

Supplementary Table 1. Samples studied and their NGS output

	sample	gestation age	No of cells	total reads count	unique clonotypes	productive clonotypes per replicate	productive clonotypes per sample
1	FL56-rep1	16wks	3000	13870	6643	5243	7854
2	FL56-rep2	16wks	3000	8088	5244	4011	
3	FL66-rep1	14wks	3000	12551	2066	1275	1882
4	FL66-rep2	14wks	3000	7956	1778	1032	
5	FL76-rep1	18wks	3000	13492	7088	5626	8588
6	FL76-rep2	18wks	3000	8181	5635	4408	
7	FL86-rep1	14wks	3000	15046	6200	4753	7045
8	FL86-rep2	14wks	3000	8783	4882	3653	
9	FL36	16wks	500	16023	2080	1291	1291
10	FBM77	17wks	1500	9047	6988	5673	5673
11	FBM87	19wks	1500	8908	7212	5886	5886
12	FBM97	13wks	3000	9271	5749	4626	4626
13	cPB97	4mo	4000	15442	7060	5703	5703
14	cPB77	4yrs	4000	16694	7983	6526	6526
15	cPB87	4yrs	4000	18690	4374	3193	3193
16	aPB37	29yrs	4000	9645	6144	5006	5006
17	aPB47	43yrs	4000	10134	7672	6451	6451
18	aPB57	40yrs	4000	9364	6401	5234	5234
19	aPB67	38yrs	4000	8824	4623	5703	5703
20	aPB66	53yrs	4000	19632	11753	9577	9577
	Total			239641	117575	94870	90238

Supplementary Table 2. Significance of frequency variability usage of VH genes amongst unique clonotypes according to developmental stage

	aPB vs. cPB	aPB vs. FBM	aPB vs. FL	cPB vs. FBM	cPB vs. FL	FBM vs. FL
IGHV4-34	**	ns	ns	ns	***	*
IGHV2-70	****	ns	**	****	****	*
IGHV1-8	ns	ns	**	ns	ns	**
IGHV4-59	***	ns	****	*	ns	**
IGHV3-7	***	ns	****	ns	ns	**
IGHV3-48	ns	ns	ns	*	ns	**
IGHV1-2	****	****	*	****	**	****
IGHV1-69	ns	****	****	****	****	****
IGHV5-51	****	****	****	****	ns	****
IGHV6-1	****	****	****	****	****	****
IGHV2-5	****	ns	****	****	****	****
IGHV3-23	ns	****	ns	****	ns	****
IGHV3-33	ns	ns	****	ns	****	****
IGHV3-21	*	***	****	ns	****	****
IGHV5-10-1	***	ns	****	****	ns	****
IGHV1-3	ns	ns	****	ns	**	****
IGHV3-30-3	ns	ns	****	ns	****	****
IGHV3-11	ns	ns	****	ns	****	****
IGHV4-39	ns	ns	ns	ns	ns	ns
IGHV1-18	ns	****	****	****	****	ns
IGHV1-46	ns	****	****	****	****	ns
IGHV4-61	***	ns	ns	****	***	ns
IGHV3-9	ns	ns	ns	ns	ns	ns
IGHV4-31	***	ns	ns	ns	*	ns
IGHV3-30	ns	ns	ns	ns	*	ns

*p<0.05; **p<0.01; ***p<0.001; ****p<0.0001

Supplementary Table 3. Frequency of clonotypes with convergent recombination in FL duplicate libraries

	FL56-1	FL56-2	FL66-1	FL66-2	FL76-1	FL76-2	FL86-1	FL86-2
unique clnt	4011	5243	1032	1275	4408	5626	3653	4753
unique convergent clnt	153	153	96	96	107	107	185	185
% unique convergent clnt	3.8	3	9.3	7.5	2.4	1.9	5	3.9

Supplementary Table 5. Representative examples of convergent recombination between duplicate FL libraries

Arbitrarily selected examples of pairs of clonotypes showing evidence of convergent evolution from Suppl Table 4 (coloured the same) were analysed with IMG2/V-QUEST.

The full VH alignments of the two assigned VH genes and alleles are shown for either clonotype (#1 and #2).

FL-56-1 FL-56-2									
FL-56-1	Junction	VH	DH	JH	FL-56-1	FL-56-2	Junction		
11	FL-56-1	CANVYVYDWM	IGHV3-8*012	IGHD1-2*012	IGHJ3*03F	0.7961	0.72	147	147
12	FL-56-2	CANVYVYDWM	IGHV1-1*02F	IGHD1-2*012	IGHJ3*03F	0.1961	0.1241	147	147
	IMG2/V-QUEST	#1							
		R1							
		R2							
		R3							
		R4							
		R5							
		R6							
		R7							
		R8							
		R9							
		R10							
		R11							
		R12							
		R13							
		R14							
		R15							
		R16							
		R17							
		R18							
		R19							
		R20							
		R21							
		R22							
		R23							
		R24							
		R25							
		R26							
		R27							
		R28							
		R29							
		R30							
		R31							
		R32							
		R33							
		R34							
		R35							
		R36							
		R37							
		R38							
		R39							
		R40							
		R41							
		R42							
		R43							
		R44							
		R45							
		R46							
		R47							
		R48							
		R49							
		R50							
		R51							
		R52							
		R53							
		R54							
		R55							
		R56							
		R57							
		R58							
		R59							
		R60							
		R61							
		R62							
		R63							
		R64							
		R65							
		R66							
		R67							
		R68							
		R69							
		R70							
		R71							
		R72							
		R73							
		R74							
		R75							
		R76							
		R77							
		R78							
		R79							
		R80							
		R81							
		R82							
		R83							
		R84							
		R85							
		R86							
		R87							
		R88							
		R89							
		R90							
		R91							
		R92							
		R93							
		R94							
		R95							
		R96							
		R97							
		R98							
		R99							
		R100							
		R101							
		R102							
		R103							
		R104							
		R105							
		R106							
		R107							
		R108							
		R109							
		R110							
		R111							
		R112							
		R113							
		R114							
		R115							
		R116							
		R117							
		R118							
		R119							
		R120							
		R121							
		R122							
		R123							
		R124							
		R125							
		R126							
		R127							
		R128							
		R129							
		R130							
		R131							
		R132							
		R133							
		R134							
		R135							
		R136							
		R137							
		R138							
		R139							
		R140							
		R141							
		R142							
		R143							
		R144							
		R145							
		R146							
		R147							
		R148							
		R149							
		R150							
		R151							
		R152							
		R153							
		R154							
		R155							
		R156							
		R157							
		R158							
		R159							
		R160							
		R161							
		R162							
		R163							
		R164							
		R165							
		R166							
		R167							
		R168							
		R169							
		R170							
		R171							
		R172							
		R173							
		R174							
		R175							
		R176							
		R177							
		R178							
		R179							
		R180							
		R181							
		R182							
		R183							
		R184							
		R185							
		R186							
		R187							
		R188							
		R189							
		R190							
		R191							
		R192							
		R193							
		R194							

Supplementary Table 6. Immunogenetic features of shared clonotypes between FL and FBM

junction	VH	DH	JH	CDR3L	#	FL, %	FBM, %
CARISGDAFDIW	IGHV2-70*01F	IGHD3-10*01F	IGHJ3*02F	12	1	0.0674	0.0223
CARGYSGGSCYYFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD2-15*01F	IGHJ4*02F	17	2	0.0524	0.0111
CARVTGDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ3*02F	12	3	0.0504	0.0334
CARLTGDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ3*02F	12	4	0.0399	0.0228
CARDWYFDLW	IGHV3-33*01F=IGHV3-33*06F		IGHJ2*01F	10	5	0.0372	0.0108
CARDNWGSADFIDW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ3*02F	13	6	0.03	0.0111
CARDGFDYW	IGHV3-7*01F	IGHD1-26*01F	IGHJ4*02F	9	7	0.016	0.0108
CAKGYSSSWYFDYW	IGHV3-30*03F=IGHV3-30*18F=IGHV3-30-5*01F	IGHD6-13*01F	IGHJ4*02F	14	8	0.015	0.0108
CARGFDYW	IGHV1-69*13(F)	IGHD1-26*01F	IGHJ4*02F	8	9	0.0124	0.0108
CARGGYSYDADFIDW	IGHV6-1*01F=IGHV6-1*02F	IGHD5-12*01F	IGHJ3*02F	16	10	0.0123	0.0111
CAREQTGDAFDIW	IGHV1-2*04F	IGHD7-27*01F	IGHJ3*02F	13	11	0.0099	0.0108
CAREANSADFIDW	IGHV1-8*01F	IGHD4-23*01ORF	IGHJ3*02F	13	12	0.0099	0.0111
CARGRTGDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD1-1*01F	IGHJ3*02F	13	13	0.0075	0.0108
CARDAFDIW	IGHV1-2*04F		IGHJ3*02F	9	14	0.0075	0.0108
CARDGFDYW	IGHV3-33*01F=IGHV3-33*06F	IGHD1-26*01F	IGHJ4*02F	9	15	0.008	0.0217
% of total repertoire						0.3758	0.2202

Supplementary Table 7. Immunogenetic features of shared clonotypes between FL and postnatal samples

junction	VH	DH	JH	CDR3L	#	FL, %	cPB, %	aPB, %
CARAKRGYYGMDVW	IGHV5-51*01F=IGHV5-51*02F	IGHD5-24*01ORF	IGHJ6*02F	14	1	5.6772	0	0.0257
CARNSGGTFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD2-15*01F	IGHJ4*02F	12	2	2.7727	0	0.036
CVHRLSTLRGDIPYFDYW	IGHV2-5*02F	IGHD3-16*02F	IGHJ4*02F	18	3	2.503	0	0.2728
CARHSAVGTRHGMVDVW	IGHV5-51*01F	IGHD6-19*01F	IGHJ6*02F	17	4	1.5306	0	0.0154
CARGRHCSSTSCYFPLFDYW	IGHV4-59*01F	IGHD2-2*01F	IGHJ4*02F	20	5	1.1856	0	0.0051
CARAHSSGMETGAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD6-19*01F	IGHJ3*02F	17	6	0.6461	0	0.0051
CARDGGYDWGTPRHFFDYW	IGHV1-18*01F	IGHD5-12*01F	IGHJ4*02F	19	7	0.5959	0	0.0154
CARDYYYYGMDVW	IGHV4-59*01F		IGHJ6*02F	13	8	0.3801	0	0.012
CASYLNWGEDYW	IGHV3-11*03F=IGHV3-11*05F	IGHD7-27*01F	IGHJ4*02F	12	9	0.3387	0	0.0051
CARVELGISPNDAFDIW	IGHV3-7*03F	IGHD7-27*01F	IGHJ3*02F	17	10	0.3011	0	0.0051
CVHRLSTLRGDIPYFDYW	IGHV2-70*01F	IGHD3-16*02F	IGHJ4*02F	18	11	0.0376	0	0.0186
CVHRLSTLRGDIPYFDYW	IGHV2-5*02F	IGHD3-10*01F	IGHJ4*02F	18	12	0.0314	0	0.0051
CARDYYYYGMDVW	IGHV4-61*01F		IGHJ6*02F	13	13	0.026	0	0.0051
CARRSNYASGFDYW	IGHV5-51*01F	IGHD3-10*01F	IGHJ4*02F	14	14	0.0125	0	0.0114
CAKGYSSWYFDYW	IGHV3-9*01F	IGHD6-13*01F	IGHJ4*02F	15	15	0.0067	0	0.0051
CVGVRTGTSCYDSW	IGHV4-31*03F=IGHV4-31*04F	IGHD2-2*01F	IGHJ5*01F	14	16	0.0063	0	0.2111
CARSSVHLAFDIW	IGHV2-5*01F	IGHD3-10*02F	IGHJ3*02F	13	17	0.0063	0	0.139
CARDKVAGEGYFHYW	IGHV4-4*02F	IGHD6-19*01F	IGHJ4*02F	15	18	0.0063	0	0.0875
CAKDMWTARSGENYYYYGMDVW	IGHV3-23*01F=IGHV3-23*04F	IGHD3-10*02F	IGHJ6*02F	22	19	0.0063	0	0.0257
CAGSHPKIVTSLDYW	IGHV3-7*01F	IGHD5-12*01F	IGHJ4*02F	16	20	0.0063	0	0.0103
CARHVMYHSGSYSLHWYFDLW	IGHV5-51*01F	IGHD1-26*01F	IGHJ2*01F	21	21	0.0063	0	0.0051
CARSPVLNHDADFIDW	IGHV5-51*01F	IGHD2-8*01F	IGHJ3*02F	15	22	0.2384	0.0785	0
% of total repertoire						16.3214		0.9217

Clonotypes with the same highlighted background demonstrate VDJ convergent recombination; clonotypes in bold are amongst the top 100 most abundant across all developmental stages (Fig 2b)

Supplementary Table 8. Immunogenetic features of shared clonotypes between FBM and postnatal samples

junction	VH	DH	JH	CDR3L	#	FBM, %	cPB, %	aPB, %	
CAHRRFLGSTGGFDYW	IGHV2-5*02F	IGHD3-10*02F	IGHJ4*02F		16	1	0.1951	0.0065	0
CARRNLTDGDFDYW	IGHV5-51*01F	IGHD7-27*01F	IGHJ4*02F		13	2	0.1192	0.0065	0
CAREVNGDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-16*01F	IGHJ3*02F		13	3	0.0975	0.0065	0
CARGTDWYFDLW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ2*01F		13	4	0.0975	0.0065	0
CAHRRRRFAFDIW	IGHV2-5*02F	IGHD3-3*01F	IGHJ3*02F		13	5	0.0759	0.0065	0
CARDGWDYFDLW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-10*01F	IGHJ2*01F		13	6	0.0759	0.0065	0
CARGGNWPPNDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ3*02F		18	7	0.0759	0.0065	0
CARTPLGKDAFDIW	IGHV2-70*01F	IGHD7-27*01F	IGHJ3*02F		14	8	0.0759	0.0065	0
CARFLTIFGVVIDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-3*01F	IGHJ3*02F		18	9	0.0683	0.0109	0
CARLELLGMVEAFDIW	IGHV5-51*01F	IGHD1-20*01F	IGHJ3*02F		16	10	0.0669	0.0121	0
CAHRRPFLWYFDLW	IGHV2-5*02F	IGHD1-14*01ORF	IGHJ2*01F		14	11	0.065	0.0065	0
CARSMARRGSYYFDYW	IGHV2-70*11F	IGHD1-26*01F	IGHJ4*02F		16	12	0.0569	0.0055	0
CARGVAGDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD2-15*01F	IGHJ3*02F		13	13	0.0557	0.006	0
CAREGGSIIIDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD4-23*01ORF	IGHJ4*02F		13	14	0.0455	0.0055	0
CAREVTGDRPGYFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ4*02F		16	15	0.0455	0.0055	0
CAHENLTGVVYW	IGHV2-5*02F	IGHD7-27*01F	IGHJ4*02F		12	16	0.0446	0.006	0
CARHVGDIW	IGHV5-51*01F	IGHD1-26*01F	IGHJ3*02F		9	17	0.0446	0.006	0
CAREGIAAAGLLDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD6-13*01F	IGHJ4*02F		15	18	0.0341	0.0109	0
CARGSAMSGSDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-16*01F	IGHJ3*02F		13	19	0.0341	0.0109	0
CAREGGSELDDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-22*01F	IGHJ3*02F		17	20	0.0325	0.0065	0
CARQLLTGDDWYFDLW	IGHV4-39*01F	IGHD7-27*01F	IGHJ2*01F		17	21	0.0325	0.0065	0
CARGDILTGYSNWFDPW	IGHV3-64*01F	IGHD3-9*01F	IGHJ5*02F		17	22	0.0228	0.0055	0
CARILQSSSWYDAFDIW	IGHV2-70*01F	IGHD6-13*01F	IGHJ3*02F		17	23	0.0228	0.0055	0
CARSIPYRWFRELLYYFDYW	IGHV5-51*01F	IGHD3-10*01F	IGHJ4*02F		20	24	0.0228	0.0055	0
CAHAIRGGGAFDIW	IGHV2-5*02F	IGHD3-16*01F	IGHJ3*02F		14	25	0.0223	0.006	0
CAHKDDGYWYFDLW	IGHV2-5*02F	IGHD3-10*01F	IGHJ2*01F		14	26	0.0223	0.006	0
CARGFNWAAAFDIW	IGHV1-2*02F	IGHD1-1*01F	IGHJ3*02F		14	27	0.0223	0.006	0
CARPLKLYDAFDIW	IGHV5-51*01F	IGHD3-10*02F	IGHJ3*02F		15	28	0.0223	0.006	0
CARGTDGDDAFDIW	IGHV3-30*01F	IGHD7-27*01F	IGHJ3*02F		14	29	0.0114	0.0109	0
CARDLNRDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-9*01F	IGHJ3*02F		14	30	0.0114	0.0055	0
CARDSPTGDDPLDAFDIW	IGHV4-31*03F=IGHV4-31*04F	IGHD7-27*01F	IGHJ3*02F		18	31	0.0114	0.0055	0
CARGRSTGEDFDYW	IGHV5-51*01F	IGHD7-27*01F	IGHJ4*02F		14	32	0.0114	0.0055	0
CARGTWNWINDYFDYW	IGHV3-53*01F=IGHV3-53*02F	IGHD1-1*01F	IGHJ4*02F		18	33	0.0114	0.0055	0
CARLVANWGYNWFDPW	IGHV5-51*01F	IGHD7-27*01F	IGHJ5*02F		17	34	0.0114	0.0055	0
CARNTGGYCSSTSCYFDLW	IGHV5-51*01F	IGHD2-2*01F	IGHJ2*01F		21	35	0.0114	0.0055	0
CARPGSAGDYW	IGHV5-51*01F	IGHD1-1*01F	IGHJ4*02F		11	36	0.0114	0.0055	0
CARRRGYSSWYAFDIW	IGHV5-51*01F	IGHD6-13*01F	IGHJ3*02F		17	37	0.0114	0.0055	0
CARRSAAAGIFDYW	IGHV5-51*01F	IGHD6-13*01F	IGHJ4*02F		14	38	0.0114	0.0055	0
CARVGITTFGVVIRGGVEFDYW	IGHV1-69*02F=IGHV1-69*04F=IGHV1-69*09F	IGHD3-3*01F	IGHJ4*02F		23	39	0.0114	0.0055	0
CAREDAFDIW	IGHV1-2*02F		IGHJ3*02F		10	40	0.0111	0.0483	0
CARVRANWGYFDLW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ2*01F		14	41	0.0111	0.0325	0
CARARFLWLFYFDYW	IGHV5-51*01F	IGHD3-3*01F	IGHJ4*02F		14	42	0.0111	0.006	0
CARDGDLDPFDYW	IGHV1-2*02F	IGHD3-10*01F	IGHJ4*02F		13	43	0.0111	0.006	0
CARDRGRTGDRGDYFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ4*02F		18	44	0.0111	0.006	0
CARERITIFGVVDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-3*01F	IGHJ4*02F		15	45	0.0111	0.006	0
CARFCEGRDWRGFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-16*01F	IGHJ4*02F		17	46	0.0111	0.006	0
CARFLEWYFDYW	IGHV1-8*01F=IGHV1-8*02F	IGHD3-3*01F	IGHJ4*02F		12	47	0.0111	0.006	0
CARGNRPLAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD1-26*01F	IGHJ3*02F		13	48	0.0111	0.006	0
CARGRANWGTYFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD7-27*01F	IGHJ4*02F		15	49	0.0111	0.006	0
CARRLTGDAFDIW	IGHV1-69*02F=IGHV1-69*04F=IGHV1-69*09F	IGHD7-27*01F	IGHJ3*02F		13	50	0.0111	0.006	0
CARTRTRPLNDGVDYW	IGHV1-2*02F	IGHD3-10*02F	IGHJ4*02F		17	51	0.0108	0.397	0
CYDFWNSGYPVW	IGHV1-8*01F=IGHV1-8*02F	IGHD3-3*01F	IGHJ4*02F		12	52	0.0108	0.0195	0
CARDLWYFDLW	IGHV3-7*01F	IGHD5-12*01F	IGHJ2*01F		12	53	0.0108	0.0065	0
CARFGDGDWYFDLW	IGHV4-39*07F	IGHD3-10*01F	IGHJ2*01F		14	54	0.0108	0.0065	0
CARIPRRIDAFDIW	IGHV2-5*02F	IGHD3-22*01F	IGHJ3*02F		14	55	0.0108	0.0065	0
CARRVAGFDYW	IGHV4-59*08F	IGHD6-19*01F	IGHJ4*02F		11	56	0.0108	0.0065	0
CARVLSIAARYYGMVDW	IGHV6-1*01F=IGHV6-1*02F	IGHD6-6*01F	IGHJ6*02F		18	57	0.0108	0.0065	0
CASLGLGTEEYFDYW	IGHV1-2*02F	IGHD6-13*01F	IGHJ4*02F		16	58	0.0108	0.0065	0
CASRLGLGIPYWFYFDLW	IGHV4-39*01F	IGHD7-27*01F	IGHJ2*01F		17	59	0.0108	0.0065	0
CARYLTGTDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD1-20*01F	IGHJ3*02F		14	60	0.0557	0	0.01
CAREGICDSSWYFQHW	IGHV6-1*01F=IGHV6-1*02F	IGHD6-13*01F	IGHJ1*01F		16	61	0.0433	0	0.0108
CARGYSGSYEYFQHW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-10*01F	IGHJ1*01F		16	62	0.0341	0	0.01
CAHQELWFGELFDYW	IGHV2-5*02F	IGHD3-10*01F	IGHJ4*02F		16	63	0.0334	0	0.0104
CALGVVEASGGWYRSLDPW	IGHV1-2*04F	IGHD2-15*01F	IGHJ5*02F		20	64	0.0223	0	0.0114
CARHKEFNWFDPW	IGHV5-51*01F	IGHD3-9*01F	IGHJ5*02F		13	65	0.0217	0	0.01
CARMGHAFDIW	IGHV4-31*03F=IGHV4-31*04F	IGHD3-16*01F	IGHJ3*02F		12	66	0.0217	0	0.01
CGRTYNYDTSWGFYEW	IGHV1-46*01F=IGHV1-46*02F=IGHV1-46*03F	IGHD3-22*01F	IGHJ4*02F		17	67	0.0114	0	0.4102
CARAERYDFWSGLYYFDYW	IGHV1-8*01F=IGHV1-8*02F	IGHD3-3*01F	IGHJ4*02F		20	68	0.0114	0	0.1823
CARRRAYGNMDSGTFEIW	IGHV2-5*02F	IGHD2-21*02F	IGHJ3*02F		19	69	0.0114	0	0.1506
CARDSRRNELLSPGYFDLW	IGHV1-2*02F	IGHD2-15*01F	IGHJ2*01F		20	70	0.0114	0	0.0114
CARERRDAFDIW	IGHV1-46*01F=IGHV1-46*02F=IGHV1-46*03F	IGHD4-23*01ORF	IGHJ3*02F		12	71	0.0114	0	0.0114
CARDRSSVDYW	IGHV7-4-1*02F	IGHD6-6*01F	IGHJ4*02F		12	72	0.0114	0	0.0108
CAHPSNGDAFDIW	IGHV2-5*02F	IGHD2-8*02F	IGHJ3*02F		13	73	0.0114	0	0.01
CARGWVDAFDIW	IGHV6-1*01F=IGHV6-1*02F	IGHD6-19*01F	IGHJ3*02F		13	74	0.0114	0	0.01
CARDRWFGELGSFDYW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-10*01F	IGHJ4*02F		16	75	0.0111	0	0.0731
CARAVWGGAVDW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-16*01F	IGHJ4*02F		12	76	0.0111	0	0.0522
CAREDRDAWVAGASYYYYYMDVW	IGHV6-1*01F=IGHV6-1*02F	IGHD3-10*02F	IGHJ6*03F		24	77	0.0111	0	0.0313
CARKAGDAAGMDVW	IGHV2-70*01F	IGHD7-27*01F	IGHJ6*02F		14	78	0.0111	0	0.0215
CARSYSGSGWFDPW	IGHV2-70*01F	IGHD3-10*01F	IGHJ5*02F		15	79	0.0111	0	0.02
CARVLYCGDCSSRYYYGMDVW	IGHV1-2*02F=IGHV1-2*05F	IGHD2-21*01F	IGHJ6*02F		22	80	0.0111	0	0.02
CAHSSITIFGVVIPYWFDPW	IGHV2-5*01F	IGHD3-3*01F	IGHJ5*02F		21	81	0.0111	0	0.01
CARSEVVGPSGEDFDNW	IGHV6-1*01F=IGHV6-1*02F	IGHD1-26*01F	IGHJ4*02F		17	82	0.0108	0	0.03
CARVDYGLHAFDIW	IGHV4-59*01F	IGHD3-16*01F	IGHJ3*02F		14	83	0.0108	0	0.01
% total repertoire						2.3641	0.854	1.1374	

Supplementary Table 9. Immunogenetic features of clonotypes belonging to CLL stereotypic IgH receptors

'confidence' is based on the difference between the assignment score for that sequence and the minimum assignment score for that subset.

sample	CLL subset	confidence	score	VH	JH	CDR3len	mut	junction	frame
FL	CLL#5	average	27.5457	IGHV7-4-1*02	IGHJ6*02	20	unmutated	CARGGITGANSKYYYYGMDVW	in-frame
FL	CLL#5	borderline	22.7507	IGHV1-69*13	IGHJ6*02	20	unmutated	CARDHPSGDGAYYYYYGMDVW	in-frame
FL	CLL#5	borderline	21.5542	IGHV1-69*13	IGHJ6*02	20	unmutated	CARTSKDVIATIRYYYYGMDVW	in-frame
FBM	CLL#5	average	28.1072	IGHV1-69*01=IGHV1-69*12=IGHV1-69*13	IGHJ6*03	20	unmutated	CARDGVRDQTGFYYYYGMDVW	in-frame
FBM	CLL#5	borderline	21.7374	IGHV1-46*01=IGHV1-46*02=IGHV1-46*03	IGHJ6*03	20	unmutated	CARVRLGPVAVGYYYYGMDVW	in-frame
FBM	CLL#5	borderline	22.1194	IGHV1-2*02=IGHV1-2*03=IGHV1-2*04	IGHJ6*02	20	unmutated	CARGGREQLVRYYYYYGMDVW	in-frame
FBM	CLL#5	high	35.2981	IGHV5-51*01	IGHJ6*03	20	unmutated	CARLTIFGVVVIDYYYYGMDVW	in-frame
cPB	CLL#5	average	31.8392	IGHV1-8*02	IGHJ6*03	20	unmutated	CARAGRPPVVIIPYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.5374	IGHV1-8*01=IGHV1-8*02	IGHJ6*03	20	unmutated	CARGNTRIFIGVVTYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.0583	IGHV1-69*01=IGHV1-69*12=IGHV1-69*13	IGHJ6*03	20	unmutated	CARGAGIYAVAGTRNYYYYGMDVW	in-frame
cPB	CLL#5	high	34.6449	IGHV1-69*13	IGHJ6*03	20	unmutated	CARDEVAVAPRHYYYYYGMDVW	in-frame
cPB	CLL#5	low	23.9373	IGHV1-18*01=IGHV1-18*04	IGHJ6*03	20	unmutated	CARDPVTVTITQDYYYYGMDVW	in-frame
cPB	CLL#5	average	27.1534	IGHV1-69*01=IGHV1-69*12=IGHV1-69*13	IGHJ6*02	20	unmutated	CARNPGIYAVPQYCYGMDVW	in-frame
cPB	CLL#5	low	25.2939	IGHV1-3*01	IGHJ6*02	20	unmutated	CARDSVDIATWVYYYYGMDVW	in-frame
cPB	CLL#5	low	23.9709	IGHV5-10-1*01=IGHV5-10-1*03	IGHJ6*02	20	unmutated	CARQQIYAVAGTVYYYYGMDVW	in-frame
cPB	CLL#5	low	23.8836	IGHV1-69*13	IGHJ6*02	20	unmutated	CASPTGSGSYTYYYYYGMDVW	in-frame
cPB	CLL#5	average	22.7617	IGHV1-18*01=IGHV1-18*04	IGHJ6*03	20	unmutated	CARVVVAATIEDYYYYGMDVW	in-frame
cPB	CLL#5	average	29.2986	IGHV1-46*01=IGHV1-46*03	IGHJ6*03	20	unmutated	CARDKGVGVNLNYYYYGMDVW	in-frame
cPB	CLL#5	borderline	22.0674	IGHV1-2*02	IGHJ6*03	20	unmutated	CARVGMGVAGTITYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.9354	IGHV5-10-1*01=IGHV5-10-1*03	IGHJ6*03	20	unmutated	CARHNEGIAARPYYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.493	IGHV1-69*05=IGHV1-69*13	IGHJ6*03	20	unmutated	CARDLRDGYNDYYYYYGMDVW	in-frame
cPB	CLL#5	low	25.0688	IGHV1-2*02	IGHJ6*03	20	unmutated	CARASISPVDGGYYYYGMDVW	in-frame
cPB	CLL#5	low	23.6375	IGHV1-8*01=IGHV1-8*02	IGHJ6*03	20	unmutated	CARGMTVTLTMYYYYYGMDVW	in-frame
cPB	CLL#5	average	27.7249	IGHV1-18*01	IGHJ6*02	20	unmutated	CARDTPPGVVPAAPYGGMDVW	in-frame
cPB	CLL#5	average	31.9444	IGHV1-18*01=IGHV1-18*04	IGHJ6*02	20	unmutated	CARVDIVVVAALYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.2668	IGHV1-69*02=IGHV1-69*04=IGHV1-69*09	IGHJ6*02	20	unmutated	CARDPLTVAATNYYYYGMDVW	in-frame
cPB	CLL#5	borderline	22.5637	IGHV1-69*01=IGHV1-69*12=IGHV1-69*13	IGHJ6*02	20	unmutated	CARGQGRGMFRSHYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.0238	IGHV5-51*01	IGHJ6*02	20	unmutated	CARQGITMVGANYYYYGMDVW	in-frame
cPB	CLL#5	borderline	22.5168	IGHV1-69*01=IGHV1-69*12=IGHV1-69*13	IGHJ6*03	20	unmutated	CARDGGTISYPNYYYYGMDVW	in-frame
cPB	CLL#5	borderline	21.0149	IGHV1-69*01=IGHV1-69*12=IGHV1-69*13	IGHJ6*01	20	unmutated	CARALNTAMVSPYYYYGMDVW	in-frame
cPB	CLL#5	high	37.2933	IGHV5-10-1*01=IGHV5-10-1*03	IGHJ6*03	20	unmutated	CARRAIFGVVNSYYYYGMDVW	in-frame
aPB	CLL#5	average	30.7116	IGHV1-2*02	IGHJ6*03	20	unmutated	CARDRVTMVAQNYYYYYGMDVW	in-frame
aPB	CLL#5	average	27.5136	IGHV1-69*02=IGHV1-69*04=IGHV1-69*09	IGHJ6*02	20	unmutated	CARESEAVVPAAMYYYYGMDVW	in-frame
aPB	CLL#5	average	28.5702	IGHV1-69*13	IGHJ6*02	20	unmutated	CAREDLFMVGNYYYYGMDVW	in-frame
aPB	CLL#5	average	26.7655	IGHV1-46*01=IGHV1-46*03	IGHJ6*02	20	unmutated	CARDLIVVVAATYYYYGMDVW	in-frame
aPB	CLL#5	average	26.6604	IGHV1-8*01=IGHV1-8*02	IGHJ6*02	20	unmutated	CARGDIVVVAAGHYYYYGMDVW	in-frame
aPB	CLL#5	borderline	22.9105	IGHV1-2*05	IGHJ6*02	20	unmutated	CARGGITGTITGTYHYGMDVW	in-frame
aPB	CLL#5	borderline	21.5591	IGHV1-8*01	IGHJ6*02	20	unmutated	CARGGIVGATVDYHYGMDVW	in-frame
aPB	CLL#5	low	24.7688	IGHV1-8*01=IGHV1-8*02	IGHJ6*02	20	unmutated	CARGPSSGTVTTFDYHYGMDVW	in-frame
aPB	CLL#5	low	24.9821	IGHV5-10-1*01=IGHV5-10-1*03	IGHJ6*02	20	unmutated	CARHEEVPVAGTVYYYYGMDVW	in-frame
FL	CLL#28A	average	48.0086	IGHV7-4-1*02	IGHJ6*02	17	unmutated	CASEGSGSYYYYYGMDVW	in-frame
FL	CLL#28A	average	45.6756	IGHV1-24*01	IGHJ6*02	17	unmutated	CASEGSGSYYYYYGMDVW	in-frame
FL	CLL#28A	high	55.646	IGHV1-2*02	IGHJ6*02	17	unmutated	CARDYSGSYYYYYGMDVW	in-frame
FBM	CLL#28A	average	46.8734	IGHV1-2*02	IGHJ6*02	17	unmutated	CARDTSSSYYYYYGMDVW	in-frame
FBM	CLL#28A	high	50.2292	IGHV1-2*02	IGHJ6*02	17	unmutated	CARAYSSSFYHYGMDVW	in-frame
cPB	CLL#28A	average	45.7733	IGHV1-2*02	IGHJ6*03	17	unmutated	CARGASGSYYYYGMDVW	in-frame
FL	CLL#1	average	22.3217	IGHV1-18*01	IGHJ4*02	13	unmutated	CARAQALGIRPLDYW	in-frame
FL	CLL#1	low	13.4818	IGHV1-2*03	IGHJ4*02	13	unmutated	CARDGRVLNPFYDYW	in-frame
FL	CLL#1	borderline	8.671	IGHV1-2*02	IGHJ4*02	13	unmutated	CARVSLTEGFYDYW	in-frame
FL	CLL#1	average	28.1086	IGHV1-2*02	IGHJ1*01	13	unmutated	CASEQWLVPQYFQHW	in-frame
FL	CLL#1	borderline	7.8789	IGHV1-2*02	IGHJ4*01	13	unmutated	CAREKGLGTYPLTTW	in-frame
FL	CLL#1	borderline	7.8832	IGHV1-2*02	IGHJ4*02	13	unmutated	CARPLGVPPYFYDYW	in-frame
FL	CLL#1	average	17.2339	IGHV1-8*02	IGHJ4*02	13	unmutated	CARAQALGIRPLDYW	in-frame
FL	CLL#1	borderline	8.3402	IGHV1-2*02	IGHJ4*02	13	unmutated	CARVPRPLGPFYDYW	in-frame
FBM	CLL#1	average	24.2051	IGHV1-2*02	IGHJ4*02	13	unmutated	CAIPQQLVPETFDYW	in-frame
FBM	CLL#1	borderline	7.3298	IGHV1-2*02	IGHJ2*01	13	unmutated	CAREARLV**YFDLW	in-frame
FBM	CLL#1	borderline	6.6296	IGHV1-46*01=IGHV1-46*02=IGHV1-46*03	IGHJ4*02	13	unmutated	CARVORGVLHYFGYW	in-frame
FBM	CLL#1	borderline	7.5937	IGHV1-2*04	IGHJ4*02	13	unmutated	CARAQATVAGQYDYW	in-frame
FBM	CLL#1	low	13.2084	IGHV1-8*01=IGHV1-8*02	IGHJ4*02	13	unmutated	CARELNFRETFDYW	in-frame
FBM	CLL#1	low	11.6549	IGHV5-51*01	IGHJ4*02	13	unmutated	CARLSILGMPYFYDYW	in-frame
FBM	CLL#1	low	12.9754	IGHV1-8*01=IGHV1-8*02	IGHJ4*02	13	unmutated	CARNLILGIRHFDYW	in-frame
cPB	CLL#1	average	19.1373	IGHV1-46*01=IGHV1-46*02=IGHV1-46*03	IGHJ4*02	13	unmutated	CARDGLWVNGSDYW	in-frame
cPB	CLL#1	borderline	6.4035	IGHV1-3*01	IGHJ4*02	13	unmutated	CARAGLLEQLFDYW	in-frame
cPB	CLL#1	low	12.7636	IGHV1-8*01=IGHV1-8*02	IGHJ4*02	13	unmutated	CARGQIYAVAGNFDYW	in-frame
cPB	CLL#1	low	11.7876	IGHV1-18*01=IGHV1-18*04	IGHJ1*01	13	unmutated	CARRQQQLPAEYFQHW	in-frame
cPB	CLL#1	low	10.7205	IGHV1-18*01=IGHV1-18*04	IGHJ4*02	13	unmutated	CARGHQWELPFYDYW	in-frame
cPB	CLL#1	average	17.6761	IGHV5-10-1*01=IGHV5-10-1*03	IGHJ4*02	13	unmutated	CARRGAMVPRSFYDYW	in-frame
cPB	CLL#1	borderline	6.4664	IGHV5-51*01	IGHJ4*02	13	unmutated	CARRGAMVPRSFYDYW	in-frame
cPB	CLL#1	borderline	5.5759	IGHV1-2*02	IGHJ4*02	13	unmutated	CARGHWVVTVPDYW	in-frame
cPB	CLL#1	borderline	6.6186	IGHV1-8*01=IGHV1-8*02	IGHJ4*02	13	unmutated	CARRNQWLVRNFDYW	in-frame
cPB	CLL#1	average	14.4517	IGHV1-3*01	IGHJ4*02	13	unmutated	CARSEWELLFFDYW	in-frame
cPB	CLL#1	average	18.0163	IGHV1-3*01	IGHJ4*02	13	unmutated	CARGSELGVRFYDYW	in-frame
cPB	CLL#1	average	17.9589	IGHV1-18*01	IGHJ4*02	13	unmutated	CARGGHWVAFPDYW	in-frame
cPB	CLL#1	borderline	8.3642	IGHV1-3*01	IGHJ4*02	13	unmutated	CARAEIWAIVFYDYW	in-frame
cPB	CLL#1	borderline	6.7906	IGHV1-18*01=IGHV1-18*04	IGHJ4*02	13	unmutated	CARDRWLFESHIDYW	in-frame
cPB	CLL#1	borderline	6.4606	IGHV1-3*01	IGHJ4*02	13	unmutated	CARDQEVVAAPPDYW	in-frame
cPB	CLL#1	high	39.3958	IGHV1-46*01=IGHV1-46*03	IGHJ4*02	13	unmutated	CARGQLVDSYFYDYW	in-frame
cPB	CLL#1	low	11.1913	IGHV1-3*01	IGHJ4*02	13	unmutated	CARVSVVVAYFYDYW	in-frame
cPB	CLL#1	low	10.7715	IGHV1-18*01=IGHV1-18*04	IGHJ4*02	13	unmutated	CAREQVAATSLDYW	in-frame
cPB	CLL#1	low	10.3091	IGHV1-18*01	IGHJ4*02	13	unmutated	CARESRRVQGNFDYW	in-frame
cPB	CLL#1	low	10.4006	IGHV1-18*01=IGHV1-18*04	IGHJ4*02	13	unmutated	CARDQAVAGTSLDYW	in-frame
cPB	CLL#1	low	9.4747	IGHV1-2*02	IGHJ4*02	13	unmutated	CAREQDNGPYPYDYW	in-frame
aPB	CLL#1	average	27.7989	IGHV1-3*01	IGHJ4*02=IGHJ5*02	13	unmutated	CARTQNLVTGTVENW	in-frame
aPB	CLL#1	average	28.662	IGHV1-8*01=IGHV1-8*02	IGHJ4*02	13	unmutated	CARGQQLVGSFSDYW	in-frame
aPB	CLL#1	average	19.69	IGHV1-18*01	IGHJ4*02	13	unmutated	CARSMQLVPSFYDYW	in-frame
aPB	CLL#1	borderline	7.0919	IGHV1-3*01	IGHJ4*02	13	unmutated	CAREGAVGATWFDYW	in-frame
aPB	CLL#1	high	35.9479	IGHV1-3*01	IGHJ4*02=IGHJ5*02	13	unmutated	CARTQNLVTGTVENW	in-frame
aPB	CLL#1	high	35.6416	IGHV1-3*01	IGHJ4*02	13	unmutated	CARTQNLVTGTVENW	in-frame
aPB	CLL#1	high	29.7688	IGHV1-3*01	IGHJ4*02	13	unmutated	CARGQWELLPFDYW	in-frame

Sequences in bold demonstrate convergent recombinations