

## SUPPLEMENTARY MATERIALS

### **Supplementary Fig. 1** – *Mafa-KIR3DL* and *Mafa-KIR3DS* phylogenetic trees

Phylogenetic analysis of MCM *KIR3DL* and *KIR3DS* sequences. Both phylogenetic trees contain the human *KIR3DL1\*00701* allele as an outgroup (AF262973). Bootstrapping values are shown to the left of nodes. Novel sequences are highlighted in bold font. A, the tree contains *KIR3DL* sequences. Vertical bars denote lineages. B, the tree contains *KIR3DS* sequences.

### **Supplementary Table 1** – PacBio CCS cohort

### **Supplementary Table 2** – WGS//MES cohort

### **Supplementary Table 3** – Rhexome1.0 target capture components

**Supplementary Table 4** – Coverage from VCRome2.1-to-“spike-in” mixing ratios for a single rhesus macaque.

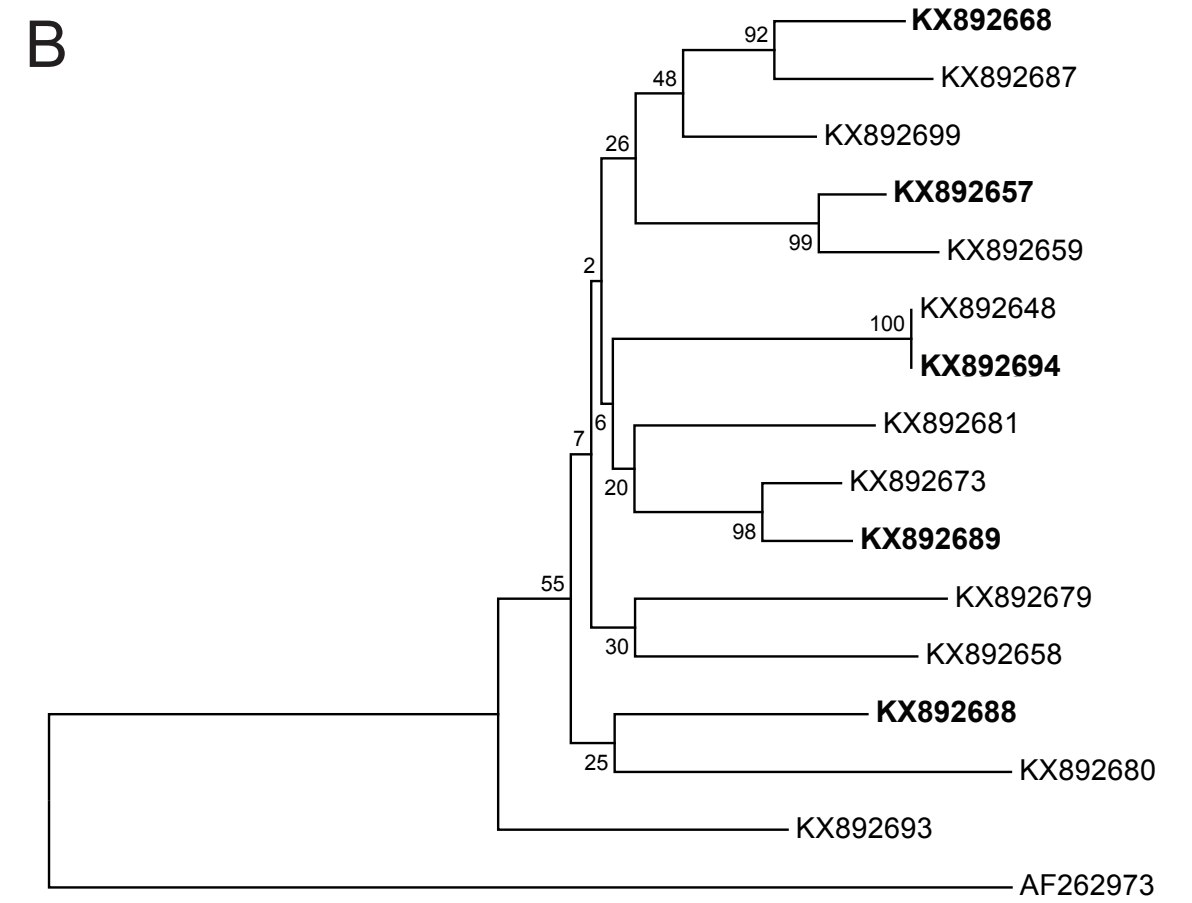
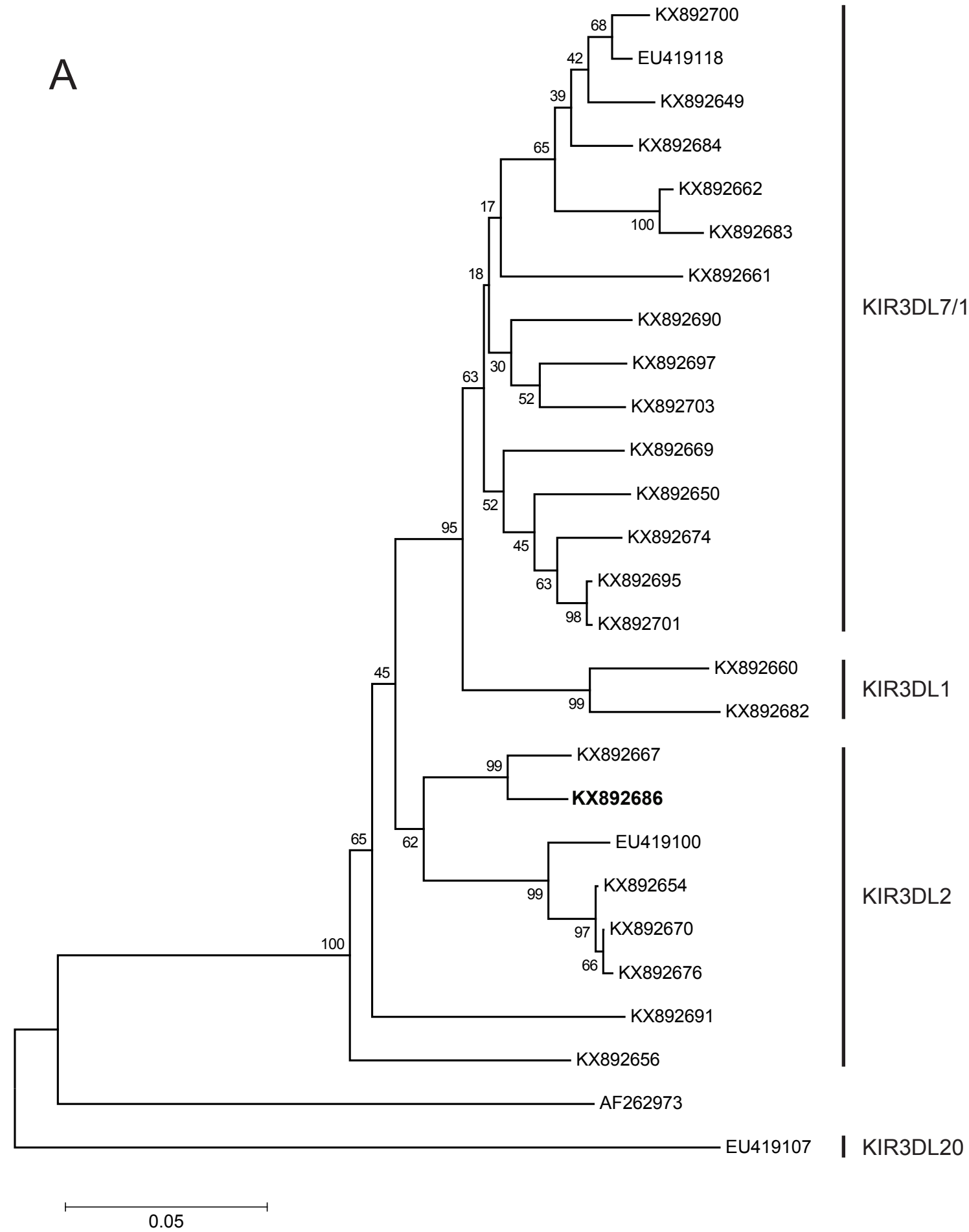
### **Supplementary Table 5** – MES target capture coverage for 36 MCM

### **Supplementary Table 6** – Comparison of sequences identified by PacBio CCS versus WGS/MES

Table 1 - Asseccion numbers for PacBio-identified sequences

Haplotype	Gene	Accession	Amino Acids	Representative animals	Prev Accession
K1	KIR1D	KX892645	279	CY0161,CY0327	EU419110
K1K7	KIR2DL4	KX892646	375	CY0161,CY0355	EU419111
K1K7	KIR2DL4-SV	KX892647	277	CY0563	EU419111
K1	KIR3DS	KX892648	374	CY0161,CY0327	EU419113
K1	KIR3DL7	KX892649	447	CY0161,CY0327	EU419109
K1	KIR3DL11	KX892650	447	CY0161,CY0327	EU419101
K1	KIR3DL11-SV	KX892651	349	CY0161,CY0327	EU419102
K2	KIR1D	KX892652	279	CY0166,CY0568	EU419124
K2K4K5	KIR2DL4	KX892653	375	CY0166,CY0570,CY0390	EU419114
K2	KIR3DL2	KX892654	444	CY0166,CY0353	EU419090
K2	KIR3DL2-SV	KX892655	394	CY0425,CY0568	EU419091
K2	KIR3DL2	KX892656	444	CY0166,CY0353	EU419083
<b>K2</b>	<b>KIR3DS</b>	<b>KX892657</b>	<b>343</b>	CY0166,CY0353	
K2	KIR3DS	KX892658	386	CY0166,CY0568	EU419092
K2	KIR3DS	KX892659	343	CY0166,CY0568	EU419079
K2	KIR3DL1	KX892660	447	CY0166,CY0568	EU419076
K2	KIR3DL7	KX892661	461	CY0163	EU419078
K2	KIR3DL7	KX892662	447	CY0166,CY0568	EU419089
K3K4	KIR1D	KX892663	176	CY0111,CY0570	EU419120
<b>K3K4</b>	<b>KIR1D-SV</b>	<b>KX892664</b>	<b>210</b>	CY0111,CY0570	
<b>K3</b>	<b>KIR2DL4</b>	<b>KX892665</b>	<b>375</b>	CY0111,CY0390	
<b>K3</b>	<b>KIR2DL4-SV</b>	<b>KX892666</b>	<b>280</b>	CY0111,CY0390	
K3	KIR3DL2	KX892667	444	CY0111,CY0390	EU419123
<b>K3</b>	<b>KIR3DS</b>	<b>KX892668</b>	<b>374</b>	CY0111,CY0390	
K3	KIR3DL11	KX892669	447	CY0111,CY0390	EU419119
K4	KIR3DL2	KX892670	444	CY0570,CY0332	EU688993
<b>K4</b>	<b>KIR3DL2-SV</b>	<b>KX892671</b>	<b>394</b>	CY0570,CY0332	
<b>K4</b>	<b>KIR3DL2-SV</b>	<b>KX892672</b>	<b>435</b>	CY0570,CY0332	
K4	KIR3DS	KX892673	374	CY0570,CY0332	EU419121
K4	KIR3DL11	KX892674	447	CY0570,CY0332	EU419115
K4	KIR3DL11-SV	KX892675	397	CY0570,CY0342	EU419116
K5	KIR3DL2	KX892676	444	CY0327,CY0163	EU419105
K5	KIR3DL2-SV	KX892677	435	CY0327,CY0163	EU419106
<b>K5</b>	<b>KIR3DL2-SV</b>	<b>KX892678</b>	<b>394</b>	CY0327,CY0163	
K5	KIR3DS	KX892679	374	CY0327,CY0163	EU419126
K5	KIR3DS	KX892680	386	CY0327,CY0163	EU419097
K5	KIR3DS	KX892681	386	CY0327,CY0163	EU419098
K5	KIR3DL1	KX892682	458	CY0327,CY0163	EU419075
K5	KIR3DL7	KX892683	447	CY0327,CY0163	EU419103
K5	KIR3DL7	KX892684	447	CY0327,CY0354	EU419099
<b>K6</b>	<b>KIR1D</b>	<b>KX892685</b>	<b>279</b>	CY0568	
<b>K6</b>	<b>KIR3DL2</b>	<b>KX892686</b>	<b>444</b>	CY0568,CY0330	
K6	KIR3DS	KX892687	386	CY0330	EU688994
<b>K6</b>	<b>KIR3DS</b>	<b>KX892688</b>	<b>374</b>	CY0568,CY0330	
<b>K6</b>	<b>KIR3DS</b>	<b>KX892689</b>	<b>374</b>	CY0568,CY0330	
K6	KIR3DL11	KX892690	447	CY0568,CY0330	EU688995
K7	KIR3DL2	KX892691	440	CY0356,CY0336	EU419080
K7	KIR3DL2-SV	KX892692	348	CY0356,CY0336	EU419081
K7	KIR3DS	KX892693	374	CY0356,CY0336	EU419086
<b>K7</b>	<b>KIR3DS</b>	<b>KX892694</b>	<b>374</b>	CY0356,CY0336	
K7	KIR3DL7	KX892695	447	CY0356,CY0336	EU419087
K7	KIR3DL7-SV	KX892696	349	CY0356,CY0336	EU419088
K7	KIR3DL11	KX892697	447	CY0356,CY0336	EU419093
<b>K8</b>	<b>KIR1D</b>	<b>KX892698</b>	<b>312</b>	CY0322,CY0558	
K8	KIR3DS	KX892699	447	CY0332	EU419122
K8	KIR3DL7	KX892700	397	CY0322,CY0558	EU419077
K8	KIR3DL7	KX892701	374	CY0322,CY0558	EU419084
K8	KIR3DL7-SV	KX892702	447	CY0322,CY0558	EU419085
K8	KIR3DL11	KX892703	447	CY0322,CY0558	EU419094
K8	KIR3D11-SV	KX892704	349	CY0322,CY0558	EU419095

Supplementary Figure 1 - Mafa-KIR3DL and Mafa -KIR3DS phylogenetic trees



Supplementary Table 1 - PacBio CCS cohort

Animal ID	Expected KIR	# PacBio Reads Mapped	WGS/MES
CY0111	K3/K3	889	MES
CY0161	K1/K1	1313	MES
CY0162	N/A	1031	MES
CY0163	N/A	1448	MES
CY0164	N/A	896	MES
CY0166	K2/K2	1329	MES
CY0322	K3/K8	1020	WGS
CY0323	K1/K7	1038	WGS
CY0327	K1/K5	998	WGS
CY0329	K1/K7	1332	WGS
CY0330	K4/K6	344	WGS
CY0332	K3/K4	689	WGS
CY0336	K4/K7	1020	WGS
CY0340	N/A	1533	MES
CY0342	N/A	1286	MES
CY0350	N/A	2535	MES
CY0351	N/A	455	MES
CY0352	N/A	698	MES
CY0353	N/A	342	MES
CY0354	N/A	656	MES
CY0355	N/A	709	MES
CY0356	N/A	1598	MES
CY0390	N/A	993	MES
CY0425	N/A	875	MES
CY0558	N/A	873	MES
CY0563	N/A	655	MES
CY0567	N/A	1736	MES
CY0568	N/A	2392	MES
CY0570	N/A	599	MES
CY0571	N/A	1281	MES

Supplementary Table 2 - WGS/MES cohort

Animal ID	Type	# Reads Mapped
CY0320	WGS	1,210,339,744
CY0321	WGS	1,222,977,688
CY0322	WGS	1,093,240,092
CY0323	WGS	1,161,761,415
CY0324	WGS	1,192,434,815
CY0325	WGS	1,091,870,521
CY0326	WGS	1,014,048,607
CY0327	WGS	1,158,978,497
CY0328	WGS	1,356,197,360
CY0329	WGS	1,169,431,587
CY0330	WGS	1,120,820,126
CY0331	WGS	1,314,518,723
CY0332	WGS	1,206,633,787
CY0333	WGS	1,217,425,129
CY0334	WGS	1,094,844,832
CY0335	WGS	1,298,840,412
CY0336	WGS	1,244,446,132
CY0337	WGS	1,357,235,243
CY0642	VCRome2.1	79,960,380
CY0643	VCRome2.1	86,437,446
CY0646	VCRome2.1	110,114,349
CY0648	VCRome2.1	106,500,711
CY0649	VCRome2.1	78,732,566
CY0651	VCRome2.1	103,106,107
CY0652	VCRome2.1	89,230,575
CY0654	VCRome2.1	99,348,080
CY0111	Rhexome1.0	84,868,520
CY0113	Rhexome1.0	74,896,873
CY0116	Rhexome1.0	70,087,668
CY0159	Rhexome1.0	91,677,820
CY0161	Rhexome1.0	75,219,097
CY0162	Rhexome1.0	79,116,692
CY0163	Rhexome1.0	106,937,306
CY0164	Rhexome1.0	69,386,970
CY0165	Rhexome1.0	64,028,740
CY0166	Rhexome1.0	93,524,003
CY0340	Rhexome1.0	75,906,691
CY0342	Rhexome1.0	73,222,499
CY0350	Rhexome1.0	74,362,549
CY0351	Rhexome1.0	84,310,849
CY0352	Rhexome1.0	70,706,927
CY0353	Rhexome1.0	79,150,380
CY0354	Rhexome1.0	88,194,729
CY0355	Rhexome1.0	94,317,219
CY0356	Rhexome1.0	69,668,552
CY0389	Rhexome1.0	85,340,992
CY0390	Rhexome1.0	80,091,428
CY0425	Rhexome1.0	81,056,275
CY0558	Rhexome1.0	75,201,169
CY0563	Rhexome1.0	85,879,877
CY0565	Rhexome1.0	69,877,775
CY0567	Rhexome1.0	65,530,642
CY0568	Rhexome1.0	60,616,212
CY0570	Rhexome1.0	65,961,393
CY0571	Rhexome1.0	102,678,998
CY0572	Rhexome1.0	67,916,905
CY0574	Rhexome1.0	67,679,736
CY0576	Rhexome1.0	81,200,016
CY0577	Rhexome1.0	79,947,378
CY0578	Rhexome1.0	89,042,361
CY0579	Rhexome1.0	83,412,702
CY0391	Rhexome1.0	89,015,672

### Supplementary Table 3 - Rhexome1.0 target capture components

<u>Target capture components</u>	<u>Baspairs</u>
existing VCRome 2.1 capture target	35,250,000
rhesus exons not in VCRome 2.1 design plus those that are under covered (<20x)	2,048,175
expanded human MHC class I and class II full gene sequences (exons, introns, UTRs)	609,840
<hr/> Total	<hr/> 2,658,015

Supplementary Table 4 - Coverage from VCRome2.1-to-  
"spike-in" mixing ratios for a single rhesus macaque

Mixing ratio VCRome2.1:"spike-in"	% Bases with 20X coverage in rhesus spike in region excluding VCRome2.1 and MHC
1:2.5	84.2
1:1.25	74.5
1:0.5	57.5

Supplementary Table 5 - MES target capture coverage for 36 MCM

Animal ID	Unique Aligned MB	Total Reads	Average Coverage	Median Coverage	Percent Reads Hit on Target/Buffer	Percentage 20X Coverage
CY0111	8016.41	90741390	59	46	45.1	83.6
CY0113	7067.57	80055756	53	41	45.3	80.4
CY0116	6589.3	74790246	48	38	45.0	78.9
CY0159	8648.13	97997910	63	49	44.9	85.5
CY0161	7101.03	80311402	52	41	45.2	80.5
CY0162	7476.14	84470862	55	43	45.6	82.1
CY0163	10055.8	72788326	70	54	66.1	86.9
CY0164	6544.5	87613014	83	63	65.8	89.6
CY0165	6044.72	86207424	82	62	65.7	89.4
CY0166	8763.37	96265496	85	65	62.0	90.2
CY0340	7162.23	89882810	85	65	65.8	89.7
CY0342	6905.3	95905632	90	69	65.7	91.0
CY0350	7029.02	114969498	107	82	64.7	92.7
CY0351	7958.44	74716760	72	55	66.3	87.0
CY0352	6684.3	68895736	66	51	66.3	85.5
CY0353	7362.63	100872546	92	71	63.9	91.6
CY0354	8170.49	81730006	77	59	65.8	88.7
CY0355	8919.98	78704202	76	57	66.3	87.5
CY0356	6519.04	74468684	78	60	71.6	88.6
CY0389	7960.62	91526036	94	72	70.8	91.3
CY0390	7476.61	85798910	89	68	71.3	90.5
CY0425	7582.24	86893730	90	69	71.3	90.5
CY0558	7034.09	80547430	84	64	71.2	89.8
CY0563	8033.95	91861906	96	73	71.4	91.3
CY0565	6604.94	79808246	78	62	68.5	91.0
CY0567	6153.84	90310086	91	72	69.2	92.7
CY0568	5689.37	75590434	76	60	69.9	90.3
CY0570	6230.34	84852852	79	63	65.6	91.3
CY0571	9701.21	94613268	86	69	64.1	92.5
CY0572	6304.07	100947384	102	81	69.3	93.7
CY0574	6338.17	73252200	73	58	66.9	90.1
CY0576	7586.82	68732488	66	53	65.6	88.8
CY0577	7476.49	63514718	61	49	65.2	87.4
CY0578	8212.38	69106484	69	55	67.2	89.0
CY0579	7809.03	107626816	106	84	66.4	94.3
CY0391	8330.84	71274028	65	53	63.3	88.6
Average	7,432	84,656,798	77.7	60.4	63.4	88.7



Supplementary Table 6 - Comparisson of alleles identified by PacBio CCS versus WGS/MES

Haplotype	Accession	Gene	Pacbio CCS	WGS/MES
K1	KX892645	KIR1D	Y	Y
K1K7	KX892646	KIR2DL4	Y	Y
K1	KX892648	KIR3DS	Y	Y
K1	KX892649	KIR3DL7	Y	Y
K1	KX892650	KIR3DL11	Y	Y
K2	KX892652	KIR1D	Y	Y
K2K4K5	KX892653	KIR2DL4	Y	Y
K2	KX892654	KIR3DL2	Y	N
K2	KX892656	KIR3DL2	Y	Y
K2	KX892657	KIR3DS	Y	Y
K2	KX892658	KIR3DS	Y	Y
K2	KX892659	KIR3DS	Y	Y
K2	KX892660	KIR3DL1	Y	Y
K2	KX892661	KIR3DL7	Y	Y
K2	KX892662	KIR3DL7	Y	Y
K3K4	KX892663	KIR1D	Y	N
K3	KX892665	KIR2DL4	Y	Y
K3	KX892667	KIR3DL2	Y	Y
K3	KX892668	KIR3DS	Y	Y
K3	KX892669	KIR3DL11	Y	Y
K4	KX892670	KIR3DL2	Y	Y
K4	KX892673	KIR3DS	Y	Y
K4	EU419118	KIR3DL7	N	Y
K4	KX892674	KIR3DL11	Y	Y
K5	EU419100	KIR3DL2	N	Y
K5	KX892676	KIR3DL2	Y	Y
K5	KX892679	KIR3DS	Y	Y
K5	KX892680	KIR3DS	Y	Y
K5	KX892681	KIR3DS	Y	Y
K5	KX892682	KIR3DL1	Y	Y
K5	KX892683	KIR3DL7	Y	Y
K5	KX892684	KIR3DL7	Y	Y
K6	KX892685	KIR1D	Y	N
K6	KX892686	KIR3DL2	Y	Y
K6	KX892687	KIR3DS	Y	Y
K6	KX892688	KIR3DS	Y	Y
K6	KX892689	KIR3DS	Y	N
K6	KX892690	KIR3DL11	Y	Y
K7	EU419107	KIR3DL20	N	Y
K7	KX892691	KIR3DL2	Y	Y
K7	KX892693	KIR3DS	Y	Y
K7	KX892694	KIR3DS	Y	Y
K7	KX892695	KIR3DL7	Y	Y
K7	KX892697	KIR3DL11	Y	N
K8	KX892698	KIR1D	Y	Y
K8	KX892699	KIR3DS	Y	Y
K8	KX892700	KIR3DL7	Y	N
K8	KX892701	KIR3DL7	Y	Y
K8	KX892703	KIR3DL11	Y	N