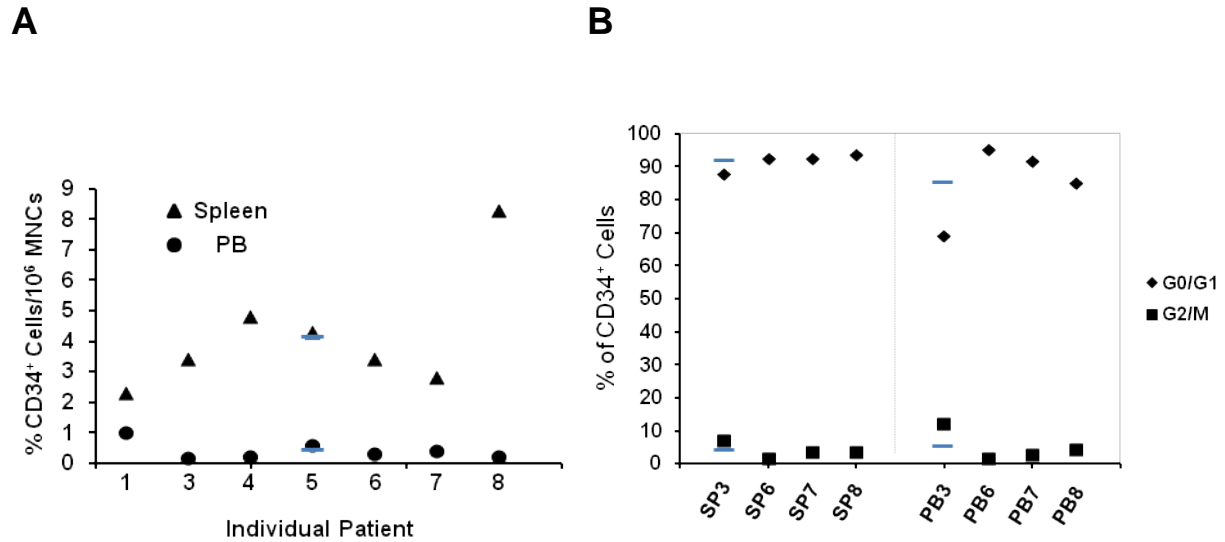
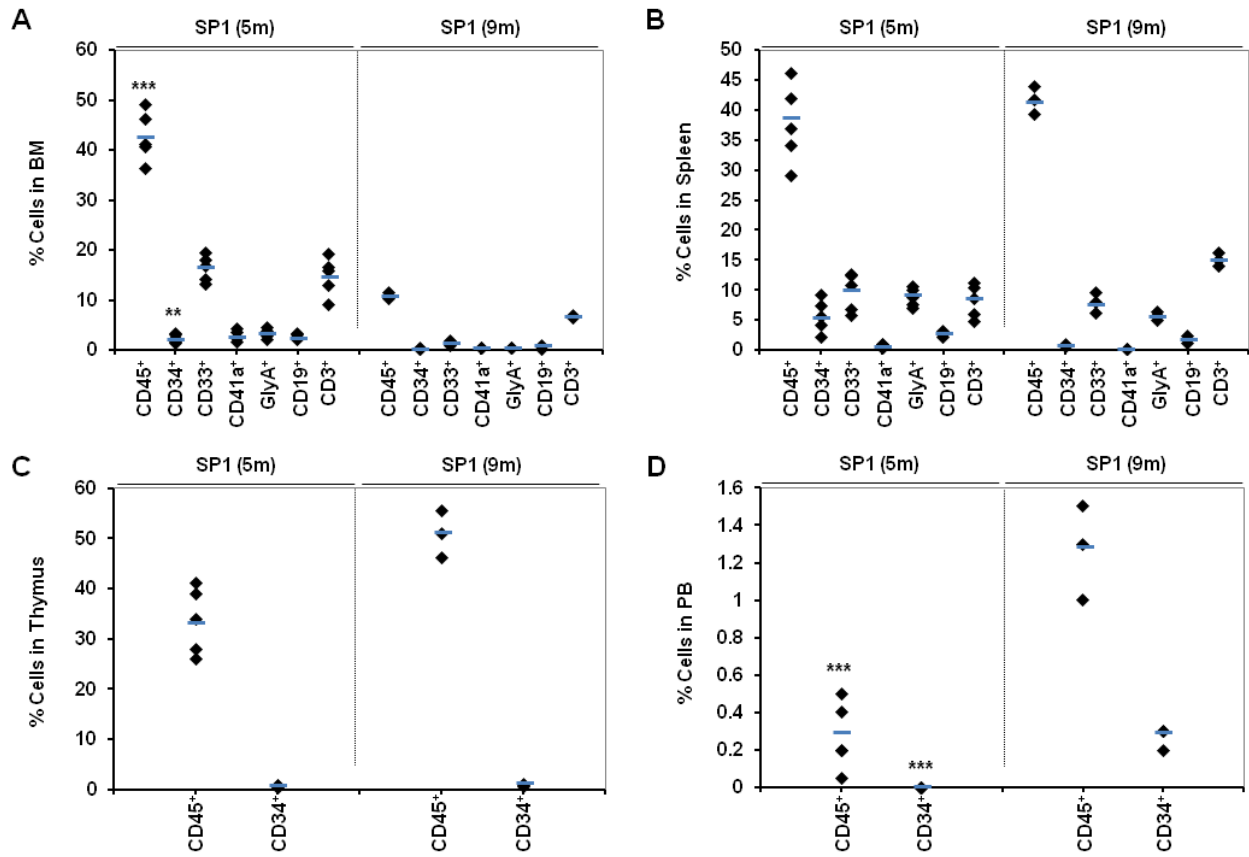


**Figure S1**



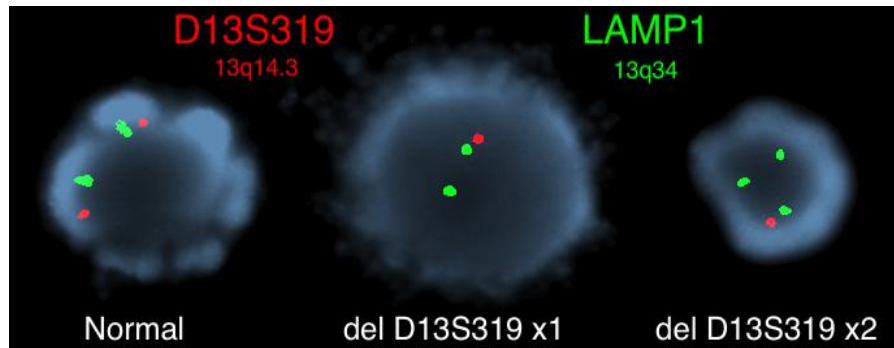
**Figure S1. Phenotypes of CD34<sup>+</sup> cells from PB and spleen of MF patients.** (A) The percentages of CD34<sup>+</sup> cells in PB and spleen of MF mononuclear cells (MNCs). A significant greater number of CD34<sup>+</sup> cells were detected in spleen as compared with PB of MF patients. \* $P < 0.05$ . Horizontal bars indicate the mean of percentage of CD34<sup>+</sup> cells in 10<sup>6</sup> MNCs from the spleen or PB of MF patients. (B) Cell cycle status of PB and splenic MF CD34<sup>+</sup> cells. The percentages of splenic MF CD34<sup>+</sup> cells in the G0/G1 phase or the G2/M phase were similar to that of PB MF CD34<sup>+</sup> cells ( $P > 0.05$ ).  $n = 4$ . Horizontal bars indicate the mean of percentage of CD34<sup>+</sup> cells in each cell cycle.

**Figure S2**



**Figure S2. Prolonged Engraftment of Human Cells in NSG Mice Transplanted with Splenic MF CD34<sup>+</sup> Cells.** (A-D) Human cell engraftment (hCD45<sup>+</sup>) and the presence of human hCD34<sup>+</sup> in the BM (A), spleen (B), thymus (C) and PB (D) of NSG mice 5-9 months after transplantation with splenic MF CD34<sup>+</sup> cells ( $2 \times 10^6$ ). The generation of human myeloid cells (hCD33<sup>+</sup>), megakaryocytes (hCD41a<sup>+</sup>), B cells (hCD19<sup>+</sup>), and T cells (hCD3<sup>+</sup>) and erythroid cells (hGlyA<sup>+</sup>) in the BM (A) and spleen (B) of the recipient mice is also shown. Black diamonds show the percentage of human cells in various organs of each individual mouse. Horizontal bars indicate the mean of percentage of human cells in various organs of NSG recipients. The p values were calculated by student's t test. \*\*\* $P < 0.001$ , \*\* $P < 0.01$ , 5m vs. 9m. Human cell chimerism was present in the marrow, spleen, thymus and PB 9 months after the transplantation only when splenic MF CD34<sup>+</sup> cells served as the graft. SP1: Splenic MF CD34<sup>+</sup> cells of Patient #1.

**Figure S3**



**Figure S3. Representative FISH analysis of normal cells, cells with del (13q), and cells with duplication of del (13q) and one normal chromosomal 13.** The left panel shows a cell with a normal signal pattern consisting of 2 red signals (D13S319 locus) and 2 green signals (LAMP1 locus) indicating two copies of normal chromosome 13, the middle panel shows a cell with 1 red signal and 2 green signals indicating one normal chromosome 13 and del (13q) (locus D13S319), and the right panel shows a cell with 1 red signal and three green signals indicating 1 normal chromosome 13 and duplication of del (13q).

**Table S1** Surface Molecule Expression by PB and Splenic MF CD34<sup>+</sup> Cells.

	Percentage (%)					
	CD38 <sup>-</sup>	CD90 <sup>+</sup>	CXCR4 <sup>+</sup>	CD47 <sup>+</sup>	CD44 <sup>+</sup>	CD49d <sup>+</sup>
<b>PB</b>	79.5±7.9	5.1±1.3	1.8±0.6	16.0±8.5	69.4±10.7	18.5±6.5
<b>Spleen</b>	68.9±10.3	6.5±3.1	2.2±1.0	20.5±7.8	77.1±7.6	31.4±9.3

A similar proportion of splenic and PB MF CD34<sup>+</sup> cells were observed to be CD38<sup>-</sup> and CD90<sup>+</sup>. Moreover, PB and splenic CD34<sup>+</sup> cells were characterized by a similar expression of cytokine receptors and adhesion molecules ( $P > 0.05$  for the expression of each molecule). n=7.

**Table S2 Experiments Performed with Cells Isolated from Each Patient**

<b>Patient #</b>	<b>Specimen</b>	<b>Experiments</b>
1	PB , Spleen	Phenotypic Analysis, HPC Assays, Engraftment into NSG mice, Immunohistochemical Analysis of Recipient Mice, Microarray Analysis
2	Spleen only	Phenotypic Analysis*, HPC Assays *, Engraftment into NSG mice, Immunohistochemical Analysis of Recipient Mice
3	PB , Spleen	Phenotypic Analysis, HPC Assays, Cell Cycle Analysis, Engraftment into NSG mice, Microarray Analysis
4	PB , Spleen	Phenotypic Analysis, HPC Assays, Engraftment into NSG mice, Microarray Analysis
5	PB , Spleen	Phenotypic Analysis, HPC Assays, Engraftment into NSG mice
6	PB , Spleen	Phenotypic Analysis, HPC Assays, Cell Cycle Analysis, Engraftment into NSG mice
7	PB , Spleen	Phenotypic Analysis, HPC Assays, Cell Cycle Analysis
8	PB , Spleen	Phenotypic Analysis, HPC Assays, Cell Cycle Analysis

\*Since only spleen of patient #2 is available, data of these 2 experiments were not included in the article.

**Table S3 Genes That Were Down-regulated in MF Splenic CD34<sup>+</sup> Cells as Compared to PB CD34<sup>+</sup> Cells**

<b>Gene Name</b>	<b>Gene Description</b>	<b>Fold Change (SP/PB)</b>	<b>P Value</b>
BAIAP2L1	BAI1-associated protein 2-like 1	-40.11	0.00022
CSF2	colony stimulating factor 2 (granulocyte-macrophage)	-34.01	0.00081
PLCXD3	phosphatidylinositol-specific phospholipase C, X domain containing 3	-20.94	0.00002
CLEC3A	C-type lectin domain family 3, member A	-19.56	8.39E-06
SPEG	SPEG complex locus	-18.62	0.00027
WFIKKN1	WAP, follistatin/kazal, immunoglobulin, kunitz and netrin domain containing 1	-17.69	1.30E-06
ASPDH	aspartate dehydrogenase domain containing	-16.95	0.00013
ITGA1	integrin, alpha 1	-16.73	5.01E-08
USH2A	Usher syndrome 2A (autosomal recessive, mild)	-15.74	0.00014
NCAM1	neural cell adhesion molecule 1	-15.26	4.63E-06
ATP8B3	ATPase, aminophospholipid transporter, class I, type 8B, member 3	-15.03	0.00001
ACTRT1	actin-related protein T1	-12.45	0.00003
PRAME	preferentially expressed antigen in melanoma	-10.72	0.00945
CXCL6	chemokine (C-X-C motif) ligand 6 (granulocyte chemotactic protein 2)	-10.43	0.0056
IL13	interleukin 13	-10.11	1.45E-06
CD22	CD22 molecule	-9.90	9.32E-07
CXCL13	chemokine (C-X-C motif) ligand 13	-8.70	3.66E-11
CADM1	cell adhesion molecule 1	-8.43	0.00007
AKAP12	A kinase (PRKA) anchor protein 12	-8.25	0.00035
IL17RB	interleukin 17 receptor B	-7.58	0.00011
PRMT8	protein arginine methyltransferase 8	-7.48	0.00137
LRRTM2	leucine rich repeat transmembrane neuronal 2	-6.69	0.00297
TMPRSS13	transmembrane protease, serine 13	-6.62	0.00001
SHC4	SHC (Src homology 2 domain containing) family, member 4	-6.02	0.00435
RCAN2	regulator of calcineurin 2	-5.99	0.00114
MMP20	matrix metalloproteinase 20	-5.74	0.00379
TFAP2A	transcription factor AP-2 alpha (activating enhancer binding protein 2 alpha)	-5.64	0.00324
PDE10A	phosphodiesterase 10A	-5.11	0.00621
ABPI	amiloride binding protein 1 (amine oxidase (copper-containing))	-4.95	2.93E-08
OSMR	oncostatin M receptor	-4.91	0.00165
IL24	interleukin 24	-4.68	0.00228
DIRAS3	DIRAS family, GTP-binding RAS-like 3	-4.05	0.00015
TACSTD2	tumor-associated calcium signal transducer 2	-3.87	0.00168
RGS11	regulator of G-protein signaling 11	-3.86	0.00243
APBA2	amyloid beta (A4) precursor protein-binding, family A, member 2	-3.02	0.00286
BMP6	bone morphogenetic protein 6	-2.63	0.00057

**Table S4 Genes That Were Up-regulated in MF Splenic CD34<sup>+</sup> Cells as Compared to PB CD34<sup>+</sup> Cells**

<b>Gene Name</b>	<b>Gene Description</b>	<b>Fold Change (SP/PB)</b>	<b>P Value</b>
PPAPDC3	phosphatidic acid phosphatase type 2 domain containing 3	27.26	8.27E-06
NRXN1	neurexin 1	21.44	0.00004
IL5RA	interleukin 5 receptor, alpha	15.36	1.25E-07
REG4	regenerating islet-derived family, member 4	13.29	1.42E-06
HSPA1A	heat shock 70kDa protein 1A	7.30	0.00267
HSPA1B	heat shock 70kDa protein 1B	6.60	9.02E-06
FPR3	formyl peptide receptor 3	5.87	2.64E-06
TEK	TEK tyrosine kinase, endothelial (TEK)	5.70	0.00145
TNIP3	TNFAIP3 interacting protein 3	5.57	0.00723
CCR9	chemokine (C-C motif) receptor 9	5.41	0.00149
RGS4	regulator of G-protein signaling 4	5.39	0.00506
CDH2	cadherin 2, type 1, N-cadherin (neuronal)	5.24	0.0024
PCDH8	protocadherin 8	4.83	0.0077
THPO	thrombopoietin	4.65	0.00376
MAP3K9	mitogen-activated protein kinase kinase kinase 9	4.64	0.00426
ADD2	adducin 2 (beta)	4.39	0.00735
XCL1	chemokine (C motif) ligand 1	4.19	0.00181
MATN2	matrilin 2	4.13	0.00197
CCR2	chemokine (C-C motif) receptor 2 B	3.89	0.00783
HSPH1	heat shock 105kDa/110kDa protein 1	3.85	0.00001
SERPINE1	serpin peptidase inhibitor, clade E (nexin, plasminogen activator inhibitor type 1), member 1	3.81	0.00001
CD274	CD274 molecule	3.47	0.00526
WT1	WT1	3.42	8.24-E14
HSPA5	heat shock 70kDa protein 5 (glucose-regulated protein, 78kDa) (HSPA5)	3.34	0.00107
ATF3	activating transcription factor 3 (ATF3)	3.15	3.39E-07
CLEC10A	C-type lectin domain family 10, member A	3.09	0.0098
PTPRD	protein tyrosine phosphatase, receptor type, D	3.03	0.00283
LPAR4	lysophosphatidic acid receptor 4	2.72	0.00121
HAS2	hyaluronan synthase 2	2.50	0.00698
HSP90AA1	heat shock protein 90kDa alpha A1	2.47	1.16E-08
HIF1A	hypoxia inducible factor 1, alpha subunit (basic helix-loop-helix)	2.24	0.0051
CSF1R	colony stimulating factor 1 receptor	2.03	1.81E-06

**Table S5** Antibodies Utilized in Immunohistochemical Analysis

<b>Immunohistochemical Stain</b>	<b>Clone</b>	<b>Dilution</b>	<b>Reactivity</b>	<b>Source</b>
<b>CD45</b>	2B11+PD7/26	1:300	Human	Dako (Carpenteria, CA)
<b>CD34</b>	QBEnd/10	1:10	Human	Biogenex (Fremont, CA)
<b>Glycophorin C</b>	Ret40f	1:50	Human	Abcam (Cambridge, MA)
<b>Lysozyme</b>	Polyclonal	1:10K	Human	Dako (Carpenteria, CA)
<b>CD61</b>	2f2	1:100	Human	Leica Microsystems (Buffalo Grove, IL)
<b>CD20</b>	L26	1:200	Human	Dako (Carpenteria, CA)
<b>CD5</b>	4C7	1:25	Human	Leica Microsystems (Buffalo Grove, IL)
<b>CD34</b>	MEC 14.7	1:25	Mouse	Abcam (Cambridge, MA)
<b>B220</b>	RA3-6B2	1:150	Mouse	BD Pharmingen (San Jose, CA)
<b>CD3</b>	Polyclonal	1:50	Mouse	Dako (Carpenteria, CA)
<b>TER-119</b>	TER-119	1:25	Mouse	BD Pharmingen (San Jose, CA)
<b>Lysozyme</b>	BGN/06/961	1:300	Mouse	Abcam (Cambridge, MA)



**Table S6** Significantly Higher Numbers of Human CD45<sup>+</sup> and Human CD34<sup>+</sup> cells Were Observed in the BM, Spleens, Thymuses and PB of Mice Transplanted with Splenic MF CD34<sup>+</sup> Cells as Compared with PB MF CD34<sup>+</sup> Cells

% hCD45 <sup>+</sup> Cells				% hCD45 <sup>+</sup> CD34 <sup>+</sup> Cells			
Engrafted Site	Cell Doses Injected	Compared Group	P value	Engrafted Site	Cell Dose Injected	Compared Group	P value
<b>BM</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.001	<b>BM</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.04
		PB3 vs. SP3	0.16			PB3 vs. SP3	0.02
		PB4 vs. SP4	0.12			PB4 vs. SP4	N/A
		PB5 vs. SP5	0.14			PB5 vs. SP5	N/A
		PB5 vs. SP5	N/A			PB6 vs. SP6	N/A
	2×10 <sup>5</sup>	PB1 vs. SP1	0.0001		2×10 <sup>5</sup>	PB1 vs. SP1	0.02
		PB3 vs. SP3	0.04			PB3 vs. SP3	0.02
		PB4 vs. SP4	0.0005			PB4 vs. SP4	0.21
		PB5 vs. SP5	0.03			PB5 vs. SP5	0.03
		PB6 vs. SP6	0.01			PB6 vs. SP6	0.02
	2×10 <sup>6</sup>	PB1 vs. SP1	2.28 e <sup>-5</sup>		2×10 <sup>6</sup>	PB1 vs. SP1	0.009
		PB3 vs. SP3	0.10			PB3 vs. SP3	0.008
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	N/A			PB5 vs. SP5	N/A
		PB6 vs. SP6	0.0003			PB6 vs. SP6	0.05
<b>Spleen</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.003	<b>Spleen</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.04
		PB3 vs. SP3	0.02			PB3 vs. SP3	0.37
		PB4 vs. SP4	0.20			PB4 vs. SP4	N/A
		PB5 vs. SP5	0.04			PB5 vs. SP5	N/A
		PB6 vs. SP6	N/A			PB6 vs. SP6	N/A
	2×10 <sup>5</sup>	PB1 vs. SP1	1.97 e <sup>-5</sup>		2×10 <sup>5</sup>	PB1 vs. SP1	0.004
		PB3 vs. SP3	0.02			PB3 vs. SP3	0.003
		PB4 vs. SP4	0.002			PB4 vs. SP4	0.02
		PB5 vs. SP5	0.03			PB5 vs. SP5	0.04
		PB6 vs. SP6	N/A			PB6 vs. SP6	0.02
	2×10 <sup>6</sup>	PB1 vs. SP1	8.68 e <sup>-5</sup>		2×10 <sup>6</sup>	PB1 vs. SP1	0.04
		PB3 vs. SP3	0.002			PB3 vs. SP3	0.01
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	N/A			PB5 vs. SP5	N/A
		PB6 vs. SP6	0.0006			PB6 vs. SP6	0.04

**Table S6 Continued**

% hCD45 <sup>+</sup> Cells				% hCD45 <sup>+</sup> CD34 <sup>+</sup> Cells			
Engrafted Site	Cell Doses Injected	Compared Group	P value	Engrafted Site	Cell Dose Injected	Compared Group	P value
<b>Thymus</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.008	<b>Thymus</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.02
		PB3 vs. SP3	0.08			PB3 vs. SP3	0.01
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	N/A			PB5 vs. SP5	N/A
		PB6 vs. SP6	N/A			PB6 vs. SP6	N/A
	2×10 <sup>5</sup>	PB1 vs. SP1	0.003		2×10 <sup>5</sup>	PB1 vs. SP1	0.04
		PB3 vs. SP3	0.007			PB3 vs. SP3	0.04
		PB4 vs. SP4	0.04			PB4 vs. SP4	0.19
		PB5 vs. SP5	0.00001			PB5 vs. SP5	0.02
		PB6 vs. SP6	0.02			PB6 vs. SP6	N/A
	2×10 <sup>6</sup>	PB1 vs. SP1	0.001		2×10 <sup>6</sup>	PB1 vs. SP1	0.0005
		PB3 vs. SP3	0.007			PB3 vs. SP3	0.006
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	N/A			PB5 vs. SP5	N/A
		PB6 vs. SP6	0.05			PB6 vs. SP6	0.03
<b>PB</b>	2×10 <sup>4</sup>	PB1 vs. SP1	0.09	<b>PB</b>	2×10 <sup>4</sup>	PB1 vs. SP1	N/A
		PB3 vs. SP3	N/A			PB3 vs. SP3	N/A
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	N/A			PB5 vs. SP5	N/A
		PB6 vs. SP6	N/A			PB6 vs. SP6	N/A
	2×10 <sup>5</sup>	PB1 vs. SP1	0.09		2×10 <sup>5</sup>	PB1 vs. SP1	N/A
		PB3 vs. SP3	0.02			PB3 vs. SP3	0.02
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	0.02			PB5 vs. SP5	0.37
		PB6 vs. SP6	0.01			PB6 vs. SP6	N/A
	2×10 <sup>6</sup>	PB1 vs. SP1	0.02		2×10 <sup>6</sup>	PB1 vs. SP1	N/A
		PB3 vs. SP3	0.005			PB3 vs. SP3	0.02
		PB4 vs. SP4	N/A			PB4 vs. SP4	N/A
		PB5 vs. SP5	N/A			PB5 vs. SP5	N/A
		PB6 vs. SP6	0.0006			PB6 vs. SP6	0.01