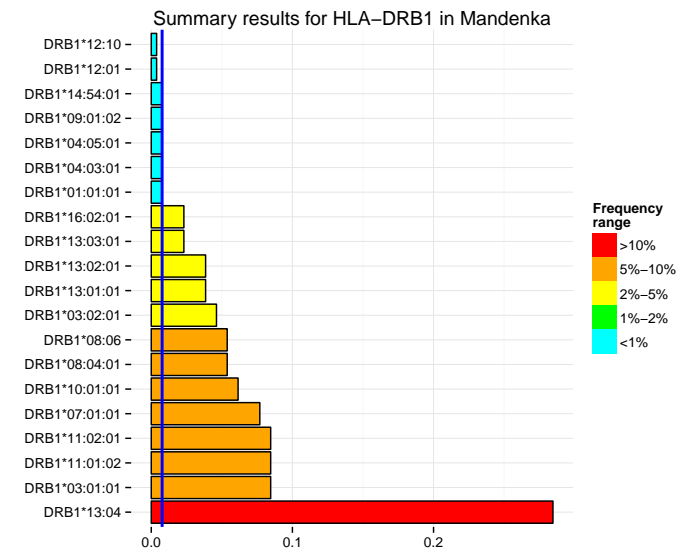
Estimated heterozygosity: 0.8762

Hardy-Weinberg equilibrium test p-value: 0.8979362

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.317 max: 0.673

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

NGS-MiSeq



Sample size: 65

Estimated heterozygosity: 0.8756

Hardy-Weinberg equilibrium test p-value: 0.08938847

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.050 max: 0.671

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

PCR-SSO

	Allele or Haplotype Name	Frequency Estimate
1	DRB1*01:02	0.0052
2	DRB1*04:05	0.0052
3	DRB1*04:03	0.0052
4	DRB1*01:01	0.0052
5	DRB1*12:01	0.0052
6	DRB1*09:01	0.0104
7	DRB1*08:06	0.0104
8	DRB1*14:01	0.0104
9	DRB1*16:01	0.0156
10	DRB1*08:04	0.0156
11	DRB1*08:01	0.0208
12	DRB1*13:03	0.0260
13	DRB1*03:02	0.0312
14	DRB1*08:02	0.0365
15	DRB1*13:01	0.0469
16	DRB1*13:02	0.0573
17	DRB1*10:01	0.0573
18	DRB1*11:02	0.0677
19	DRB1*07	0.0781
20	DRB1*03:01	0.0990
21	DRB1*11:01	0.1146
22	DRB1*13:04	0.2760

NGS-454

	Allele or Haplotype Name	Frequency Estimate
1	8	0.0052
2	26	0.0052
3	9	0.0052
4	38	0.0052
5	49	0.0052
6	53	0.0052
7	54	0.0052
8	59	0.0052
9	37	0.0104
10	39	0.0104
11	35	0.0156
12	6	0.0260
13	19	0.0260
14	34	0.0365
15	57	0.0365
16	20	0.0469
17	23	0.0521
18	13	0.0573
19	17	0.0625
20	2	0.0833
21	4	0.1094
22	27	0.1094
23	21	0.2760

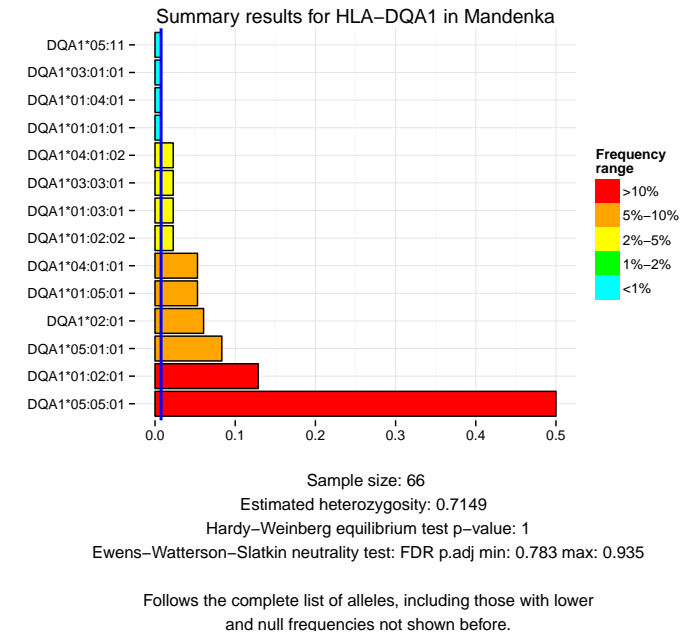
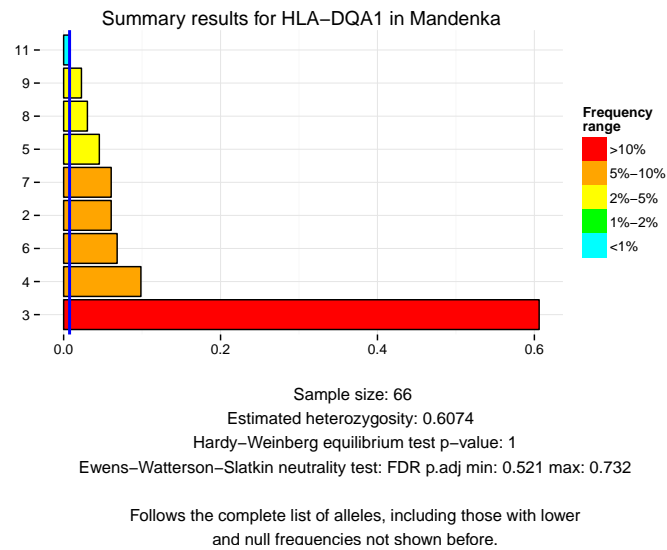
NGS-MiSeq

	Allele or Haplotype Name	Frequency Estimate
1	DRB1*12:10	0.0038
2	DRB1*12:01	0.0038
3	DRB1*01:01:01	0.0077
4	DRB1*04:05:01	0.0077
5	DRB1*04:03:01	0.0077
6	DRB1*09:01:02	0.0077
7	DRB1*14:54:01	0.0077
8	DRB1*16:02:01	0.0231
9	DRB1*13:03:01	0.0231
10	DRB1*13:02:01	0.0385
11	DRB1*13:01:01	0.0385
12	DRB1*03:02:01	0.0462
13	DRB1*08:04:01	0.0538
14	DRB1*08:06	0.0538
15	DRB1*10:01:01	0.0615
16	DRB1*07:01:01	0.0769
17	DRB1*03:01:01	0.0846
18	DRB1*11:02:01	0.0846
19	DRB1*11:01:02	0.0846
20	DRB1*13:04	0.2846

PCR-SSO

NGS-454

NGS-MiSeq



PCR-SSO

NGS-454

NGS-MiSeq

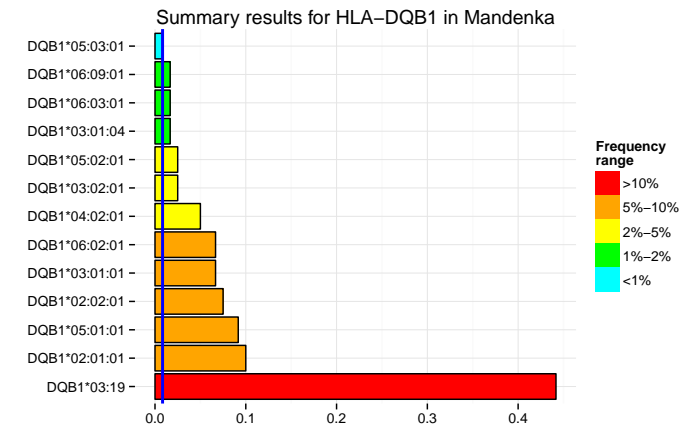
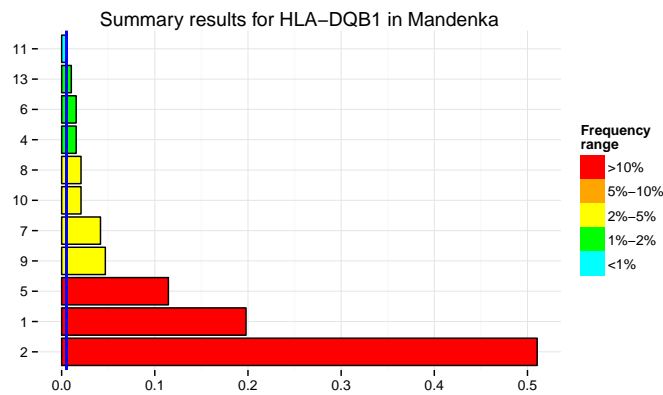
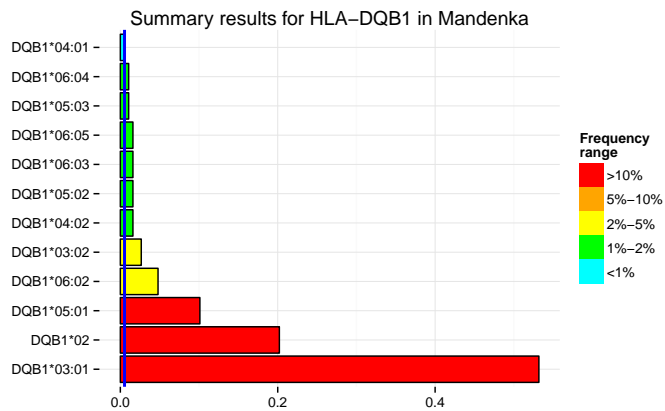
	Allele or Haplotype Name	Frequency Estimate
1	11	0.0076
2	9	0.0227
3	8	0.0303
4	5	0.0455
5	2	0.0606
6	7	0.0606
7	6	0.0682
8	4	0.0985
9	3	0.6061

	Allele or Haplotype Name	Frequency Estimate
1	DQA1*05:11	0.0076
2	DQA1*03:01:01	0.0076
3	DQA1*01:01:01	0.0076
4	DQA1*01:04:01	0.0076
5	DQA1*03:03:01	0.0227
6	DQA1*01:02:02	0.0227
7	DQA1*01:03:01	0.0227
8	DQA1*04:01:02	0.0227
9	DQA1*01:05:01	0.0530
10	DQA1*04:01:01	0.0530
11	DQA1*02:01	0.0606
12	DQA1*05:01:01	0.0833
13	DQA1*01:02:01	0.1288
14	DQA1*05:05:01	0.5000

PCR-SSO

NGS-454

NGS-MiSeq



Sample size: 94
 Estimated heterozygosity: 0.6617
 Hardy-Weinberg equilibrium test p-value: 0.7363483
 Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.897 max: 0.969

Sample size: 96
 Estimated heterozygosity: 0.6818
 Hardy-Weinberg equilibrium test p-value: 1
 Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.712 max: 0.900

Sample size: 60
 Estimated heterozygosity: 0.7673
 Hardy-Weinberg equilibrium test p-value: 1
 Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.425 max: 0.870

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

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PCR-SSO

	Allele or Haplotype Name	Frequency Estimate
1	DQB1*04:01	0.0053
2	DQB1*05:03	0.0106
3	DQB1*06:04	0.0106
4	DQB1*04:02	0.0160
5	DQB1*06:03	0.0160
6	DQB1*05:02	0.0160
7	DQB1*06:05	0.0160
8	DQB1*03:02	0.0266
9	DQB1*06:02	0.0479
10	DQB1*05:01	0.1011
11	DQB1*02	0.2021
12	DQB1*03:01	0.5319

NGS-454

	Allele or Haplotype Name	Frequency Estimate
1	11	0.0052
2	13	0.0104
3	4	0.0156
4	6	0.0156
5	8	0.0208
6	10	0.0208
7	7	0.0417
8	9	0.0469
9	5	0.1146
10	1	0.1979
11	2	0.5104

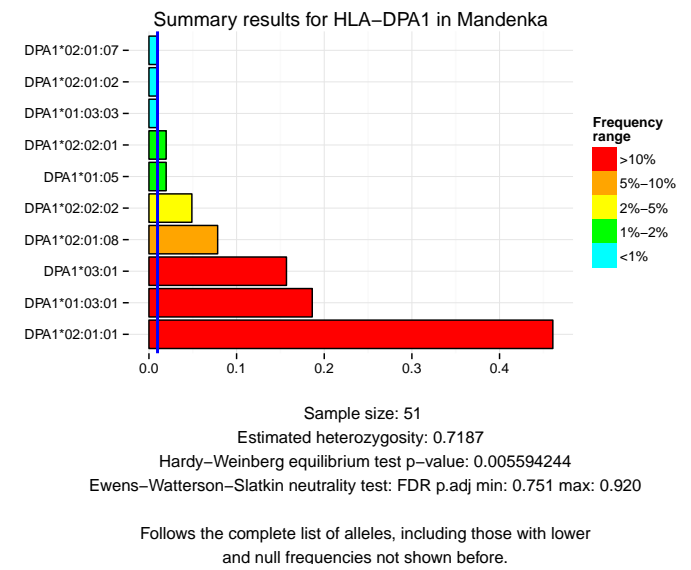
NGS-MiSeq

	Allele or Haplotype Name	Frequency Estimate
1	DQB1*05:03:01	0.0083
2	DQB1*03:01:04	0.0167
3	DQB1*06:09:01	0.0167
4	DQB1*06:03:01	0.0167
5	DQB1*03:02:01	0.0250
6	DQB1*05:02:01	0.0250
7	DQB1*04:02:01	0.0500
8	DQB1*03:01:01	0.0667
9	DQB1*06:02:01	0.0667
10	DQB1*02:02:01	0.0750
11	DQB1*05:01:01	0.0917
12	DQB1*02:01:01	0.1000
13	DQB1*03:19	0.4417

PCR-SSO

NGS-454

NGS-MiSeq



PCR-SSO

NGS-454

NGS-MiSeq

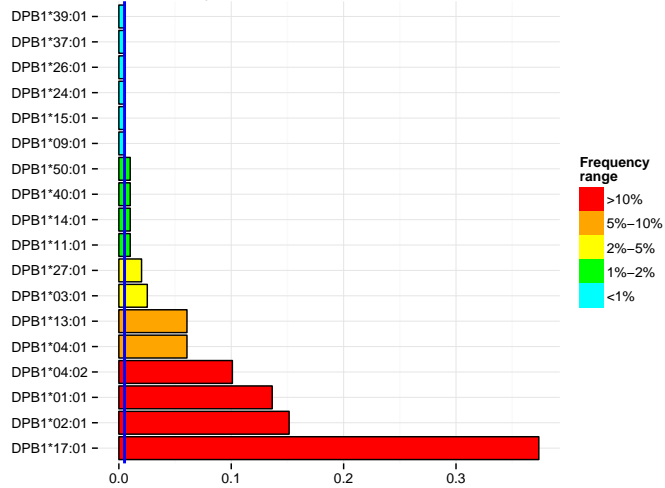
	Allele or Haplotype Name	Frequency Estimate
1	DPA1*01:03:03	0.0098
2	DPA1*02:01:07	0.0098
3	DPA1*02:01:02	0.0098
4	DPA1*01:05	0.0196
5	DPA1*02:02:01	0.0196
6	DPA1*02:02:02	0.0490
7	DPA1*02:01:08	0.0784
8	DPA1*03:01	0.1569
9	DPA1*01:03:01	0.1863
10	DPA1*02:01:01	0.4608

PCR-SSO

NGS-454

NGS-MiSeq

Summary results for HLA-DPB1 in Mandenka



Sample size: 99

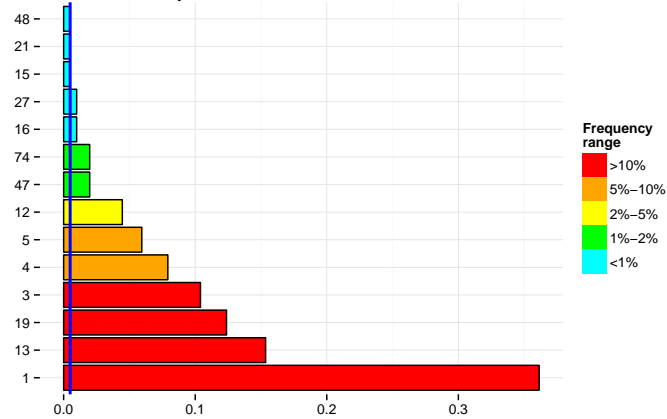
Estimated heterozygosity: 0.7996

Hardy-Weinberg equilibrium test p-value: 0.6708691

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.863 max: 0.975

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

Summary results for HLA-DPB1 in Mandenka



Sample size: 101

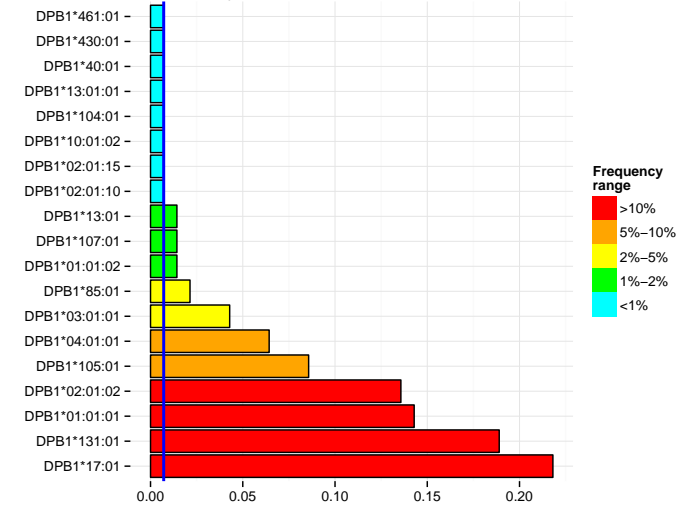
Estimated heterozygosity: 0.8068

Hardy-Weinberg equilibrium test p-value: 1

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.383 max: 0.686

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

Summary results for HLA-DPB1 in Mandenka



Sample size: 70

Estimated heterozygosity: 0.8631

Hardy-Weinberg equilibrium test p-value: 0.0551156

Ewens-Watterson-Slatkin neutrality test: FDR p.adj min: 0.719 max: 0.897

Follows the complete list of alleles, including those with lower and null frequencies not shown before.

PCR-SSO

NGS-454

NGS-MiSeq

	Allele or Haplotype Name	Frequency Estimate
1	DPB1*15:01	0.0051
2	DPB1*09:01	0.0051
3	DPB1*24:01	0.0051
4	DPB1*37:01	0.0051
5	DPB1*39:01	0.0051
6	DPB1*26:01	0.0051
7	DPB1*11:01	0.0101
8	DPB1*14:01	0.0101
9	DPB1*40:01	0.0101
10	DPB1*50:01	0.0101
11	DPB1*27:01	0.0202
12	DPB1*03:01	0.0253
13	DPB1*04:01	0.0606
14	DPB1*13:01	0.0606
15	DPB1*04:02	0.1010
16	DPB1*01:01	0.1364
17	DPB1*02:01	0.1515
18	DPB1*17:01	0.3737

	Allele or Haplotype Name	Frequency Estimate
1	15	0.0050
2	21	0.0050
3	48	0.0050
4	16	0.0099
5	27	0.0099
6	47	0.0198
7	74	0.0198
8	12	0.0446
9	5	0.0594
10	4	0.0792
11	3	0.1040
12	19	0.1238
13	13	0.1535
14	1	0.3614

	Allele or Haplotype Name	Frequency Estimate
1	DPB1*02:01:15	0.0071
2	DPB1*104:01	0.0071
3	DPB1*13:01:01	0.0071
4	DPB1*02:01:10	0.0071
5	DPB1*10:01:02	0.0071
6	DPB1*40:01	0.0071
7	DPB1*430:01	0.0071
8	DPB1*461:01	0.0071
9	DPB1*01:01:02	0.0143
10	DPB1*107:01	0.0143
11	DPB1*13:01	0.0143
12	DPB1*85:01	0.0214
13	DPB1*03:01:01	0.0429
14	DPB1*04:01:01	0.0643
15	DPB1*105:01	0.0857
16	DPB1*02:01:02	0.1357
17	DPB1*01:01:01	0.1429
18	DPB1*131:01	0.1890
19	DPB1*17:01	0.2181