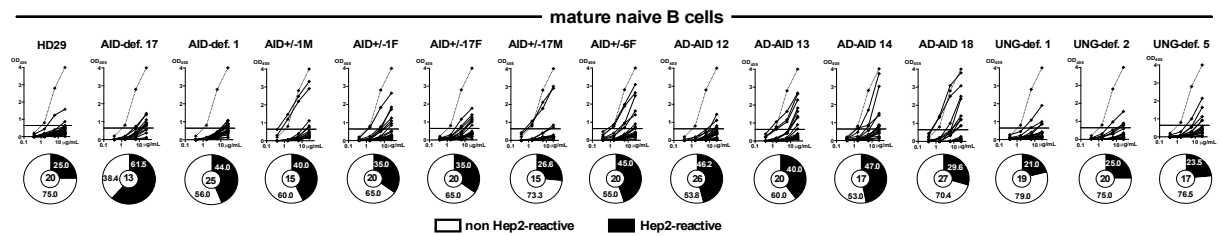
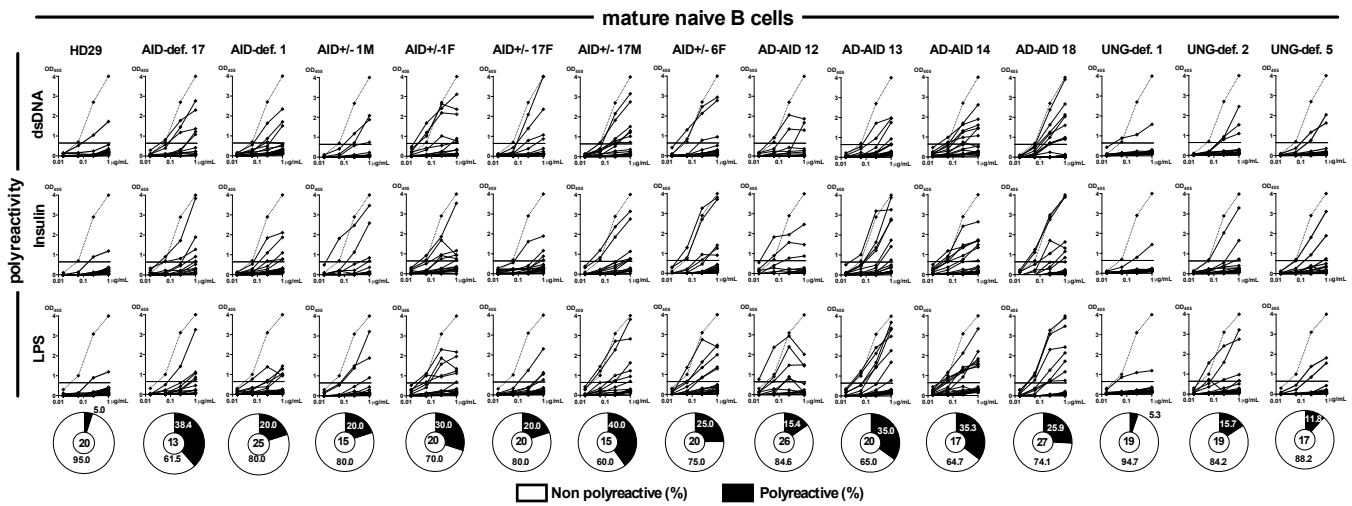


Figure S1



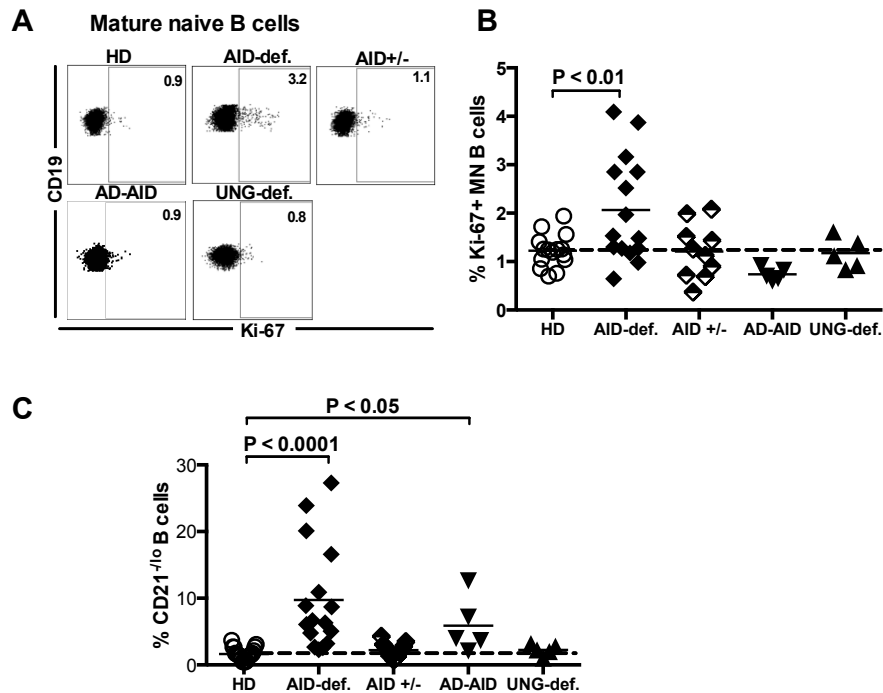
Supplemental Figure 1. Increased frequencies of autoreactive mature naïve B cells in all subjects with *AICDA* gene mutations. Recombinant antibodies expressed by mature naïve B cells from AID-deficient patients (n=6), AID^{+/-} (n=5), AD-AID (n=4) and UNG-deficient patients (n=3) were tested by ELISA for HEp-2 reactivity. Solid lines show binding for each cloned recombinant antibody. Dotted lines show ED38-positive control. Horizontal lines show cutoff OD₄₀₅ for positive reactivity. For each individual, the frequency of autoreactive and non autoreactive B cells are summarized in pie charts, with the number of antibodies tested shown in the center.

Figure S2



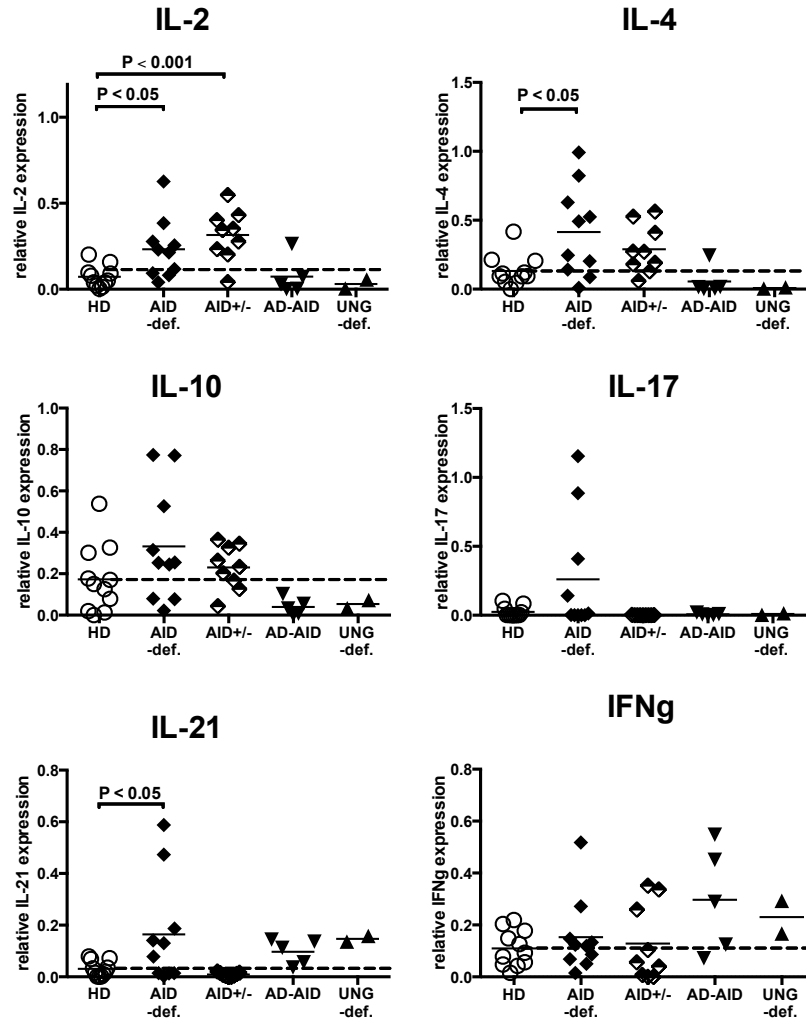
Supplemental Figure 2. Increased frequencies of polyreactive mature naïve B cells in all subjects with *AICDA* mutations. Recombinant antibodies expressed by mature naïve B cells from AID-deficient patients (n=6), AID^{+/-} (n=5), AD-AID (n=4) and UNG-deficient patients (n=3) were tested by ELISA for reactivity against lipopolysaccharide (LPS), Insulin and double stranded DNA (dsDNA). Antibodies were considered polyreactive if they reacted to all 3 antigens. Solid lines show binding for each cloned recombinant antibody. Dotted lines show ED38-positive control. Horizontal lines show cutoff OD₄₀₅ for positive reactivity. For each individual, the frequency of polyreactive and non polyreactive B cells are summarized in pie charts, with the number of antibodies tested shown in the center.

Figure S3



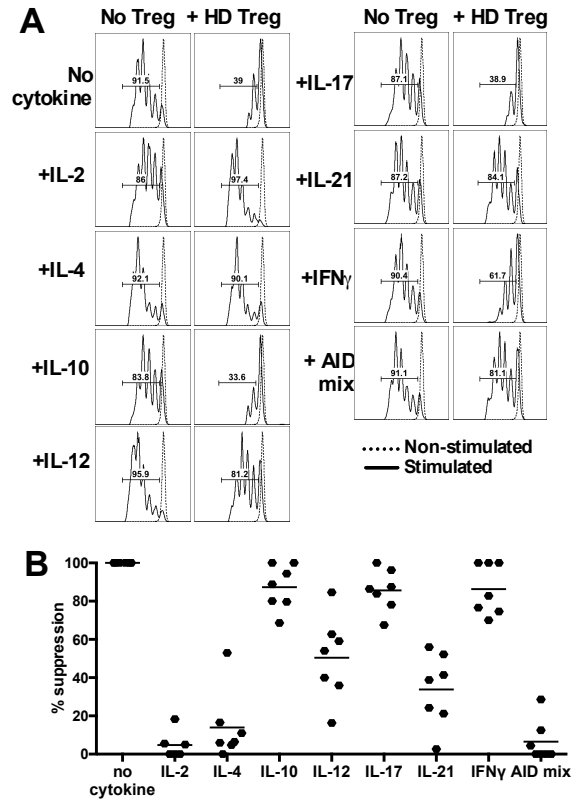
Supplemental Figure 3. Increased mature naïve B cell proliferation and percentage of CD21^{-lo} B cells in AID-deficient patients. (A) Representative dot plots of Ki-67 staining on mature naïve B cells. (B) Summary of the Ki-67 staining shows a higher percentage of cycling mature naïve B cells in AID deficient patients (n= 15) compared to HD (n=15), AID^{+/-} (n=10), AD-AID (n=4) or UNG-deficient patients (n=5). (C) Percentages of CD19⁺CD27⁻CD10⁻CD21^{-lo} B-cells in HD (n=21) compared to AID-deficient patients (n=16), AID^{+/-} (n=15), AD-AID patients (n=5) or UNG-deficient patients (n=4). Solid lines indicate means, dashed lines show the mean of the HD. P values were obtained with ANOVA using Dunnett correction for testing multiple comparisons.

Figure S4



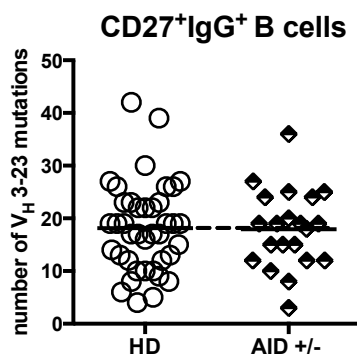
Supplemental Figure 4. Increased cytokine production by Tresp of subjects carrying *AICDA* gene mutation(s). Quantitative real-time PCR of CD4⁺ sorted cells shows cytokine transcripts in AID-deficient patients (n=10), AID^{+/-} (n=9), AD-AID (n=5) and UNG-deficient patients (n=2) compared to HD (n=11). Solid lines indicate means, dashed lines show the mean of HD for comparison. P values were obtained with ANOVA using Dunnett correction for testing multiple comparisons.

Figure S5



Supplemental Figure 5. Cytokines produced by Tresp in subjects with mutations in *AICDA* block Treg suppression *in vitro*. (A) Representative histograms of Treg mediated suppression of autologous CFSE labeled Tresp cells on day 4.5 from a healthy donor in the presence of the indicated cytokines. Dashed line display non-stimulated Tresp. The “AID mix” contains IL-2, IL-4, IL-10, IL-17, IL-21, and IFN γ , all of which are increased in AID-deficient patients. The suppressive activity of Tregs in presence of various cytokines is summarized in (B) (n=7), where the suppressive capacity of Tregs in co-culture without cytokines of each individual donor is normalized to 100%. Lines show mean.

Figure S6



Supplemental Figure 6. Similar SHM frequencies in IgG sequences encoded by *VH3-23* genes between HD and AID^{+/-} heterozygotes. The number of mutations in *V_H3-23* sequences derived from single CD19⁺CD21⁺CD27⁺IgG⁺ memory B cells are shown. Each sequence is depicted by a symbol, solid line represents the mean in AID^{+/-} heterozygotes while the dashed line the mean of HD for comparison.

Supplemental Table 1: Characteristics of patients with *AICDA* or *UNG* mutations and heterozygote asymptomatic relatives

Patient number	Ethnic group	Sex	Age at diagnosis (yr)	Current age (yr)	Serum immunoglobulins in mg/dl			Clinical Manifestations	Mutation in AICDA gene	Mutation in AID	Inheritance
					IgM	IgA	IgG				
AID-def.1*	Moroccan	M	5	22	240	<7	40	lymphoid hyperplasia, recurrent infections	203 G>A / 175-184 del	W68X / H25-E58 del insV	AR
AID-def.2*	Moroccan	M	1	16	150	<7	<6	recurrent infections	203 G>A / 175-184 del	W68X / H25-E58 del insV	AR
AID-def.4	Moroccan	M	1	20	100	<7	<6	lymphoid hyperplasia, recurrent infections	203 G>A / del	W68X / 0	AR
AID-def.5	Turkish	M	11	21	1150	<5.8	264	lymphoid hyperplasia, recurrent infections	415 A>G / 415 A>G	M139V / M139V	AR
AID-def.6	Pakistani	M	4	4	4000	<7	<7	recurrent infections	394 G>C / 394 G>C	A132P / A132P	AR
AID-def.8	French Canadian	F	28	60	8830	<60	na	lymphoid hyperplasia, recurrent infections	334 C>T / 334 C>T	R112C / R112C	AR
AID-def.9	French Canadian	F	5	26	451	<30	178	lymphoid hyperplasia, recurrent infections	334 C>T / 334 C>T	R112C / R112C	AR
AID-def.10	French Canadian	F	3	22	621	40	60	recurrent infections	334 C>T / 334 C>T	R112C / R112C	AR
AID-def.11	French Canadian	M	2	50	6800	<60	na	recurrent infections	334 C>T / 334 C>T	R112C / R112C	AR
AID-def.17	Turkish	M		18					415 A>G / 415 A>G	M139V / M139V	AR
AID-def.19	Kuwait	M	1	5	223	< 6	< 33	lymphoid hyperplasia, recurrent infections	254 G>A / 254 G>A	S85N / S85N	AR
AID-def.20	Kuweit	M	1.5	16	408	40	<30	lymphoid hyperplasia, recurrent infections	254 G>A / 254 G>A	S85N / S85N	AR
AID-def.22*	Kuweit	M	3	14	1800	< 7	< 7	lymphoid hyperplasia, recurrent infections	254 G>A / 254 G>A	S85N / S85N	AR
AID-def.23*	Kuweit	M	8.5	13	677	< 6	< 33	lymphoid hyperplasia, recurrent infections	254 G>A / 254 G>A	S85N / S85N	AR
AID-def.25	Ukraine	F	12	39	1367	5	51	recurrent pneumonias, Lymphoid hyperplasia, nodular regenerative hyperplasia liver	del exon1/del exon1	0/0	AR
AID-def.26	French	M	6	10	140	<7	<7			C87R / C147X	AR
AID-def.27	French Canadian	M							334 C>T / 334 C>T	R112C / R112C	AR
AD-AID 12	French	F	71	76	203	<7	130	recurrent infections	568 C>T / Normal	R190X / Normal	AD
AD-AID 13	Japan	M	13	31	156	<29	<158		568 C>T / Normal	R190X / Normal	AD
AD-AID 14	Japan	F		58					568 C>T / Normal	R190X / Normal	AD
AD-AID 18	Turkish	M		17					559 del/ Normal	V186X/ Normal	AD
AD-AID 28	Japan	F	26	39	1030	<5	83	recurrent infections	568 C>T / Normal	R190X / Normal	AD
AID+/- 1M	Moroccan	F		adult				healthy	203 G>A/ Normal	W68X/ Normal	HET
AID+/- 1F	Moroccan	M		adult				healthy	175-184 del	H25-E58 del insV/ Normal	HET
AID+/- 6F	Pakistani	M		adult				adult	394 G>C / Normal	A132P / Normal	HET
AID+/- 6M	Pakistani	F		adult				adult	394 G>C / Normal	A132P / Normal	HET
AID+/-17F	Turkish	M		adult				healthy	415 A>G/ Normal	M139V/ Normal	HET
AID+/-17M	Turkish	F		adult				healthy	415 A>G/ Normal	M139V/ Normal	HET
AID +/- 19F	Kuweit	M		35				healthy	254 G>A/ Normal	S85N/ Normal	HET
AID +/- 20F	Kuweit	M		48				healthy	254 G>A/ Normal	S85N/ Normal	HET
AID +/- 22M	Kuweit	F		33				healthy	254 G>A/ Normal	S85N/ Normal	HET
AID+/- 26M	French	F		41				healthy		C87R/ Normal	HET
AID+/- 27B	French Canadian	M		57				healthy	334 C>T / Normal	R112C / Normal	HET
AID+/-27S	French Canadian	F		47				healthy	334 C>T / Normal	R112C / Normal	HET
UNG-def.1	USA	M	39	40	785	<7	209	lymphoid hyperplasia, recurrent infections	497,498 del AT/497,498 del AT	frameshift	AR
UNG-def.2	Japan	F	3	12	267	25	<50	recurrent infections	T822C/T822C	F251S/F251S	AR
UNG-def.3	French	M	7	26	740	48	50	recurrent infections	462 delC /639,640 delTA	frameshift	AR
UNG-def.4	The Netherlands	F	22	31	6800	20	<1	recurrent infections	392 delC/392 delC	frameshift	AR
UNG-def.5	The Netherlands	M	18	22	50	30	150	recurrent infections	330_632delCCT/630_632delCC1	del L210/ del L210	AR

* siblings

AR: autosomal recessive

AD: autosomal dominant

HET: heterozygote

Supplemental Table 2: primers used for detection of cytokines

cytokine	Forward Primer Sequence 5'-3'	Reverse Primer Sequence 3'-5'
IL-2	ATGAGACAGCAACCATTGTAGAATTT	CACTTAATTATCAAGTCAGTGTTGAGATGA
IL-4	ATGGGTCTCACCTCCCAACT	GATGTCTGTTACGGTCAACTCG
IL-10	GGAGGACTTTAAGGGTTACCTG	TCTTGGAGCTTATTAAAGGCATTC
IL-17	CCCAAATTCTGAGGACAAGAAC	AGGGATATCTCTCAGGGTCCTC
IL-21	TTCTGCCAGCTCCAGAAGAT	TTTGTGGAAGGTGGTTTCCTC
IFN γ	AAACGAGATGACTTCGAAAAGC	CATCTGACTCCTTTTTTCGCTTC

Supplemental Table 3: Repertoire and reactivity of antibodies from mature naive B cells of AID-def. patient 1.

Ig	HEAVY						LIGHT				REACTIVITY		
	VH	D	RF	JH	CDR3(aa)	Length	Vκ	Jκ	CDR3(aa)	Length	Poly	Hep2	Staining
mAID1 1	4-59	6-13	2	5	QREGSSSWYKRAWFDP	17	1-33	4	QQYDNLPT	9	-	-	-
mAID1 10	4-34	2-2	3	6	DLGTADIVVPAAMMEDYYGMDV	23	1-39	5	QQRSNWSIT	9	-	-	-
mAID1 27	3-21	/	/	6	EGEGYYYGMDV	11	1-39	1	QQSYSTPWT	9	-	-	-
mAID1 29	4-39	2-8	3	6	QSSPSDPSLIVLMPYYYYMDV	21	3-15	4	QQYNNWPPLT	10	+	-	-
mAID1 32	3-11	3-9	2	5	DILTGASSLDP	11	1-39	2	QQSYSTPPYT	10	-	-	-
mAID1 43	4-39	6-6	2	4	LNEYSSSTFDY	11	1-39	2	QQSYSTPYT	9	-	+	C
mAID1 48	3-21	3-22	3	4	GRTMIVVVTNPFYD	14	1-5	2	QQYNSYSYS	9	+	+	F
mAID1 55 #	3-21	3-10	3	6	DSPRITMSPEASHEYYYYYMDV	24	1-39	2	QQSYSTPITFG	11			
mAID1 58 #	1-18	3-3	3	4	VPTIFGVVLMYFDY	15	3-20	1	QQYGSSPWT	9			
mAID1 60	4-61	6-6	3	5	EIIARHWFD	11	1-33	3	QQYDNLPR	9	+	+	N
mAID1 62 #	4-59	2-8	3	5	RSGNGVGLNWFDP	14	1-33	5	QQSYSTPHT	9			
mAID1 68	4-39	/		4	RERSHRSLNYFDY	13	1-39	1	QQSYSTPWT	9	+	+	-
mAID1 70 #	1-18	3-3	3	4	VPTIFGVVLMYFDY	15	1-33	4	QQYDNLPLT	9			
mAID1 72	3-33	2-2	2	3	DRGYCSSTCYRNFAD	17	3-11	3	QQRSNWPPLFT	11	-	-	C
mAID1 82	4-30-4	5-5	2	4	APRYSYGYGDY	11	3-15	1	QQYNNWPWT	10	-	+	-
mAID1 83	3-33	2-2	2	6	AGYCSSTSCYGNYYMDV	18	1-12	3	QQANSFPVT	9	-	+	N
mAID1 84	4-59	2-15	3	5	HGGVADDWFDP	12	4-1	2	QQYYSTPYS	9	-	-	-
mAID1 85	3-21	/		5	DPGMRRDSNWFDP	13	1-33	2	QQYDNLPLY	9	-	-	-
mAID1 86	4-34	6-19	1	1	SPQWLKQKTGYFQH	14	1-8	1	QQYYSYPR	9	+	+	C
mAID1 88	3-30-3	2-2	2	5	NYCSSTSCYMYWFD	15	3-15	4	QQYNNWPLT	9	-	+	-
mAID1 92	3-48	/		6	ELNPVGEFYYYYYMDV	16	3-20	2	QQYGSSPPYS	10	-	-	-
	VH	D	RF	JH	CDR3(aa)	Length	Vλ	Jλ	CDR3(aa)	Length	Poly	Hep2	Staining
mAID1 4	3-64	3-3	2	6	GWAGGGYPHYMDV	15	1-44	2	AAWDDSLNGVV	11	-	+	-
mAID1 5	4-34	4-17	2	5	THDDYGDSNWFDP	13	2-23	3	CSYAGSSTFV	10	-	-	-
mAID1 08	4-59	/	/	6	SPVADYYYYMDV	12	2-8	2	SSYAGSNV	10	-	+	-
mAID1 14	3-23	3-22	2	4	EYYDSSGYREPEIDY	15	2-23	2	CSYAGSSTFKV	11	-	-	-
mAID1 25	3-30-3	2-2	2	6	DLYQLLPGYYYYYMDV	17	2-11	2	CSYAGSYGGV	10	-	+	-
mAID1 41	3-23	6-6	1	6	AGFKQLVPHLYYGM	17	1-40	2	QSYDSSLGAVV	12	-	-	-
mAID1 66	1-8	3-10	2	6	GNSWSGEFYNYGMDV	17	2-23	1	CSYAGSSTPYV	11	-	-	-
mAID1 77	4-31	2-15	2	4	GRRYCSGGSCYHFDY	15	8-61	3	VLYMGSGISV	10	-	-	N
	VH	D	RF	JH	CDR3(aa)	Length							
mAID1 2	3-74	2-15	3	4	DLEDIVVVAATTFGY	16							
mAID1 9	4-34	6-13	3	6	GEAAAGNYYYYYMDV	16							
mAID1 36	3-33	1-7	3	5	SGITGTTDRCWFD	14							
mAID1 52	3-30	/		6	FSVPTARYYYYYMDV	14							
mAID1 63	3-7	4-17	2	4	TKIYGDYGYFDY	12							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 4: Repertoire and reactivity of antibodies from mature naive B cells of AID-def. patient 17.

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3(aa)	Length	Vκ	Jκ	CDR3(aa)	Length	Poly	Hep2	Staining
mAID17 49	3-33	6-13	2	6	DLGSSSWYDYYYYYGMDV	18	2-28	5	MQALQTPPIT	10	-	+	-
mAID17 50	3-23	1-26	2	4	SGIPSTRKTSGSSDY	15	1-27	3	QKYNSAPFT	9	+	+	N
mAID17 64 #	7-4-1	1-26	3	5	EGVGGNWFDP	10	3-20	1	QQYGSSHVT	9			
mAID17 68	4-59	3-10	3	4	DVRSAFFDY	9	3-11	4	QQRSNWPLT	9	-	+	-
mAID17 75	3-7	3-10	2	4	GRYYYYY	7	1-16	2	QQYNSYPYT	9	+	+	N
mAID17 80	4-34	6-19	3	4	AVAGRVLGY	9	3-20	1	QQYGSSPRT	9	-	-	-
mAID17 81	3-15	/	/	4	SSGALFDY	8	3-15	2	QQYNNWPPCS	10	-	+	-
mAID17 94 #	3-33	2-2	1	1	SDQLLLVGYFQH	12	1-5	4	QQYGSNSLT	9			
mAID17 96	3-23	6-19	3	4	SLKRGVAAPGGY	12	3-20	4	QQYGSSPLT	9	+	+	N
mAID17 51	VH	D	RF	JH	CDR3(aa)	Length	Vλ	Jλ	CDR3(aa)	Length	Poly	Hep2	Staining
mAID17 51	3-66	/	/	6	GHYGMDV	7	1-47	3	AAWDDSLSGRV	11	+	-	-
mAID17 64					see kappa		1-40	2	QSYDSSLVL	10	-	-	-
mAID17 70	4-34	3-22	2	4	GEGSGWYGDYYYDSSGYSSY	20	6-57	3	QSYDSSNHKV	10	-	-	-
mAID17 74	4-34	2-21	3	3	GGSTPPHIVVTAIPEYAFDI	21	2-23	2	CSYAGSSTFV	11	-	+	-
mAID17 87	3-23	4-23	2	2	SNYGGNWLNWYFDL	15	3-21	1	QVWDSSSDPHYV	12	+	+	F
mAID17 88 #	3-66	3-22	2	4	DPYYYDSSFGY	11	7-46	2	LLSYSGARV	9			
mAID17 89	3-11	4-23	2	3	EANGGRAFDI	10	2-23	2	CSYAGSSTFV	11	-	-	-
mAID17 73							3-21	1	QVWDSSSDHV	10			
	VH	D	RF	JH	CDR3(aa)	Length							
mAID17 54	3-23	3-3	2	4	GLYDFWWSGYLDC	13							
mAID17 57	1-69	3-22	2	1	GPFNYDSSGSAEYFQH	17							
mAID17 66	1-18	1-26	2	4	DWSYYPADY	9							
mAID17 71	4-34	6-13	2	4	GDSSSWWIYFDY	12							
mAID17 72	3-21	3-3	2	4	DGGGGSGYETYFDY	14							
mAID17 85	4-39	6-13	3	4	HVLSIAAAGTVSGFIDY	17							
mAID17 92	1-18	3-22	2	4	GKDYDSSGYVVDY	14							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 5: Repertoire and reactivity of antibodies from mature naive B cells of AID+/- healthy donor 1F

Ig	HEAVY						LIGHT				REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vκ	Jκ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID1F 27	3-15	3-3	2	4	PYSVYYDFWSGSPDGNN	17	3-20	1	QQYGSSPRT	9	-	-	-
mAID1F 46	4-39	4-4	3	4	SIIFQTTVTSFDY	13	3-20	3	QQYGSSPIT	9	+	-	-
mAID1F 49	4-34	6-6	3	4	PGTKHRIAHRGCFAY	16	3-11	4	QQRSNWPPLT	10	+	+	V
mAID1F 59	1-58	4-17	2	4	SVRGYGDVQGTGDY	13	3-11	1	QQRSNWPPWT	10	-	-	-
mAID1F 65	3-74	3-22	2	3	RFKSSGLFADAFDI	14	1-8	4	QQYYSYPQT	9	-	-	-
mAID1F 69	3-23	3-22	2	4	DPSDPYYDSSGGYYSYGY	17	1-16	3	QQYNSYPLT	9	-	-	-
mAID1F 72	1-18	3-22	2	4	YYYDSSGYYIDY	13	3-11	4	QQRSNWPRIT	10	+	+	F
mAID1F 76	1-69	4-17	3	6	AATVTTFFPKGGYYYYMDV	19	3-15	2	QQYNNWPPDT	10	+	+	-
mAID1F 82	3-30	3-22	2	4	DFVGVNYYDSSGYFDY	16	3-20	4	QQYGSSPSLT	10	-	-	-
mAID1F 83	3-23	2-15	2	2	AGRSHRPWVWYFDL	15	1-27	4	QKYNAPRALT	11	+	+	N
mAID1F 95							1-5	2	QQYNSYSPYT	10			
mAID1F 84							3-11	3	QQRSNFIFT	9			
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID1F 41	4-61	4-23	2	6	LPTVVPEEAGYYYYGMDV	18	1-40	3	QSYDSSLSV	9	-	-	-
mAID1F 46	see kappa						3-1	2	QAWDSSMVV	9	+	-	-
mAID1F 63	3-21	1-26	2	4	GGGMGMYSGSYEGMSGRPPFDY	23	3-1	3	QAWDSSTA	8	-	+	-
mAID1F 64	3-48	1-26	3	4	SLIVGATSGSYDY	13	3-10	2	YSTDSSGNHRV	11	-	+	-
mAID1F 67	4-61	2-2	3	6	VVVVPAATKYYYYGMDV	17	3-25	2	QSADSSGTLV	10	-	+	N
mAID1F 73	4-39	6-19	2	4	HVSPEESGFDY	11	3-1	1	QAWDSSTAWSV	11	-	-	-
mAID1F 75	4-31	4-17	2	4	QLYGDYLLDY	10	3-21	2	QVWDSSSDHVV	11	-	-	-
mAID1F 81	3-15	1-20	2	6	RYWNDVSGMDV	11	3-1	2	QAWDSSTEV	9	-	-	-
mAID1F 86	1-8	1-26	2	3	IPSQSGSVVAFDI	13	3-1	2	QAWDSSTVV	9	-	-	-
mAID1F 89	1-58	5-5	2	3	DGYSGRYAFDI	12	3-25	3	QSADSSGTYWV	11	-	-	-
mAID1F 92 #	4-4	4-23	2	2	TLYGGKDDL	9	1-47	1	AAWDDSLSL	10			
mAID1F 85							3-25	2	QSADSSGSVV	10			
mAID1F 95							3-10	2	YSTDSSGNHRV	11			
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID1F 57	3-23	1-7	2	4	GYNWNQYYFDY	11							
mAID1F 60	4-39	/	/	4	HESPDPVDY	10							
mAID1F 70	4-61	1-7	2	6	GWSPGENYGMVDV	12							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 6: Repertoire and reactivity of antibodies from mature naive B cells of AID+/- healthy donor 1M

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vκ	Jκ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID1M 51	4-59	2-2	3	6	DSEPLPAAISNYYYYGMDV	19	2-28	1	MQALQTRT	8	-	-	-
mAID1M 58	4-59	6-6	3	4	DRIAAGGIDY	10	1-9	4	QQLNSYPLT	0	-	+	-
mAID1M 59	3-30	6-13	2	6	EGGSSWFGASNYYYYGMDV	19	1-5	2	QQYNSYS	7	+	+	C
mAID1M 62	3-9	1-26	3	6	DAVGATTGDSMDV	13	1-8	4	QQYYSYPLT	10	-	-	-
mAID1M 68	3-33	3-3	1	4	DQEEWSDSYFDY	13	4-1	5	QQYYSTPPGGIT	12	-	-	-
mAID1M 69	3-9	6-19	2	6	QSGWYEPYGMVDV	13	3-20	3	QQYGSSRVT	9	-	+	-
mAID1M 71	3-7	4-23	1	6	EGGRVRWPYYYYGMDV	17	1-8	1	QQYYSYPPGT	10	+	+	C
mAID1M 75 #	4-4	/	/	5	AHSMWFDP	9	3-15	2	QQYNNWPPA	9			
mAID1M 77	1-24	3-3	1	4	VRFLEWLFHY	10	3-20	5	QQYGSSHT	8	-	-	-
mAID1M 83	1-46	2-2	2	4	DLPYCSSTSCYFGDLDY	17	1-9	4	QQLNSYPLT	9	-	-	-
mAID1M 86 #	4-34	3-22	2	6	LLTYYYYYGMDV	13	1-39	2	QQSYSTPRS	9			
mAID1M 90	4-61	3-22	2	2	LALEDSSGYAGLYFDL	16	3-11	4	QQRSNLLT	8	-	-	-
mAID1M 93	4-31	/	/	4	GIKSDPQIDY	10	3-20	2	QQYGSSLVQ	9	+	+	-
mAID1M 95 #	5-51	3-9	1	6	SSALLRYFDWAPRGMVDV	17	3-20	1	QQYGSSPWT	9			
mAID1M 73							1-33	4	QQYDNLPPA	9			
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID1M 63	3-43	5-12	2	6	DLTVVSGYDFREPYGMDV	18	1-40	2	QSYDSSPVV	9	-	-	-
mAID1M 66	3-23	1-7	3	5	SRTGTTFLAFFSFDV	15	1-40	1	QSYDSSLGPNYV	13	-	-	-
mAID1M 67 #	3-15	6-13	2	4	RGYSSWYVDY	11	2-35	2	QSADSSGTYLV	11			
mAID1M 77					see kappa		1-47	2	AAWDDSLKRV	10	-	-	-
mAID1M 87 #	3-11	5-5	3	6	VPMVSGYGMDV	11	3-1	2	QAWDSSTPVV	10			
mAID1M 89	4-34	4-17	2	1	VAFGDPRTSSG	11	3-1	2	QAWDSSSTAKV	10	-	+	-
mAID1M 72							2-8	1	SSYAGSNYV	9			
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID1M 61	4-31	3-22	2	4	LFGAGSGYGGVDY	14							
mAID1M 70	4-39	5-24	2	6	DIGPGDGYNYPFYGGMDV	22							
mAID1M 82	4-59	5-5	2	4	GRYGYPADYFDY	13							
mAID1M 87	3-11	5-5	3	6	VPMVSGYGMDV	11							
mAID1M 94	4-39	3-22	2	3	RYYSVIGAFDI	11							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 7: Repertoire and reactivity of antibodies from mature naive B cells of AID+/- healthy donor 6F

Ig	HEAVY					Length	LIGHT				REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)		Vκ	Jκ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID6F 49	3-48	/	/	3	RKGRAYDAFDI	11	1-33	4	QQYDNLPLT	9	-	-	-
mAID6F 54	4-31	3-22	3	4	GSPTMIKAAWFDFDY	16	1-39	1	QQSYSTPWT	9	+	+	-
mAID6F 55	4-61	6-19	2	5	VSYSSGWRKKNWFDP	15	1-12	4	QQANSFPLT	9	+	+	C
mAID6F 57	3-49	3-16	2	4	VRVEGDYVWGSYRTFDY	17	3-11	1	QLEA	4	-	+	-
mAID6F 58	3-25	3-10	1	4	REPQWFFDY	9	1-9	1	QQLNSYHWT	9	-	+	C
mAID6F 59 #	3-33	2-15	2	5	GAHCSGGSCYSEVDP	15	1-5	2	QQYNSYPYT	9			
mAID6F 60 #	3-23	4-23	3	6	ETTIVTPDYYYGMDV	16	2-30	1	MQGTHWP	7			
mAID6F 67	3-15	2-2	3	4	DPPDIVVPAAIGKY	16	3-11	4	QQRSNWLPL	9	+	-	-
mAID6F 71	3-30	5-24	1	3	DLGLQFTSDAFDI	13	1-16	4	QQYNSYPLT	9	-	-	-
mAID6F 73	4-39	2-15	3	6	DIVVVVAATRNYYYGMDV	18	3-15	1	QQYNNWPPEGT	11	+	-	-
mAID6F 75	5-51	3-10	3	4	LGVMVRELDY	10	3-15	3	QQYNNWPRFT	10	-	+	-
mAID6F 76	3-11	2-15	3	4	TVVVVDH	6	2-30	1	MQGTA	5	-	-	-
mAID6F 77	3-33	2-21	2	2	VSPSNAYCGGDCYPDYWYFDL	22	1-39	1	QQSYSTPPA	9	-	-	-
mAID6F 79 #	3-33	3-22	2	3	DRGGYESSGNRYSDI	17	3-15	3	QQYNNWPPFT	10			
mAID6F 86	3-48	3-3	1	4	VFEELLQTTYFDY	15	1-12	5	QQANSFPIT	9	-	-	-
mAID6F 87	3-30	3-22	2	4	ERRVWYDSSGYDY	14	4-1	4	QQYSTPLT	9	-	+	C
mAID6F 89 #	1-18	1-7	3	4	ARGGVAGTTARFDY	14	1-39	2	QQSHTPYT	9			
mAID6F 91	3-48	2-2	3	6	DRDVVPAAEVAYYYYGMDV	21	3-20	2	QQYGSSPLYT	10	-	-	-
mAID6F 150 #	4-34	2-2	3	3	GQVVVPAASRLNAFDI	17	4-1	2	QQYSTPTT	9			
mAID6F 164 #	1-8	3-3	2	3	VFWSGYFAFDI	11	3-11	1	QQRSNWT	7			
mAID6F 169	3-23	6-6	3	6	GAARPHYGRSYYYGMDV	17	2-28	3	MQALQFTT	8	+	+	-
mAID6F 56							1-17	2	LQHNSYPRT	9			
mAID6F 74							3-15	1	QQYNNWPFWT	10			
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID6F 50	3-48	/	/	3	RKGRAYDAFDI	11	1-40	2	QSYDSSLGYYV	12	-	-	-
mAID6F 61 #	4-61	2-2	3	6	DRRIVVPAADYYYYGMDV	20	1-47	3	AAWDDSLSGWV	11			
mAID6F 62	4-59	5-5	3	4	LLHARAMVYFDY	12	1-51	2	GTWDSSLSAVV	11	-	+	-
mAID6F 68	4-61	6-25	2	4	GYSSPKIDY	9	6-57	3	QSYDSRVVV	9	-	-	-
mAID6F 70	3-33	6-13	3	6	DPGIAAAGTPVPEPLDGMDV	21	1-44	3	AAWDDSLNGWV	11	-	-	-
mAID6F 71 #	3-30	5-24	1	3	DLGLQFTSDAFDI	13	3-25	2	QSADSSGTYVV	11			
mAID6F 79 #	3-33	3-22	2	3	DRGGYESSGNRYSDI	17	2-23	2	CSYAGSSTPV	10			
mAID6F 172	3-23	3-10	3	4	DSAMVRGVISGYFDY	15	1-51	2	GTWDSSLSAVV	11	-	+	-
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID6F 52	3-9	5-24	3	4	DSYPATIAKFDY	12							
mAID6F 64	4-4	3-9	3	4	EGTITPFYD	9							
mAID6F 69	3-11	3-9	1	6	SPTGGRYFDWSDYGMVDV	17							
mAID6F 72	3-15	1-26	3	3	DVGANDAFAFDI	10							
mAID6F 88	1-46	3-10	2	6	DIGVQGGSGSYHYYYGMDV	18							
mAID6F 89	1-18	1-7	3	4	ARGGVAGTTARFDY	14							
mAID6F 90	4-39	/	/	4	HASGAASSFPGGY	14							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 8: Repertoire and reactivity of antibodies from mature naive B cells of AID+/- healthy donor 17M

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3(aa)	Length	Vκ	Jκ	CDR3(aa)	Length	Poly	Hep2	Staining
mAID17M 1	4-34	6-19	3	5	GEGIAVNVWFDP	12	2-18	4	MQATQFPKET	10	-	+	C
mAID17M 2 #	4-59	/		6	AHYGLPSMDV	10	1-33	5	QQYDNLPIIT	9			
mAID17M 3	4-39	3-3	2	5	GMTYYDFWSGYTSNWFDP	19	3-20	3	QQYGSSPIFT	10	+	-	C
mAID17M 8	3-30	6-13	3	5	ETIIAATGLYNWFDP	15	1-39	4	QQSYSTPRT	9	-	+	C
mAID17M 14	4-31	2-15	3	5	ESVVVAATLYWGWDFP	16	1-5	1	QQYNSYRT	8	+	+	-
mAID17M 15	4-31	3-3	3	6	DARITIFGVVTPGGMDV	17	3-20	1	QQYGSYLGIT	9	+	-	-
mAID17M 18	3-11	/		4	TGYSSGWYLGVCRY	14	1-33	4	QQYDNLPLIT	10	-	-	-
mAID17M 22	4-34	6-19	3	4	GPGAVAGNPFDY	12	3-15	1	QQYNNWPPWT	10	-	-	-
mAID17M 23	3-11	1-7	3	6	RTGTYYYYYGMVDV	14	3-20	3	QQYGSSPPGFT	11	-	-	C
mAID17M 28	1-18	/		4	EAGGSKEDY	9	1-33	4	QQYDNLPIIT	9	-	-	C
mAID17M 30	4-30	/		4	TKGARVFDY	9	3-15	1	QQYNNWPPWT	9	+	+	N
mAID17M 32 #	5-51	/		6	HRPVNGHTTARLSRYYYGMVDV	21	1-12	4	QQANSFPQIT	10			
mAID17M 35	3-11	/		5	ALGERLLPKGNWFDP	15	3-11	1	QQRSNWPPTWT	11	-	-	C
mAID17M 36	3-49	/	/	6	DFNYPHYYYYYGMVDV	15	1-16	5	QQYNSYPIT	9	-	-	-
mAID17M 47	3-7	6-19	3	6	DPLIAVAGTHYYYYGMVDV	17	3-11	4	QQRSNWPPLIT	10	+	-	-
mAID17M 6							1-39	1	QQSYSSPWT	9			
	VH	D	RF	JH	CDR3(aa)	Length	Vλ	Jλ	CDR3(aa)	Length	Poly	Hep2	Staining
mAID17M 11	3-49	1-20	3	4	GIDAGTTWN	9	1-47	3	AAWDDSLSAFM	11	-	-	N
mAID17M 13	1-58	3-3	2	5	DQADRFVVISRSLRFDV	18	1-51	3	GTWDSLSARVW	12	+	-	-
mAID17M 33 #	3-48	5-12	1	4	GGGYDAYFDY	10	1-40	3	QSYDSSLSGSV	11			
mAID17M 38 #	4-4	4-17	2	6	LASPYGDPVDDYYYYYGMVDV	19	2-14	2	SSYTSSSRV	9			

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 9: Repertoire and reactivity of antibodies from nmatue naive B cells of AID+/- healy donor 17F

Ig	HEAVY						LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3(aa)	Length	Vκ	Jκ	CDR3(aa)	Length	Poly	Hep2	Staining	
mAID17F 3	5-51	2-2	2	6	HVIWQGTSSSTRYEDYGMDV	20	1-39	1	QQSYSTPWT	9	-	+	V	
mAID17F 14	4-34	6-19	2	4	GTGPYSSGWYFDY	14	1-39	2	QQSYSTPRT	9	-	-	-	
mAID17F 16	4-34	6-13	3	4	GRRAAAAGTPGHFDY	15	1-5	2	QQYNSYSMYT	10	+	+	-	
mAID17F 29	4-61	5-12	3	6	GSIVAPVGMDV	11	3-20	2	QQYGSSPRT	9	-	-	-	
mAID17F 40	4-34	6-13	3	3	RGRIAAAGGAFDI	13	4-1	1	QQYSTRT	8	+	+	-	
mAID17F 101	1-18	1-1	1	4	VQQGPLYCDY	11	3-20	2	QQYGSSAT	8	-	-	-	
mAID17F 104	4-4	3-10	3	4	EATMVRGVINY	11	1-16	4	QQYNSYPPT	9	-	-	-	
mAID17F 106	3-30	6-13	2	4	DRVVGGYSSRWYFDY	16	1-39	2	QQSYSTPRT	9	+	+	C	
mAID17F 107	4-39	6-19	3	4	DCIAVAGTDYFDY	13	1-39	1	QQSYSTPWT	9	-	+	-	
mAID17F 111	3-48	1-26	3	4	VLLRRGATSLDY	12	2-28	3	MQALQTPGFT	10	-	-	N	
mAID17F 115	1-8	3-22	3	4	EVVGAPNWFDP	11	1-39	1	QQSYSTPWT	9	-	-	-	
mAID17F 116	3-23	6-19	2	4	DVSSSGWYPIFDY	13	3-11	5	QQRSNWPPD	9	-	-	-	
mAID17F 119 #	3-30	3-10	1	6	DTLWFGELFLGVLGRHYGMDV	22	3-11	4	QQRSNWPPLT	10				
mAID17F 124	4-39	6-13	3	5	HSIAAAGTGLHWFPD	15	1-33	1	QQYDNLPT	9	-	-	V	
mAID17F 6							3-15	3	QQYNNWPFT	9				
mAID17F 109							1-39	4	QQSYSTPLT	9				
mAID17F 114							1-33	4	QQYDNLPLT	9				
	VH	D	RF	JH	CDR3(aa)	Length	Vλ	Jλ	CDR3(aa)	Length	Poly	Hep2	Staining	
mAID17F 9	4-59	6-13	2	5	SSRGGGYWFDP	11	1-44	3	AAWDDSLNGLV	11	-	-	-	
mAID17F 18	3-21	1-14	3	4	GHGTPDY	7	2-14	2	SSYTSSSTLV	10	-	-	-	
mAID17F 19	4-34	3-22	2	4	RNYYSRGLRY	11	2-18	2	SSYTSSSTV	9	-	+	-	
mAID17F 46	3-23	6-13	3	6	SAAAGPYYYGMDV	14	1-44	2	AAWDDSLNGVV	11	-	-	-	
mAID17F 47	3-23	1-20	2	5	EGGGWNWDSWFPD	14	1-44	1	AAWDDSLNGYV	11	-	-	-	
mAID17F 106					see kappa		1-44	3	AAWDDSLNGVV	11	-	-	-	
mAID17F 119					see kappa		2-23	3	CSYAGSSNVV	10	+	+	-	
mAID17F 10							2-8	1	SSYAGSNNLV	10				
	VH	D	RF	JH	CDR3(aa)	Length								
mAID17F 22	3-23	3-22	2	4	DLLRLRYDSSPFYD	14								
mAID17F 37	7-4	4-17	2	6	DLTTLVSDYYYGMDV	16								
mAID17F 36	3-23	3-9	2	4	YYDVTNFDY	9								
mAID17F 102	3-30-3	3-22	2	4	DQDPLYYYDSSGYRTGGLFDY	22								
mAID17F 103	4-30-4	4-17	2	6	ALYGDYSFYAWRSGGGYYYYGMDV	25								
mAID17F 113	1-18	3-22	2	4	TAPLQYYYDSSGYYPVNYFDY	23								
mAID17F 122	1-46	4-17	3	4	DMAVTDLDY	9								

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 10: Repertoire and reactivity of antibodies from mature naive B cells of AD-AID patient 12

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vk	Jk	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID12 1	3-9	2-2	2	3	AKDLFPLGYCSSSCYGARAFDI	23	3-15	2	QQYNNWPPYT	10	-	+	-
mAID12 3	1-2	/	/	5	ARGVSV DARGGWFD P	15	2-28	4	MQALQTLT	8	-	+	-
mAID12 4	3-48	6-19	2	4	ARPYSSGWYYDY	12	4-1	2	QQYYSTPLYT	10	-	+	-
mAID12 13 #	3-23	5-5	2	4	AKGGYSYGFVNRPELDY	17	2-30	4	MQGTHWPLT	9			
mAID12 18	4-30-4	/	/	4	ASATSEGTIDY	11	2-28	4	MQALQTPLT	9	-	-	N
mAID12 20	4-34	/	/	5	ARGPGRGRPPKHWFDP	16	1-12	4	QQANSFPLT	9	-	-	N
mAID12 21	3-66	1-26	2	4	AREPHSGSYSYD	12	3-15	1	QQYNNWPS	8	-	-	-
mAID12 22	3-20	/	/	3	ARDRMEPYRGNAFDI	15	1-39	1	QQSYSTPKT	9	-	-	-
mAID12 23	3-66	3-3	2	4	ARILAEWESTYNFWSGYSEYFDY	24	3-20	1	QQYGSSLWT	9	+	+	-
mAID12 26 #	3-33	3-10	2	4	ARDGSGSSPGFDN	13	1-9	4	QQLNSYPLT	9			
mAID12 39	3-21	2-2	2	6	ASSGYCSSTSCYRRLNYYGMDV	23	1-39	1	QQSYSTPWT	9	+	+	C
mAID12 40	5-51	6-13	3	6	ARWGSIAAAGTGYGMDV	19	3-20	1	QQYGSSLWT	9	-	+	-
mAID12 43	3-21	/	/	3	ARGGVGGAFDI	11	1-5	4	QQYNSYSPLT	10	-	-	-
mAID12 44	4-34	/	/	6	AREGYDYYGMDV	12	2-28	2	MQALQTPKT	9	-	-	-
mAID12 46	1-3	2-2	1	5	AREGRVTSYQLLKGWFFDP	19	3-11	4	QQRSNWPPFT	10	-	+	-
mAID12 47	3-33	3-10	2	6	ASEESGSTSEGQRYYYMDV	20	1-39	4	QQSYSTPLT	9	-	-	-
mAID12 02	1-3	3-3	1	6	ARGQFLEWVYMDV	13	1-44	2	AAWDDSLNEGV	11	-	-	-
mAID12 05	4-59	6-19	2	6	ARRVRDLSSGWRLAPVRGYYGMDV	26	2-14	1	SSYTSSTLEV	11			
mAID12 10	1-2	6-13	2	5	ASRDYSSSWYNWFDP	15	3-21	2	QVWDDSSDHVV	11			
	VH	D	RF	JH	CDR3 (aa)	Length	Vk	Jk	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID12 14	1-2	6-13	3	6	ARALSIAAAGAFYGM DV	17	2-14	1	SSYTSSTYV	10	-	+	-
mAID12 17 #	4-39	3-16	2	4	ARHGLSYDYVWGSYSFDY	19	8-61	3	VLYMGSGISV	10			
mAID12 18					see kappa		1-44	3	AAWDDSLNGYVW	12	-	-	-
mAID12 21					see kappa		2-14	2	SSYTSSTVV	10	-	+	-
mAID12 30	3-23	2-15	2	4	AKYSGGSCCYFDY	13	1-51	2	GTWDDSLSAV	11	-	+	-
mAID12 31	3-53	2-15	2	6	ARDPRRYC GSGCSDGMDV	20	3-25	3	QSADSSGTLVW	11	-	+	-
mAID12 34	4-39	6-6	2	4	ARVHSSSPTKYFDY	14	3-21	3	QVWDDSSDHPGV	12	-	-	-
mAID12 37	3-30	1-26	2	4	AKDSGSYGGSHFDY	15	3-25	3	QSADSSGTSVW	11	-	-	-
mAID12 38	1-8	3-3	3	4	ARGLLQEAIFGVVITYYFDY	20	1-44	2	AAWDDSLNGV	11	-	-	-
mAID12 39					see kappa		2-23	3	CSYAGSSTVW	10	+	+	C
mAID12 42	4-30-2	3-22	2	4	VRVIDYDSSGYGYFDY	18	2-23	3	CSYAGSSTVW	11	-	+	N
mAID12 44 #					see kappa		4-69	3	QTWGTGSV	8			
mAID12 46					see kappa		2-23	2	CSYAGSSTVW	11	+	+	-
mAID12 25							1-39	1	QQSYSTPRT	9			
mAID12 45							3-15	1	QQYNNWPPWT	10			
mAID12 33							3-1	2	QAWDSSTV	9			
mAID12 35							1-44	2	AAWDDSLNGLV	11			
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID12 8	3-9	/	/	6	AKDMEYGPHYGMDV	14							
mAID12 15	3-30	3-10	1	4	AKDPGSELLWGFEDY	16							
mAID12 16	1-18	1-26	1	4	ARGWELPMDY	10							
mAID12 41	3-30-3	6-19	1	4	ARGLLKFP TQWLVS PFDY	18							
mAID12 42	4-30-2	3-22	2	4	VRVIDYDSSGYGYFDY	18							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 11: Repertoire and reactivity of antibodies from mature naive B cells of AD-AID patient 13

Ig	HEAVY						LIGHT				REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vk	Jk	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID13 57	4-59	3-3	2	6	GNYDFWSGYYYYYMDV	17	3-11	4	QQRSNWPTT	9	+	+	-
mAID13 63	5-51	2-2	2	4	RRCSSSTSCYDL	11	1-5	1	QQYQR	5	+	+	C
mAID13 67	3-48	5-5	2	6	DQRGYSYGYPFPPRSVGYGMDV	23	1-39	5	QQSYSTPT	8	+	+	C
mAID13 68	4-34	6-13	3	6	RKGIAAATRYYYYYGMDV	19	4-1	4	QQYYSTPFT	9	+	+	C
mAID13 69 #	5-51	3-9	2	4	EGEDILTGYKPFDY	14	1-39	1	QQSYSTLWT	9			
mAID13 70	3-30	3-10	1	1	DSGEWGSWYGYKGFQH	16	4-1	4	QQYYSTPPLT	10	+	+	-
		6-13	2										
mAID13 72	3-48	2-2	3	4	IVVPAAMPSTYFDY	14	2-28	3	MQUALQTRGEFT	11	-	-	-
mAID13 74	3-21	1-26	2	4	DGGDSGSYTTFDY	13	1-6	1	LQDYNYPRT	9	-	-	-
mAID13 77	1-69	6-13	3	1	LVAAGTGYFQH	12	3-20	5	QQYGSSPPIT	10	+	+	-
mAID13 78	1-69	/	/	6	ARRFAGVQYYYYGMDV	16	1-33	4	QQYDNLPPA	9	+	+	-
mAID13 79	3-21	5-12	2	4	DGRFGYSGYDPPFDY	14	1-39	1	QQSYSTPRT	9	-	-	-
mAID13 82	1-8	6-19	2	3	QGFSGWYGNAFDI	14	1-8	1	QQYYSTPWT	9	-	-	-
mAID13 84	4-34	3-3	2	5	WTVSTYYDFWSSGYYPYNWFD	21	3-11	4	QQRSNWPLT	9	-	-	-
mAID13 87	1-24	5-12	3	3	QPVGWDIVATIGAFDI	16	1-39	4	QQSYSTPYT	9	-	-	-
mAID13 91 #	1-2	6-13	2	5	GISSWYDWFDP	12	1-39	4	QQSYSTYT	8			
mAID13 92	5-51	6-13	2	4	QAGYSSWYDPY	12	4-1	4	QQYYSTPLT	9	-	-	-
mAID13 94	5-a	3-22	2	4	LAEYDSSGHSG	12	1-39	4	QQSYSTPLT	9			
mAID13 95	1-69	3-22	2	3	DRDSIKDGGAFDI	13	1-5	2	QQYNSYST	8			
	VH	D	RF	JH	CDR3 (aa)	Length	Vl	Jl	CDR3 (aa)	d	Poly	Hep2	Staining
mAID13 55	3-15	3-10	2	6	YGSGSYYYYYGMV	17	1-40	3	QSYDSSLGSKV	12	-	-	-
mAID13 56	3-11	2-2	2	6	VDCSSTSCYDYYYYMDV	18	1-40	2	QSYDSSLVSV	10	-	-	-
mAID13 58 #	3-64	3-22	2	4	TLYYDSSGYYY	12	2-23	3	CSYAGSSTWV	10			
mAID13 61 #	4-34	6-19	2	1	SGWYAYFQH	9	1-44	3	AAWDDSLNGWV	11			
mAID13 62	3-74	1-26	2	4	DSGSYYDY	8	3-1	1	QAWDSSLVY	9	-	-	-
mAID13 73 #	3-33	3-3	1	4	GSGRLRFLEWLSGGFDY	17	7-43	3	LLYYGGANWV	10			
mAID13 77 #					see kappa		2-8	1	SSYAGSNNPYV	11			
mAID13 81 #	1-2	3-16	1	4	EGEQNQPLLDY	11	3-1	3	QAWDSSTWV	9			
mAID13 83 #	3-7	3-3	2	4	VTYDFWWSGYYFDY	15	2-14	3	SSYTSSTWV	10			
mAID13 85	3-30	6-19	2	4	DFSSGWYAGIDY	12	2-23	3	CSYAGSSTFWV	11	-	-	-
mAID13 86 #	3-48	6-19	2	4	GIGGGWGGYFDY	12	4-69	3	QWGTGQV	9			
mAID13 88 #	3-7	2-2	3	3	ETDVVVPSQLGPDADF	18	3-1	2	QAWDSSTAV	9			
mAID13 90	4-59	3-10	2	3	RYYGSGSYRKGAFDI	15	3-1	2	QAWDSSTV	9	-	+	-
mAID13 96	1-18	6-19	3	3	STVAGREDAFDI	12	1-44	2	AAWDDSLNGWV	11	-	-	-
mAID13 93 #							2-14	3	SSYTSSTHWV	11			
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID13 49	3-30	5-5	2	4	DAGQGYSYWGKTYFDY	18							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 12: Repertoire and reactivity of antibodies from mature naive B cells of AD-AID patient 14

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vκ	Jκ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID14 49 #	3-30	3-10	1		DHVLLWFGIPEQSYYYGMDV	21	1-39	1	QSYSTPPWT	10			
mAID14 52	3-66	/		4	GGY	3	2-28	2	MQALQTPHT	9	-	-	-
mAID14 59 #	1-69	3-22	2	4	RYYDSSGYLN	11	3-20	5	QYGSSTHT	8			
mAID14 63	3-23	3-10	2	4	PGRYYYGSGSSNPFDY	16	3-20	1	QYGSSTPRT	9	-	+	-
mAID14 67	4-61	5-5	2	4	DKRGYSPRGLEY	12	4-1	1	QYYSTPWT	9	+	+	-
mAID14 71 #	1-69	3-10	3	6	VDITMVRGVKGGRDGRYYYGMDV	24	1-9	4	QQLNSYPLT	9			
mAID14 75 #	3-11	3-16	1	4	LGGSKYYFDY	10	1-5	1	QYNSYPWT	9			
mAID14 81	5-51	6-13	2	3	LALSAPYSSWYDAFDI	17	3-11	1	QQRSNWPPT	9	-	+	-
mAID14 82	3-23	3-10	1	5	DPSKLLWFEGEPYNWFDP	18	2-28	4	MQALQTPHT	9	-	-	-
mAID14 83 #	1-18	3-22	2	3	ESPTYDSSGSYAFDI	17	2-30	2	MQGTHWPRT	9			
mAID14 86	3-7	3-10	1	4	DWSWFGELFDY	11	1-39	2	QSYSTPPNT	10	+	-	-
mAID14 87 #	4-34	3-9	2	5	VTGILTGNWVDFP	14	2-28	1	MQALQTPWT	9			
mAID14 88	3-15	4-17	2	6	LYGDYVGRHYGMDV	15	4-1	2	QYYSTPYT	9	+	+	-
mAID14 89 #	1-3	6-13	3	4	KSTSLPGIAAAGPNYFDY	18	3-15	2	QYNNWPPYT	10			
mAID14 93	4-61	/		6	DLRTGMDV	8	1-33	2	QYDNLPT	9	-	-	-
mAID14 95	3-23	6-19	2	4	GPAYSSGWGMDYFDY	15	3-20	4	QYGSSTPPLT	11	-	-	-
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID 56	3-30	/		6	ILYLGfVHYYYGMDV	15	1-51	2	GTWDSLSAGVV	11	+	+	-
mAID 58	1-69	4-17	2	4	ASDYGdYDVPVFDY	14	2-14	2	SSYTSSTLV	10	+	-	-
mAID 59 #	1-69	3-22	2	4	see kappa	11	1-44	3	AAWDDSLNGPWW	12			
mAID 60	7-4-1	2-2	2	4	DSGYCSSTSCHFDY	14	1-44	2	AAWDDSLNLVV	11	-	-	-
mAID 62 #	3-30	2-15	2	6	DGAGGCSGSSCYYYGMDV	18	1-40	2	QSYDSSLGSDVW	11			
mAID65	3-11	1-1	1	5	DGPQLERPWFDP	13	1-40	2	QSYDSSLVW	10	-	-	-
mAID66	4-61	3-9	1	4	VDGGYFDY	8	2-14	3	SSYTSSTVW	10	-	-	-
mAID75 #					see kappa		1-40	2	QSYDSSLVW	10			
mAID78	3-49	6-19	1	6	DRGEQWLIYYYGMDV	17	2-8	2	SSYAGSNYYVW	11	+	+	-
mAID 81 #					see kappa		1-40	2	QSYDSSLGGSV	11			
mAID 90 #	1-46	5-12	2	6	DVRDSGYDHYYYGMDV	17	1-44	2	AAWDDSLNGVV	11			
mAID 91	4-31	2-2	2	4	AWRYCSSTSCPGYYFDY	18	2-23	2	CSYAGSSTFAV	11	-	+	-
mAID 92	3-23	2-2	3	6	VEVPAAMRVEAHYGMDV	17	3-25	3	QSADSSGTYVW	11	-	+	-
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID14 57 #	1-3	3-22	2	6	SPYYYDSSGYPYYYGMDV	19							
mAID 63 #	3-23	3-10	2	4	PGRYYYGSGSSNPFDY	16							
mAID14 64	3-48	/		4	DTTLWRGLFDY	11							
mAID14 69 #	3-21	3-9	2	6	DGLNYDILTGSVGGMDV	17							
mAID 73 #	1-46	2-15	3	5	DLVQVVVAATYWFDP	15							
mAID14 80 #	3-49	6-19	1	6	DRGEQWLIYYYGMDV	16							
mAID14 84 #	3-33	2-15	2	6	LMDCSGGSCYYGMDV	15							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 13: Repertoire and reactivity of antibodies from mature naive B cells of AD-AID patients

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vκ	Jκ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID18 7 #	3-30-3	5-5	2	6	DQRYSYAITNYYYGMDV	18	2-28	3	MQALQTLFT	9			
mAID18 16	3-48	6-19	2	5	DYSSGWYDNWFDP	13	1-39	1	QQSYSTPWT	9	-	-	-
mAID18 33	3-30-3	2-21	2	4	DCGGDCYGGLDY	12	3-11	2	QQRSNWPPYT	10	-	-	-
mAID18 36 #	1-69	5-12	3	6	EGIVAKRASNYGMDV	16	3-20	1	QQYGSSPRT	9			
mAID18 43	4-31	2-22	3	1	FGTAVVGEH	9	3-11	1	QQRSNWPGT	9	-	-	-
mAID18 47	3-73	3-22	2	3	RTPWAKYYDSSGYNFDAFDI	22	2-28	4	MQALQTLPT	9	+	+	-
mAID18 49	4-34	3-10	3	5	GTYYYGSGSFQRGHWFDP	18	1-39	2	QQSYSTPRGT	10	-	-	-
mAID18 53 #	4-31	3-3	1	5	WQGADVLRFLWSSYNWFDP	20	1-39	4	QQSYSTPLT	9			
mAID18 54	1-2	5-5	3	4	GSGAMVTGKFDY	12	1-9	1	QQLNSYPWT	9	-	+	-
mAID18 65	1-69	3-3	2	4	TIFGVVIEYFDY	13	1-5	3	QQYNSYSPFT	10	+	-	-
mAID18 69 #	3-21	/	/	4	EMGYPGYFDY	10	1-39	1	QQSYSTPRT	9			
mAID18 72	1-2	3-22	2	4	DLGDSSGYGLVAWGDLDY	20	1-27	1	QKYNALWT	9	-	-	-
mAID18 73	4-39	5-5	3	4	DLNTAMAPTPYFDY	14	1-12	4	QQANSFPLT	9	-	-	-
mAID18 76	4-31	1-26	2	4	DISSSGSYGLFADFADI	17	1-39	3	QQSYSTPPTT	10	+	+	C
mAID18 78	3-30-3	5-24	3	4	DRMATIESFDY	11	1-12	4	QQANSFPLT	9	-	-	-
mAID18 79	4-34	2-21	2	4	GKVVITARWSRRGDVGYFDY	19	3-15	3	QQYNNWPSFT	10	+	+	N
mAID18 86	4-34	4-23	2	4	GRPDDYGGNPFDY	14	4-1	1	QQYYSTPST	9	-	-	-
mAID18 57							1-39	1	QQSYSTPRT	9			
mAID18 62							1-39	4	QQSYSTPLT	9			
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining
mAID18 2	4-59	5-5	2	5	DKGGYSYGYENWFDP	15	5-45	3	MIWHSSAWV	9	-	-	N
mAID18 3	3-15	5-5	2	4	MFGYSYGYSYFDY	13	1-40	2	QSYDSSLGSGV	11	-	-	-
mAID18 11	4-34	2-2	3	4	GGASAQDIVVPAAIKGRYFDY	23	1-51	3	GTWDSLSVWV	11	-	-	-
mAID18 13	1-69	3-10	3	6	DRKGGFTMVRGVLRYGMDV	20	1-40	2	QSYDSSLGSGV	11	+	+	C
mAID18 19	3-21	5-5	1	4	AWIQLWHPFDY	11	3-21	2	QVWDSSTDHPV	11	-	-	-
mAID18 23	4-34	/	/	6	GVNYYGMDV		1-51	2	GTWDSLSAVV	11	-	+	-
mAID18 24	3-9	3-10	3	6	DMGEGITMVRGVTDDYYGMDV	22	1-36	3	AAWDDSLNGWV	11	-	-	-
mAID18 25	4-59	1-26	2	4	AMAGEKWEQGWGFDY	15	1-44	1	AAWDDSLNGYV	11	-	-	-
mAID18 49					see kappa		3-21	1	QVDSSTDHPGV	11	-	-	-
mAID18 50	3-11	/	/	4	VQEPWGGLDY	10	1-47	3	AAWDDSLSGPGV	12	-	-	-
mAID18 53					see kappa		2-11	3	CSYAGSYTPV	10	+	+	-
mAID18 56	3-30-3	3-3	2	6	SSYDFWSGYPYYYGMDV	19	7-46	3	LLYSGAYWV	10	+	-	-
mAID18 68	1-69	2-2	3	3	EGVGT RPRAARKAFDI	16	1-40	1	QSYDSSLGSGYV	11	-	-	-
mAID18 75	1-2	6-6	3	6	DSAAPT KGGYYYYGMDV	17	2-8	3	SSYAGSNNWV	10	-	+	N
mAID18 95 #	3-7	3-10	3	6	GVIVAVYYYYGMDV	14	7-46	2	LLYSGARPGV	11			
mAID18 85							1-47	2	AAWDDSLSGVW	11			
	VH	D	RF	JH	CDR3 (aa)	Length							
mAID18 42	3-23	3-22	2	5	NAWSWSYYYDSSGYG	16							
mAID18 91	1-46	/	/	5	GSNWFPD	7							
mAID18 5	1-69	3-16	2	4	VAPYYDYVWGCDFY	14							
mAID18 90	4-34	4-17	2	4	VEKGGTYGDYVSGLYYFDY	19							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 14: Repertoire and reactivity of antibodies from mature naive B cells of UNG-deficient patient 1.

Ig	HEAVY				CDR3 (aa)	Length	LIGHT			CDR3 (aa)	Length	REACTIVITY		
	VH	D	RF	JH			Vk	Jk	Poly			Hep2	Staining	
mUNG1 06	3-13	6-6	3	3	ARAGIAALRDAFDI	14	3-20	1	QQHGSSPWWT	9	-	-	-	
mUNG1 07	1-58	4-17	3	5	AASTHTVTTLGWDFP	15	3-11	2	QQRSNWPPKYT	11	-	+	-	
mUNG1 12	3-9	2-15	2	1	GGGDGGGSFPLQH	13	1-13	3	QQFNSYPFT	9	-	-	-	
mUNG1 13	3-9	3-3	2	3	AKRGRVFWSSYMDALDI	16	1-39	1	QQSYSSPPT	9	-	+	F	
mUNG1 17	4-39	/	/	6	ASYPESYYGMDV	13	3-20	3	QQYGSSPGGFT	11	-	-	-	
mUNG1 29	4-59	3-22	2	4	ARGTYYYDSSGYSPYFDY	20	1-39	1	QQSYSTPPT	9	-	-	-	
mUNG1 35	1-2	2-2	2	4	ARGPYCSSTSCPGAIFY	17	1-13	4	QQFNSYPLT	9	-	-	-	
mUNG1 41	3-23	/	/	4	AKTPPEPFYD	10	2-30	3	MQGTHWPPFT	10	-	-	-	
mUNG1 59	1-8	4-17	2	4	ARGSYGDYFDY	11	1-5	1	QQYNSYPWT	9	-	-	-	
mUNG1 70	4-31	2-15	2	5	ARDGCSGGSCYPRPNWF	19	4-1	4	QQYYSIPPV	9	-	-	-	
mUNG1 106	3-48	3-16	2	6	ARESDYVWGINYGMDV	16	1-39	2	QQSYSTPYT	9	-	-	-	
mUNG1 113	1-8	2-15	3	6	ARGRVVAAIPLMDV	15	3-20	1	QQYNSPT	8	-	-	-	
mUNG1 118	1-69	6-19	2	4	ARVGAGYSSGGDY	14	1-5	1	QQYNSYHT	8	+	+	C	
mUNG1 120	3-23	4-17	2	4	AKPPDYGLD	10	1-5	2	QQYNSYSCS	9	-	-	-	
mUNG1 153	3-23	3-22	2	4	AKSGGYDSSGYRYFDY	18	1-33	5	QQYDNLPIIT	9	-	-	-	
mUNG1 183	3-48	1-26	2	4	ARDTYSGIRGFFDY	14	1-12	2	QQANSFPMYT	10	-	+	-	
mUNG1 190	4-28	/	/	6	ARDHGMDV	8	1D-17	4	LQHNSYPLT	9	-	-	-	
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining	
mUNG1 13					see kappa		3-19	1	NSRDSSGNHYV	11	-	-	-	
mUNG1 28	3-33	/	/	6	ARDRWPPYGMDV	12	3-1	1	QAWDSSTCYV	11	-	-	-	
	VH	D	RF	JH	CDR3 (aa)	Length								
mUNG1 14	1-46	3-3	3	6	ARDQGPFTIFGYGMDV	17								
mUNG1 22	4-31	/	/	4	ARGPFGHFDY	10								
mUNG1 43	3-33	7-27	3	4	AREGTGSLDY	10								
mUNG1 44	3-7	6-19	3	4	ARERIIAVAGFPVYFDY	17								
mUNG1 45	3-15	3-10	1	4	TTDVPSREFYFDY	14								
mUNG1 47	3-15	3-3	3	5	ARDEGITIFGVVS	13								
mUNG1 79	3-48	3-22	2	3	ARDSIFDSSGYHDAFDI	17								
mUNG1 101	3-33	3-22	2	4	ARDGHYYDSSGYSPFDY	17								
mUNG1 138	4-59	/	/	4	ARHVTLKGGGRYFDY	15								
mUNG1 149	1-8	6-25	2	4	ASGYAWDY	9								
mUNG1 162	4-28	3-3	2	4	GGERRGNDFWSGQDY	15								
mUNG1 165	3-23			4	AGRDGY	6								

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 15: Repertoire and reactivity of antibodies from new emigrant B cells of UNG-deficient patient 2.

Ig	HEAVY					LIGHT					REACTIVITY		
	VH	D	RF	JH	CDR3 (aa)	Length	Vκ	Jκ	CDR3 (aa)	Length	Poly	Hep2	Staining
mUNG2 1	3-21	3-22	2	6	HYDSSGQEKNYYYYGMDV	18	2-28	2	MQALQTPNT	9	-	-	-
mUNG2 2	5-51	6-13	2	4	HDGSSSWPFDDY	11	1-27	1	QKYNAPWT	9	-	-	-
mUNG2 3	3-73	3-10	3	4	RITMVRGVEIHDY	13	2-28	5	MQALQTLIT	9	-	+	-
mUNG2 4	3-53	3-10	1	/	DHAGILWFG	9	1-33	2	QQYDNLPLYT	9	-	-	-
mUNG2 5	4-39	2-2	3	4	TLPAAAIPNSFDY	13	1-27	1	QNPRT	5	-	-	-
mUNG2 7 #	3-30	6-13	1	5	GRQQLVGNWFDP	12	1-5	5	QQYNSYPIT	9			
mUNG2 9 #	1-18	/	/	6	DKDWSPVIVDYYGMDV	17	2-29	1	MQGIHLPTWT	11			
mUNG2 10 #	3-49	3-9	1?	6	ARLRYFDWLLDFGMDV	16	2-28	4	MQALQTPIT	9			
mUNG2 12	3-30	3-22	2	4	GKYYYYDSSGYHY	13	1-39	5	QQSYSTPFT	9	-	-	-
mUNG2 13 #	1-24	/	/	4	DFSHTS	7	3-15	4	QQYNNWPPLT	10			
mUNG2 15 #	4-31	/	/	5	DVAVRRGWFPD	11	1-39	2	QQSYSTLYT	9			
mUNG2 18 #	3-11	3-10	1	6	DRPRNVLLWFGELLDYYGMDV	22	1-33	5	QQYDNLPT	9			
mUNG2 21	3-30	2-2	2	6	APPGYCSSTSCYPVYYYYGMDV	23	1-16	4	QQYNSYPPT	9	+	+	N
mUNG2 24	3-30	5-12	3	3	GLGVVATIWIWGARGHDAFDI	21	1-33	2	QQYDNLPT	9	+	+	C
		3-16	2										
mUNG2 26	3-23	3-22	2	4	LIFWRAGSSGYLRETFDY	18	1-33	4	QQYDNLPLT	9	-	-	-
mUNG2 27	3-23	3-10	2	6	FGSGSYYYYYGMDV	14	1-39	4	QQSYSTPPLT	10	+	+	C
mUNG2 28	3-9	2-2	1	4	ANLYQLRWYFDY	13	1-39	2	QQSYSTPNT	9	-	-	-
mUNG2 34	3-48	2-15	3	6	GNPDIVVVAATLHYGMDV	21	2-30	1	MQGTHWPPWT	10	-	-	-
mUNG2 36	4-59	6-13	2	5	TLGYSSSWYWFDP	14	1-39	5	QQSYSTLIT	9	-	+	C
mUNG2 39	3-21	2-15	2	6	DQGCSSGSCRIGYYGMDV	19	3-11	4	QQRSNWPRLLT	11	-	-	-
mUNG2 46 #	3-30	/	/	3	PHDYRAFDI	9	3-20	1	QQYGSSPWT	9			
mUNG2 47 #	3-49	3-10	3	5	DGAPFMVRGVIGWFDP	16	1-39	3	QQSYSTFIT	9			
mUNG2 48 #	3-9	3-10	2	6	DRGYYGSGSYTHYYYYGMDV	23	3-20	1	QQYGSSWT	8			
mUNG2 8							1-5	2	QQYNSY	6			
	VH	D	RF	JH	CDR3 (aa)	Length	Vλ	Jλ	CDR3 (aa)	Length	Poly	Hep2	Staining
mUNG2 13 #					see kappa		6-57	2	QSYDSSNVV	9			
mUNG2 20	3-30	3-22	2	6	ARYYYDSSGYPGYYYYGMDV	21	6-57	2	QSYDSSNQNVV	11	-	-	-
mUNG2 28					see kappa		1-51	2	GTWDSSLSAVV	11	-	-	-
mUNG2 29	3-21	3-10	1	6	GLLWFGEPSTYYYGMDV	17	1-40	2	QSYDSSLSAVV	11	-	-	-
mUNG2 30	4-59	3-10	2	6	GISGSGIGEALLYYYGMDV	20	3-1	2	QAWDSSIHVV	10	-	-	-
mUNG2 32	1-69	4-17	2	4	EAGDNGFDY	9	2-14	1	SSYTSSTYV	10	-	-	-
mUNG2 33	1-69	5-12	2	4	DQWGAERGYSGYETD	15	1-47	2	AAWDDSLSGVV	11	-	-	-
mUNG2 40 #	1-69	6-13	2	4	VGISSADPSYFYDY	15	3-21	1	QVWDDSSDLFYV	12			
	VH	D	RF	JH	CDR3 (aa)	Length							
mUNG2 19	4-59	3-10	2	6	LGGSGSYNPTYYYYYYGMDV	22							
mUNG2 22	4-59	2-15	2	6	AYRPRYCSGGSCYGGGMDV	19							
mUNG2 35	4-34	6-13	2	5	GPGSSWYGPWFDP	13							
mUNG2 37	4-39	3-10	3	5	PYSDISMVRGVITWFDP	17							
mUNG2 42	3-49	3-22	2	4	GPNDRLGSGYVYDGGNEEFDY	22							
mUNG2 44	3-30	7-27	2	6	AKDFWGFPSNYYYGMDV	17							

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles

Supplemental Table 16: Repertoire and reactivity of antibodies from new emigrant B cells of UNG-deficient patient 5.

Ig	HEAVY						LIGHT						REACTIVITY			
	VH	D	RF	JH	(-)	CDR3(aa)	(+)	Length	Vκ	Jκ	CDR3(aa)	Length	Poly	Hep2	Staining	
mUNG5 57	4-34	3-22	2	4	2	RYYDSSGYPLQYFDY	1	15	3-15	1	QQYNNWPWT	9	-	-	-	
mUNG5 64	4-39	6-19	1	3	2	RLHAQWLVLDAFDI	2	14	2-29	4	MQGIHLPLT	9	-	-	-	
mUNG5 67	1-46	7-27	2	4	1	PLNGNYWGYFDY	0	13	1-39	3	QQSYSTPFT	9	-	-	-	
mUNG5 69	3-48	2-2	3	6	2	DDFFIVVPAAPLFCGMDV	0	19	3-20	4	QQYGSSPLT	9	-	+	-	
mUNG5 72	4-31	6-6	3	4	1	GGAARAYYFDY	1	12	1-5	2	QQYNSYPYT	9	-	-	-	
mUNG5 73	1-8	2-2		5	1	NCSSTSCYIRGPAGYWFDP	1	19	3-11	4	QQRSNWPLT	9	-	-	-	
mUNG5 74	5-51	3-22	2	4	2	HHYYDSSGYHYDY	3	13	1-39	4	QQSYSTPPH	9	-	-	-	
mUNG5 76	1-8	3-22		4	2	GRVHYDDY	2	8	1-9	1	QQLNSYPRT	9	-	-	-	
mUNG5 77	3-53	3-10		5	1	SDEV	0	4	1-39	1	QQSYSTLWT	9	-	-	-	
mUNG5 90	1-69	3-3	2	6	3	LNTSGYHREWDYYGMDV	2	18	1-39	4	QQSYSTPLT	9	-	-	-	
mUNG5 92	3-30	7-27		3	3	DDHMRHWGGFAFDI	3	14	1-8	3	QQYYSYPFT	9	-	+	-	
mUNG5 93	3-49	3-22	2	4	3	EVDSSGYHYQGDY	1	14	4-1	5	QQYYSTPIT	9	-	-	-	
mUNG5 95	3-21	6-19	3	6	1	TLPARIAVAGYGMDV	1	15	3-20	4	QQYGSSPP	8	+	+	C	
	VH	D	RF	JH	(-)	CDR3(aa)	(+)	Length	Vλ	Jλ	CDR3(aa)	Length	Poly	Hep2	Staining	
mUNG5 50	5-51	5-5	2	6	1	NIGYSYGPPLNYGMDV	0	16	2-11	2	CSYAGSYTVV	10	-	-	-	
mUNG5 59	1-18	2-21	3	6	3	GQVTPDEGPLNYYYYYGMVDV	0	21	1-47	3	AAWDDSLSGWV	11	-	-	-	
mUNG5 83 #	3-74	6-6	2	6	1	LSSSSFYYYYYYGMVDV	0	16	1-44	2	AAWDDSLNGPV	11				
mUNG5 85	3-23	3-3	1	4	4	EDRLRFLEWLFHGYYFDY	3	18	2-14	2	SSYTSSTVV	10	+	+	-	
mUNG5 87	4-34	6-19	3	4	2	ESAVAGTDY	0	9	1-40	2	QSYDSSLSGSKV	12	-	-	-	
mUNG5 92						see kappa			1-47	2	AAWDDSLSVVV	11	-	+	-	

RF, reading frame; #, antibody failed to be expressed

-, non-reactive; +, reactive;

C, diffuse cytoplasmic staining; N, nuclear staining; F, cytoplasmic fibers; V, vesicles