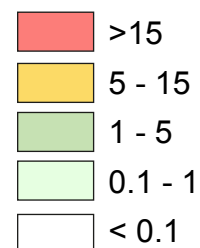


Table S1. Demographic, clinical and serological characteristics of birch pollen allergic patients and non-allergic subjects studied during two pollen seasons. Abbreviations used: A1-A30: birch pollen allergic patients 2019; HS1-HS6: non-allergic subjects 2019; B1-B10: birch pollen allergic patients 2021; m: male; f: female; AD: Atopic dermatitis; A: Asthma; R: Rhinitis; C: Conjunctivitis; P: Pollen-food syndrome. Bet v 1-specific IgE levels are shown as international standardized units (ISU) and the colour code for specific IgE levels is shown.

Year	#	Sex	Age	Symptoms	Bet v 1-specific IgE, ISU
2019	A1	m	33	AD, R, P	11.6
	A2	f	36	R, C	5.9
	A3	m	37	R, C	104
	A4	f	52	AD	37.4
	A5	m	35	A, R, C, P	41.2
	A6	m	46	AD, A, R, C	3.28
	A7	f	21	AD, R, C	35.9
	A8	f	20	R	28.7
	A9	m	34	AD, R, P	103
	A10	m	24	R, C, P	67.5
	A11	f	19	A, R, P	0.44
	A12	m	30	A, R, C, P	14.7
	A13	m	30	R, C, P	19.5
	A14	f	21	R, C, P	82.9
	A15	m	34	AD, R, C, P	71.6
	A16	m	13	A, R, C	3.22
	A17	m	34	A, R, C, P	58.9
	A18	m	34	R, C, P	45.6
	A19	m	14	R, C, P	5.27
	A20	m	45	AD, R, C	24.7
	A21	m	27	A, AD, R, C, P	86
	A22	m	12	A, R, C, P	66.4
	A23	f	24	R, C	0.37
	A24	m	33	AD, R, C	0.48
	A25	f	59	AD, R, C, P	19.2
	A26	f	23	A, R, C	16.5
	A27	f	34	R	5.38
	A28	m	58	A, R, C	9.79
	A29	m	34	A, R	14.7
	A30	m	55	A, R, C	16.3
	HS1	f	27	none	0
	HS2	m	29	none	0
	HS3	m	25	none	0
	HS4	f	30	none	0
	HS5	f	40	none	0
	HS6	m	30	none	0
2021	B1	f	16	R, C, P	6.88
	B2	m	43	R, C	0.52
	B3	f	18	A, R, C, P	234.28
	B4	m	18	R, C, P	29.84
	B5	f	17	A, R, C, P	23.92
	B6	f	20	AD, R, C, P	26.96
	B7	m	21	AD, R, C, P	19.32
	B8	m	42	R	6.88
	B9	f	47	A, R, P	68.1
	B10	m	24	R, C, P	43



AD – Atopic Dermatitis, A – Asthma, R – Rhinitis, C – Conjunctivitis, P – Pollen-food syndrome

Table S2. Molecular IgE reactivity profiles determined by ImmunoCAP ISAC for allergic, non-allergic and predominantly Bet v 1-sensitized allergic patients. Shown are specific IgE levels for those allergen molecules which were recognized by at least one of the patients. Bet v 1-cross-reactive PR-10 allergens are indicated in orange followed by the other allergen molecules in alphabetical order from left to right. Allergen-specific IgE levels are shown as international standardized units (ISU) and the colour code for specific IgE levels is shown.

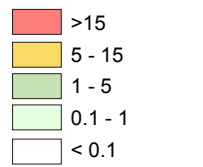
[illegible]

Table S3. Primer sequences used for RT-PCR amplification of IgE VH transcripts.

Reverse Transcription	5' - 3' sequence
Ec1	TTTTGTTGTCGACCCAGTCTGTG
PCR Forward Primer	
5' IGHV1/7	CCTCAGTGAAGGTCTCCTGCAAGGC
5' IGHV2	GTCCTGCGCTGGTGAAAYCCACACA
5' IGHV3	GGGGTCCCTGAGACTCTCCTGTGCAG
5' IGHV4	GACCCTGTCCCTCACCTGCRCTGTC
5' IGHV5	AAAAAGCCCGGGGAGTCTCTGARGA
5' IGHV6	ACCTGTGCCATCTCCGGGGACAGTG
PCR Reverse Primer	
3' CE1	CAGCAAGCTGATGGTGGCATAGTG
3' CE2	ATGTTTTTGCAGCAGCGGGTCAAG

Table S4. Bet v 1-specific IgG₁, IgG₄ and IgE levels measured at TP1, TP3 and TP5. Results are shown for birch pollen allergic patients A1-A30 and non-allergic subjects HS1-HS6.

ID	Bet v 1-specific IgG ₁ [OD]			Bet v 1-specific IgG ₄ [OD]			Bet v 1-specific IgE [kUA/l]		
	TP1	TP3	TP5	TP1	TP3	TP5	TP1	TP3	TP5
A1	0,216	0,543	0,504	0,194	0,446	0,358	15,2	53,1	50,6
A2	0,032	0,05	0,022	0,03	0,034	0,015	2,51	2,44	1,87
A3	0,363	0,546	0,603	1,898	2,887	2,465	618	1713	709
A4	0,209	0,2	n/d	1,39	1,215	n/d	65,1	68,7	n/d
A5	0,072	0,79	0,202	0,065	0,733	0,251	54,2	292	147
A6	0,06	0,045	0,052	0,184	0,155	0,134	3,1	2,76	2,29
A7	0,027	0,099	0,08	0,143	0,233	0,262	28,8	62,6	43,8
A8	0,03	0,021	0,097	0,209	0,156	0,354	24,5	76,9	41,2
A9	0,389	0,495	0,682	1,82	2,556	2,566	677	884	688
A10	0,265	0,268	0,202	0,601	0,639	0,431	118	142	72,6
A11	0,026	0,031	0,034	0,053	0,09	0,089	0,16	0,75	0,53
A12	0,028	0,028	0,027	0,018	0,032	0,02	8,3	31,6	9,53
A13	0,144	0,07	0,117	0,242	0,23	0,308	24,8	28,1	36,5
A14	0,092	0,106	0,151	1,456	1,641	2,274	91,8	106,2	73,2
A15	0,027	0,027	0,025	0,716	0,668	0,626	87	120	123
A16	0,032	0,014	0,023	0,18	0,127	0,142	2,1	2,12	2,5
A17	0,053	0,05	0,056	0,692	0,673	0,755	63,4	62,3	48,7
A18	0,066	0,064	0,232	0,075	0,057	0,218	56,4	58,4	144
A19	0,019	0,014	0,051	0,028	0,009	0,014	0,12	0,25	0,36
A20	0,238	0,931	0,222	0,939	3,418	0,835	35,3	78,7	33
A21	1,366	2,557	1,08	0,192	0,479	0,2	125	193	104
A22	3,027	3,727	1,431	0,637	0,499	0,369	289	299	210
A23	0,017	0,028	0,023	0,042	0,063	0,079	0,11	0,53	0,43
A24	0,035	0,029	0,029	0,023	0,006	0,008	0,27	0,27	0,16
A25	1,085	0,73	1,203	0,899	0,743	1,181	44,3	65	51,3
A26	1,193	1,015	1,269	0,688	0,637	1,039	42,9	64	52,7
A27	0,004	0,004	0,003	0,048	0,042	0,022	1,98	2,21	1,48
A28	0,038	0,022	0,023	0,031	0,098	0,021	4,89	0,43	11
A29	0,11	0,093	0,065	0,036	0,036	0,025	24,1	33,6	13,8
A30	0,022	0,009	0,029	0,018	0,104	0,019	11,4	0,53	4,85
HS1	0,016	0,011	0,015	0,003	0,003	0,003	≤0.35	≤0.35	≤0.35
HS2	0,037	0,068	0,033	0	0,006	0,003	≤0.35	≤0.35	≤0.35
HS3	0,082	0,065	0,074	0,004	0,003	0,004	≤0.35	≤0.35	≤0.35
HS4	0,058	0,037	0,038	0,003	0,002	0,006	≤0.35	≤0.35	≤0.35
HS5	0,014	0,013	0,009	0,006	0,005	0,008	≤0.35	≤0.35	≤0.35
HS6	0,138	0,116	0,087	0,024	0,025	0,024	≤0.35	≤0.35	≤0.35

Figure S1. Correlation between Bet v 1-specific IgE levels measured by ImmunoCAP (kUA/l) (x-axis) and ImmunoCAP ISAC micro-array (ISU) (y-axis). Results are shown for birch pollen allergic patients A1-A30 at TP1.

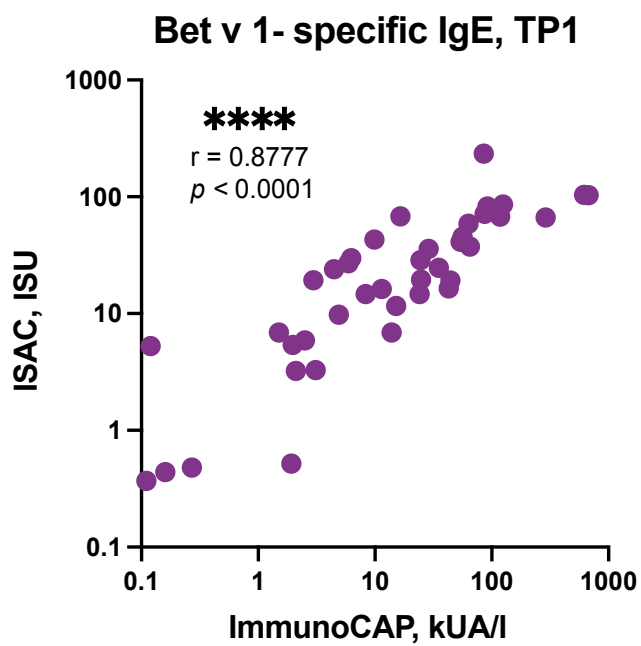
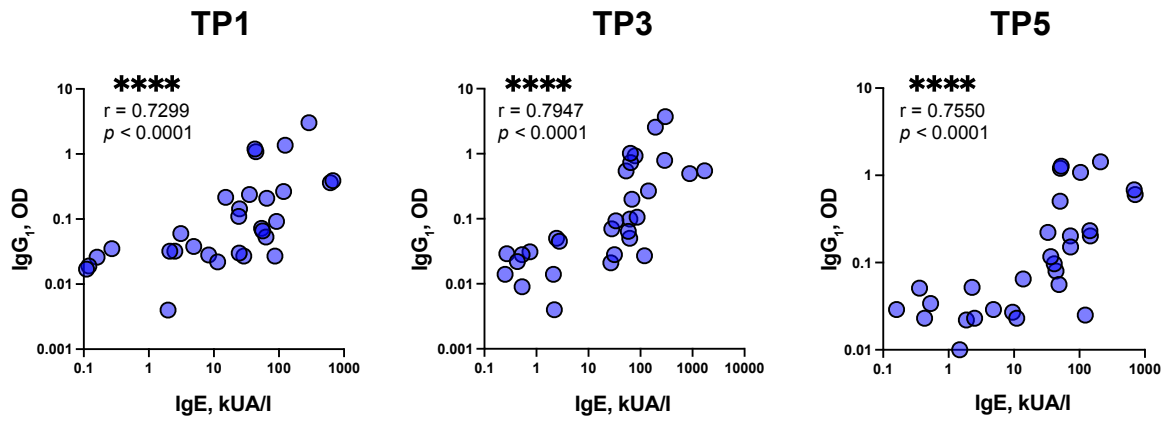


Figure S2. Correlation between Bet v 1-specific IgE levels and Bet v 1-specific IgG₁ and IgG₄ levels. IgE levels measured by ImmunoCAP (kUA/l) (x-axis) and (a) IgG₁ and (b) IgG₄ levels (y-axes: OD levels) measured by ELISA are shown for birch pollen allergic patients A1-A30 at TP1, TP3 and TP5.

a



b

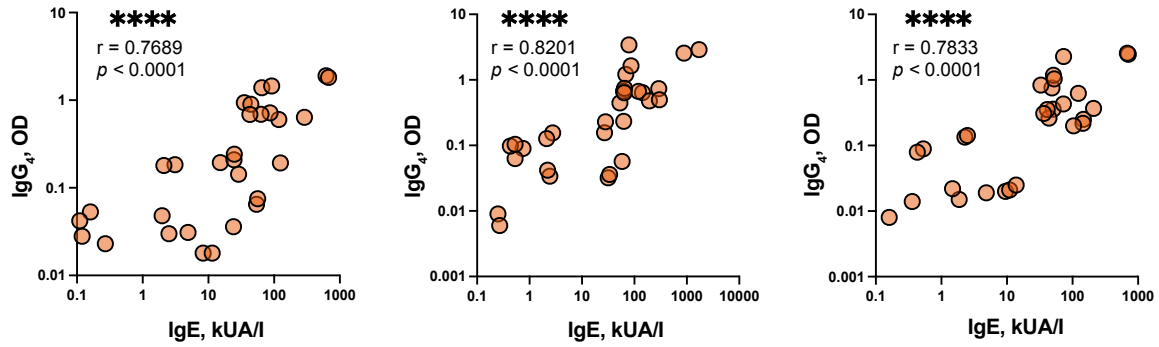


Table S5. Bet v 1-specific IgG₁, IgG₄ and IgE levels and Bet v 1-specific basophil activation measured at TP1, TP3 and TP5.
Results are shown for birch pollen allergic patients A3, A5, A7, A9, A20.

ID	Bet v 1-specific IgG ₁ [OD]			Bet v 1-specific IgG ₄ [OD]			Bet v 1-specific IgE [kUA/l]			% of activated basophils		
	TP1	TP3	TP5	TP1	TP3	TP5	TP1	TP3	TP5	TP1	TP3	TP5
A3	0,363	0,546	0,603	1,898	2,887	2,465	618,00	1713,00	709,00	77,10	2,60	73,40
A5	0,072	0,790	0,202	0,065	0,733	0,251	54,20	292,00	147,00	61,10	12,00	41,70
A7	0,027	0,099	0,080	0,143	0,233	0,262	28,80	62,60	43,80	39,50	11,70	64,30
A9	0,389	0,495	0,682	1,820	2,556	2,566	677,00	884,00	688,00	81,50	14,40	55,20
A20	0,238	0,931	0,222	0,939	3,418	0,835	35,30	78,70	33,00	76,70	5,30	51,80

Figure S3. Gating strategy for the identification of IgE B-cell receptor positive cells using flow cytometry.

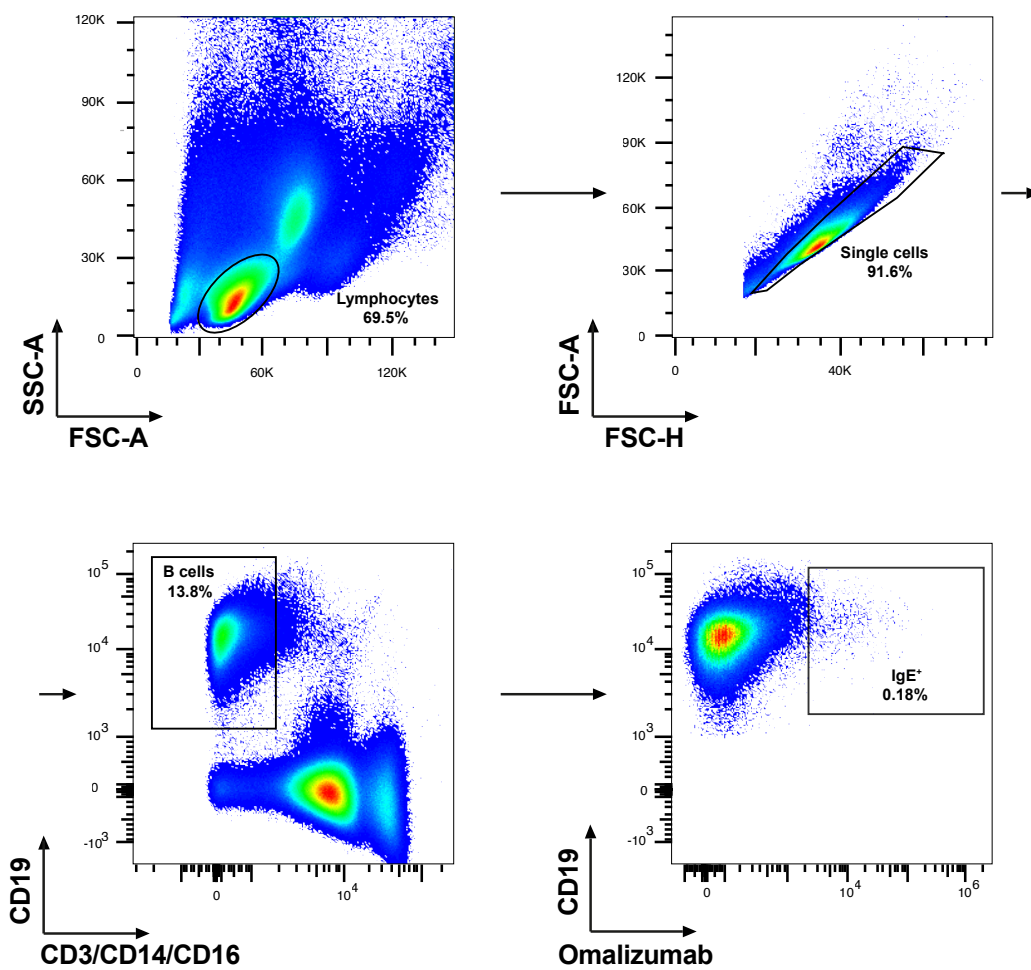


Figure S4. Sensitivity and specificity of RT-PCR amplification of IgE VH transcripts. Agarose gels containing a DNA marker with a 400 bp indicated (left) followed by IgE VH RT-PCR products obtained from 25,000 PBMCs from a non-allergic donor spiked with U266 cells (100, 50, 10, 5 or 1), PBMC alone, 25,000 U266 cells and the negative control performed without addition of input RNA.

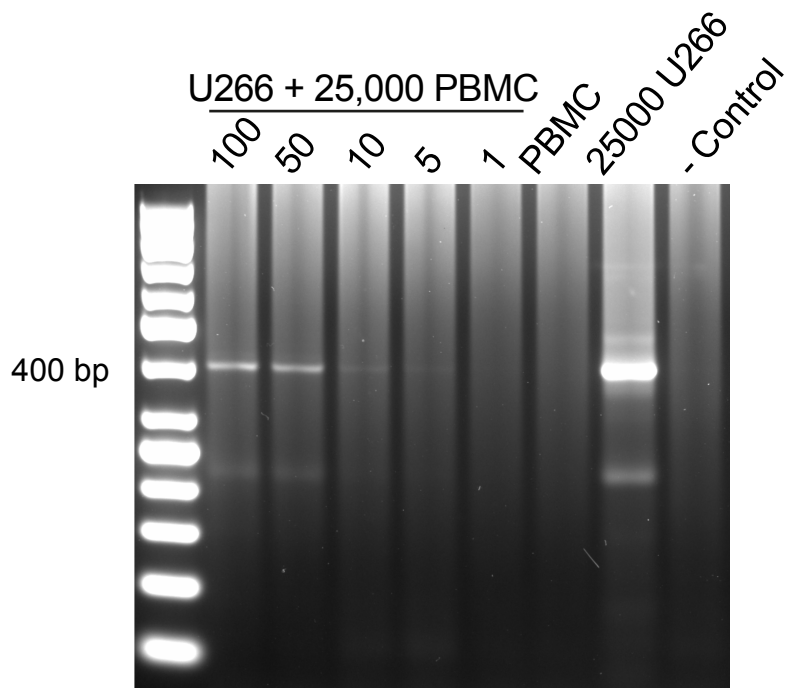


Figure S5. Presence of Bet v 1 degradation products in natural birch pollen extracts. (a) Coomassie blue-stained SDS-PAGE containing birch pollen extract (BPE), a molecular weight marker (M), purified rBet v 1 and (b) immunoblots stained with rabbit anti-Bet v 1 antibodies, rabbit antibodies raised against six synthetic Bet v 1-derived peptides (anti P1-P6), anti-fragment 1 (F1) and 2 (F2) rabbit antibodies or with serum from a non-immunized rabbit (NRS).

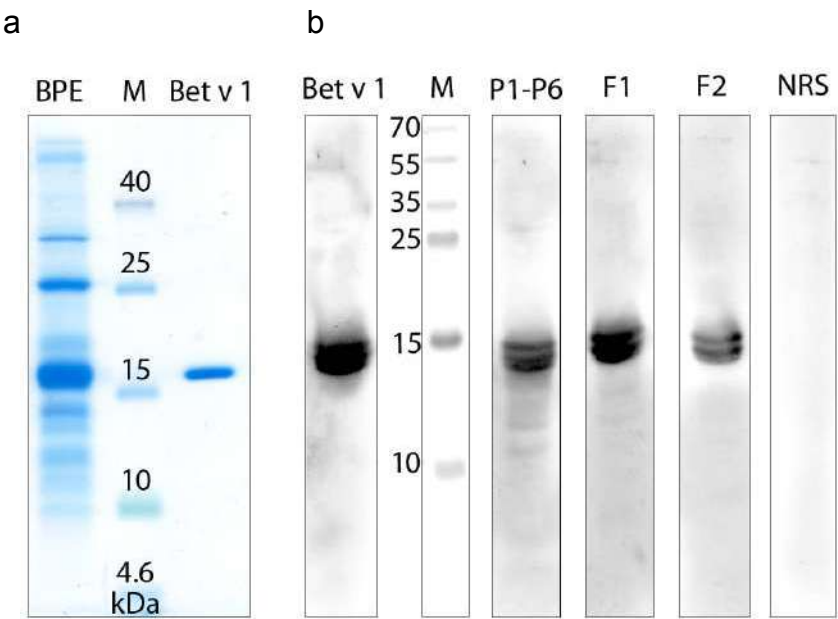


Figure S6. Gating strategy for the identification of Bet v 1⁺IgE B-cell receptor positive cells using flow cytometry, shown in Figure 3e and in the last panel of Figure S6.

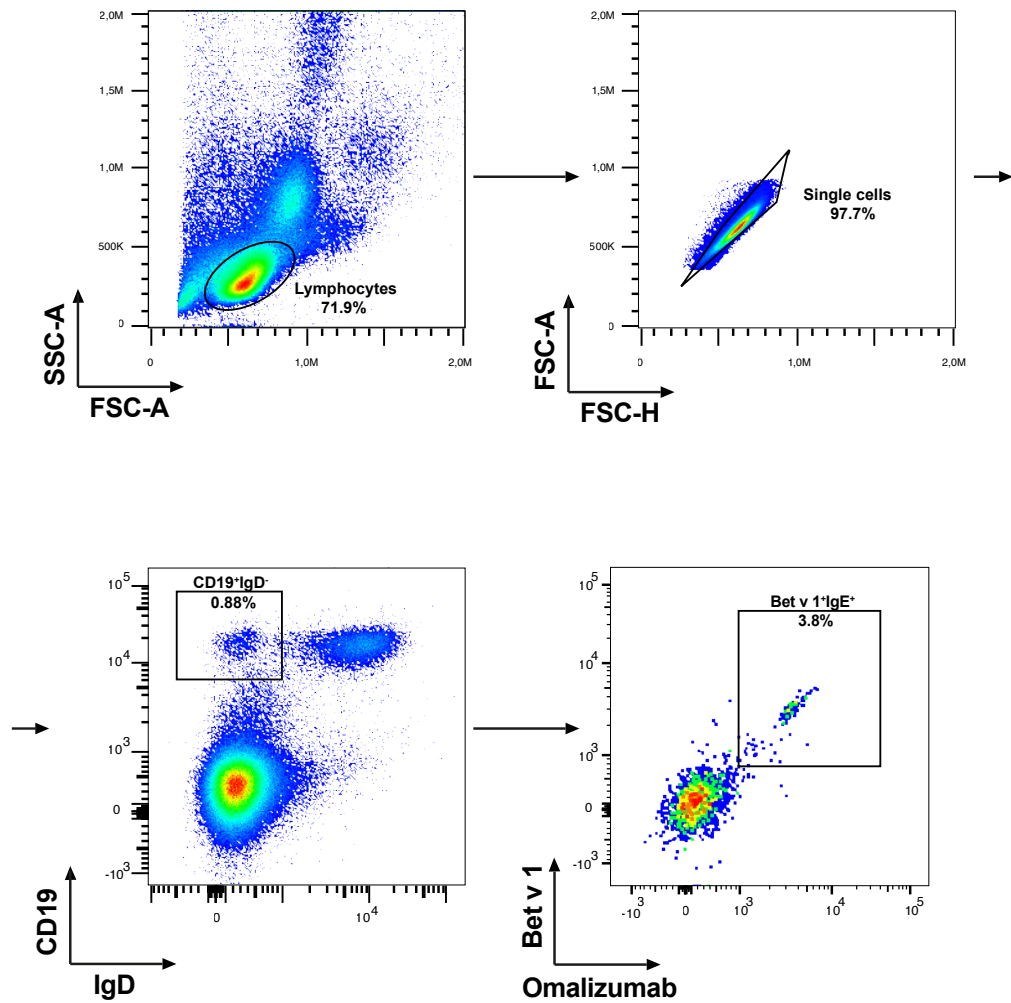


Table S6. Detailed description of the obtained 61 IgE VH sequences. Sequences are listed by numbers, attributed to the donors and time points. Further information given: Sequence ID, functionality, V-GENE and allele, V-region identity with the germ line sequence, J-GENE and allele, J-region identity, D-GENE and allele, CDR3 length, AA Junction and nucleotide sequence.

Sequence number	Donor ID	Time point	Sequence ID	Functionality	V-GENE and allele	V-REGION identity %	J-GENE and allele	J-REGION identity %	D-GENE and allele	CDR3 length	AA JUNCTION	Sequence
1	B1	TP1	4111	productive	IGHV4-31*11	88.6	IGHJ5*02	90.2	IGHD3-3*01	14	CARSFLEWLPNW FGPW	tgaccctgtccctcaactgcgctgtctctgttgactccatcagcagtggtcggtta cttctggaattggatccgcagcaccaggggaagggcctggagtggattg ggttcatctctcacagtgaggagtaccactacaatccgtccctcaagagtcg aatagccatgacattaacacgctctaacaatcaacttccctgaaattgagtt ccatgactgcgcgggacacggccgtatattactgtgcagagtcctttctgga gtggttgcccaactggttcgccccctgggcccgggactcctgtgtaccggtc tctcag
2	B2	TP1	6111	productive	IGHV3-30-3*01, or IGHV3-33*09	93.8	IGHJ1*01	82.7	IGHD6-13*01	12	CAKELAPAEPPD YW	ggggctctgagactctctgtgcagcctctggattcacctcagtagatatgtct atgcactgggtccgcccaggctccaggccaggggctggagtgggtggcagt tatacatcatgatggaaacaaatgaatattacgcagactccgtgaagggccg attccacatctccagagacaattccaacaacacactgtatctgcaaatgaac agcctgagagctgaggacacggctctcttcactgtgcgaagagctggca ccagctgaacccccgactattggggccagggaaccctgtcaccgctctcc tcag
3	B2	TP1	6112	productive	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95.1	IGHJ6*01	90.5	IGHD3-3*01	18	CAKEEWSLFGKY YYYGMDVW	ttggggctccctgagactctctgtgcagcctctggactcacttttagcagctatg tcatgagctgggtccgcccagggtccaggggaggggctggagtgggtctca ggaaattagtggtagtggtgtagcacatactacgcagactccgtgaaggg ccggttcacatctccagagacaattccaggaatacgtgtatctgcaaatg agcagcctgagagccgaggacacggccgtatattactgtgcgaagagg agtggtcattttggaaagtactactactatggatggacgtctggggacaa gggaccacgggtcacgtctcctcag
4	B2	TP1	6113	productive	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95.9	IGHJ6*01	90.5	IGHD3-3*01	18	CAKEEWSLFGKY YYYGMDVW	tggggtccctgagactctctgtgcagcctctggactcacttttagcagctatgt catgagctgggtccgcccagggtccaggaaggggctggagtgggtctcag gaattagtggtagtggtgtagcacatactacgcagactccgtgaagggcc gggtcacatctccagagacaattccaggaatacgtgtatctgcgaatgag cagcctgagagccgaggacacggccgtatattactgtgcgaagaggag tggtcattttggaaagtactactactatggatggacgtctggggacaagg gaccacgggtcacgtctcctcag
5	B2	TP1	6121	productive	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	87.3	IGHJ4*02	89.6	IGHD4-23*01	18	CARALRRDRPVVL TLDFDSW	tggggtccctgagactctctgtgcagcctctggattacttttagctttattcca tgagctgggtccgacaggtccagggaaggggctggaatgggtctcagg cattcccggtagtggtggaagtacatactacgcagactccgtggaggccg attctccatctccagggaacattccaagaacacactgtttctcaaatgaaca gcctaagagccgacgacacgggctatactattgtgcgagagccctgcgg cgggaccgcccgtgtgcttaccctcgactttgactcctgggcccgggaa cccaggtcacgtctcctcag
6	B2	TP1	6122	productive	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	96.1	IGHJ6*01	90.5	IGHD3-3*01	18	CAKEEWSLFGKY YYYGMDVW	actctctgtgcagcctctggactcacttttagcagctatgtcatgagctgggtc cgccagggtccagggaaggggctggagtgggtctcagggaattagtggtag tggtgtagcacatactacgcagactccgtgaagggccggttcacatctcc agagacaattccaggaatacgtgtatctgcaaatgagcagctgagagc cgaggacacggccgtatattactgtgcgaagaggagtggtcattatttg aaagtactactatgtgatggacgtctggggacaagggaccacgggtca ccgtctcctcag

7	B2	TP1	6123	productive	IGHV3-23*01, or IGHV3- 23*04 or IGHV3- 23D*01	87.3	IGHJ4*02	89.6	IGHD4-23*01	18	CARALRRDRPVVL TLDFDSW	tggggtccctgagactctcctgtgcagcctctggattacttttagtctttattcca tgagctgggtccgacaggctccagggaaggggctggaatgggtctcagg cattcccggtagtggtggaagtagatattacgcagactccgtggaggcgccg attctccatctccagggaacaattccaagaacaacactgtttcttcaaatgaaca gcctaagagccgacgcagacgggcctatactattgtgcgagagccctcgccg cgggaccgcccggctgtgcttaccctcgactttgactcctgggcccgggaa cccagggtcacccgtctcctcag
8	B3	TP1	7111	productive	IGHV3-49*03, or IGHV3- 49*05	90.3	IGHJ2*01	98.1	IGHD2-15*01	16	CAGVLAGSGYLY WYFDLW	gggtcctgagactctcctgtgcaggctctggattcctttgggtattatactctg agctgggtccgacaggctccagggaaggggctggagtgggtcgggtctcgtt acaagcaaaagcttatgggtgagacaacaaaatactccgctctgtgcaagc cagattcaccttctcaagagatgattcgaaaagcatcgctatctacaaatg aacagcctgcaaacggacgcacagccgtgtactactgtctggtcggttctg gtggcagtggtacttgtactgtgacttgcgatctctggggccgtggcacctt ggtcactgtctcctcag
9	B3	TP1	7112	productive	IGHV3-49*03, or IGHV3- 49*05	90.4	IGHJ2*01	98.1	IGHD2-15*01	16	CAGVLAGSGYLY WYFDLW	tggggtccctgagactctcctgtgcaggctctggattcctttgggtattatact ctgagctgggtccgacaggctccagggaaggggctggagtgggtcgggtctc gttacaagcaaaagcttatgggtgagacaacaaaatactccgctctgtgcaa gccagattcaccttctcaagagatgattcgaaaagcatcgctatctacaaa tgaacagcctgcaaacggacgcacagccgtgtactactgtctggtcggttc tggctggcagtggtacttgtactggtacttgcgatctctggggccgtggcacc ctggtcactgtctcctcag
10	B3	TP1	7121	productive	IGHV3-49*03, or IGHV3- 49*05	91.2	IGHJ2*01	98.1	IGHD2-15*01	16	CAGVLAGSGYLY WYFDLW	gggggtccctgagactctcctgtgcaggctctggattcctttgggtattatact ctgagctgggtccgacaggctccagggaaggggctggagtgggtcgggtctc gttacaagcaaaagcttatgggtgggacaacaaaatactccgctctgtgcaa gccagattcaccttctcaagagatgattcgaaaagcatcgctatctacaaa tgaacagcctgcaaacggacgcacagccgtgtactactgtctggtcggttc tggctggcagtggtacttgtactggtacttgcgatctctggggccgtggcacc ctggtcactgtctcctcag
11	B3	TP1	7123	productive	IGHV3-49*03, or IGHV3- 49*05	79.3	IGHJ2*01	98.1	IGHD2-15*01	16	CAGVLAGSGYLY WYFDLW	gggggtccctgagactctcctgtgcagggtggcacaacccagtcgaggctgcc ctgtcctcagagactccccgggcttttgggtccctgagactctcctgtgcag gctctggattctcctttgggtgattatactctgagctggttccgacaggctccagg gaaggggctggagtgggtcgggtcgtctgtacaagcaaaagcttatgggtgaga caacaaaatactccgctctgtgcaagccagattcaccttctcaagagatg attcgaaaagcatcgctatctacaaatgaacagcctgcaaacggacgcac acagccgtgtactactgtgtcgtggcttctggctggcagtggtacttgtactgg tacttgcgatctctggggccgtggcaccttggtcactgtctcctcag
12	B10	TP1	T3a6	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	88.84298	Homsap IGHJ4*02 F	79.17	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggtctcctgcaaggctctggaggcaccttcaacagttatgct gtcagctgggtgctggcaggcccctagacaagggcttgagtggatgggaa gggtcatccctggccttgatagatcaaatatgcacagaaattccaggggca gaatcatgattagcgcggacaataccacgacctcagctacatggagctga gcggcctaagctctgaaagacacgggccatatattactgtgcgagagaaggg ggatatgtactgttggaagctgtacccaggagcactggggcctgggaac cctggtcacggtctcctcagcctccacacagagcccatccgtcttccccttgac ccgctgtgcataaaacat

13	B10	TP1	T3a10	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	88.84298	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggtttcctgcaaggctctggaggcaccttcaacagttatgct gtcagctgggtgcggcaggccctagacaaagggttgatggatgggaa gggtcatccctggccttgatagatcaaatatgcacagaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagttacatggagctga gcggcctaagctctgaagacacggccatatattactgtgcgagagaaggg ggatattgtactggtggaagctgacccaggagcactgggctgggaac cctggtcacggtctcctcagcctccacacagagcccatccgtcttccccttgac ccgctactgcaaaaacat
14	B10	TP1	T7a11	productive	Homsap IGHV5-51*01 F	93.33334	Homsap IGHJ5*02 F	90.20	Homsap IGHD1- 26*01 F	13	CARSIVGTLPWFD PW	aaaaagccggggagtgctctgaggatctcctgtaaggcttctggatacagc tttataacgtactggattgcctgggtgcgccagatgccgggagaggcctg gaatggatggggatcatctatcctggtgactctgataccagatacagcccgt cctttgaaggccagggtcaacatctcagccgacaagtcctcaataacccgt acctcagtgaggcagcagcctgaaggcctcggacagcgccatgtattattgtg cgaggagtatagtgggcacattgcctggttcgacctggggccaggga accctagtcaccgtctcctcagcctccacacagagcccatccgtcttccccttg acccgtctgcaaaaacat
15	B10	TP1	T3a14	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaaggggctggaatggatttca tattttagtaagagtgggtggcaccatatattacgcagactctgtgaaggcc gatttaccgtctccaggaaacaacgcgagaaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttattattgtgcaagagatccaggga gttaccgacgaaggatcaggctactatttgcactctggtggccgtggcaccc tggtcactgtctcctcagcctccacacagagcccatccgtcttccccttgacc gctgctgcaaaaacat
16	B10	TP1	T3_b1	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaaggggctggaatggatttca tattttagtaagagtgggtggcaccatatattacgcagactctgtgaaggcc gatttaccgtctccaggaaacaacgcgagaaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttattattgtgcaagagatccaggga gttaccgacgaaggatcaggctactatttgcactctggtggccgtggcaccc tggtcactgtctcctcagcctccacacagagcccatccgtcttccccttgacc gctgctgcaaaaacat
17	B10	TP1	T3_b6	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	88.42976	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggtttcctgcaaggctgtcggaggcaccttcaacagttatgct gtcagctgggtgcggcaggccctagacaaagggttgatggatgggaa gggtcatccctggccttgatagatcaaatatgcacagaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagttacatggagctga gcggcctaagctctgaagacacggccatatattactgtgcgagagaaggg ggatattgtactggtggaagctgacccaggagcactggggctgggaac cctggtcacggtctcctcagcctccacacagagcccatccgtcttccccttgac ccgctgtgcaaaaacat
18	B10	TP1	T7_b8	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	88.42976	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggtttcctgcaaggctgtcggaggcaccttcaacagttatgct gtcagctgggtgcggcaggccctagacaaagggttgatggatgggaa gggtcatccctggccttgatagatcaaatatgcacagaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagttacatggagctga gcggcctaagctctgaagacacggccatatattactgtgcgagagaaggg ggatattgtactggtggaagctgacccaggagcactggggctgggaac cctggtcacggtctcctcagcctccacacagagcccatccgtcttccccttgac ccgctgtgcaaaaacat

19	B10	TP1	T3_b9	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	89.2562	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggtctcctgcaaggctctggaggcacctcaacagttatgct gtcagctgggtgcggcaggccctagacaagggtgagtggaatgggaa gggtcatccctggcctgatagatacaaatatgcacagaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagttcatagagctga gcggcctaagctctgaagacacggcccatatattactgtcgcagagagaagg ggatattgtactgttggaagctgcacccaggagcactgggctgggaac cctggtcacgcgtctcctcagctccacacagagcccatccgtcttccccttgac ccgtctgcaaaaacataagggc
20	B10	TP1	T3_b10	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaagggtggaatggatttca tattttagtaagagtgggtggcaccatatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcagagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttatttgtgcaagagatccagga gttaccgacgaaggatcagggtactatttcgatctctggggccgtggcaccc tggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaaacat
21	B10	TP1	T3_c1	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaagggtggaatggatttca tattttagtaagagtgggtggcaccatatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcagagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttatttgtgcaagagatccagga gttaccgacgaaggatcagggtactatttcgatctctggggccgtggcaccc tggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaaacat
22	B10	TP1	T3_c2	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaagggtggaatggatttca tattttagtaagagtgggtggcaccatatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcagagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttatttgtgcaagagatccagga gttaccgacgaaggatcagggtactatttcgatctctggggccgtggcaccc tggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaaacat
23	B10	TP1	T3_c4	productive	Homsap IGHV3-11*01 F	88.11475	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccggggaagggtggaatggatttca tattttagtaagagtgggtggcaccatatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcagagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttatttattgtgcaagagatccagga gttaccgacgaaggatcagggtactatttcgatctctggggccgtggcaccc tggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaaacat
24	B10	TP1	T3_c5	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	87.70492	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	ttcctcagtgaaaggtctcctgcaaggctctggaggcaccttcaacagttatg cngtcagctgggtgcggcaggccctagacaagggttgagtggaatggg aagggtcatccctggccttgatagatcaaatatgcacagaaattccaggg cagagtcattgattagcgcggacaaatccacgacctcagttcatatgnagct gagcggcctaanccttgaagacacggccatatattactgtgcgagagaag ggggatattgtactgttggaagctgcacccaggagcactggggcctggga accctggtcacgtctcctcagcctccacacagagcccatccgtcttccccttg accgctgctgcaaaaaacat

25	B10	TP1	T3_c6	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	89.2562	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggtctcctgcaaggctctggaggcaccttcaacagttatgct gtcagctgggtgcggcaggccctagacaagggtctgagtggaatgggaa gggtcatccctggccttgatagatcaaatatgacagaaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagctctacatggagctga gcggcctaagctctgaaagacacggccatatattactgtgcgagagaaggg ggatatgtactgtggaagctgcacccaggagcactggggcctgggaac cctggtcacggtctcctcagcctccacacagagcccatccgtcttccccttgac ccgctgctgcaaaaacat
26	B10	TP1	T3_c7	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	88.84298	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTGGS CTQEHW	cctcagtgaaaggttctcctgcaaggctctggaggcaccttcaacagttatgct gtcagctgggtgcggcaggccctagacaagggtctgagtggaatgggaa gggtcatccctggccttgatagatcaaatatgacagaaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagctctacatggagctga gcggcctaagctctgaaagacacggccatatattactgtgcgagagaaggg ggatactgtactgtggaagctgcacccaggagcactggggcctgggaa ccctgggtcacggtctcctcagcctccacacagagcccatccgtcttccccttga ccgctgctgcaaaaacat
27	B10	TP1	T3_c8	productive	Homsap IGHV1-69*04 F, or Homsap IGHV1-69*09 F or Homsap IGHV1-69*10 F	89.2562	Homsap IGHJ4*02 F	81.25	Homsap IGHD2- 15*01 F	16	CAREGGYCTDGS CTQEHW	cctcagtgaaaggtctcctgcaaggctctggaggcaccttcaacagttatgct gtcagctgggtgcggcaggccctagacaagggtctgagtggaatgggaa gggtcatccctggccttgatagatcaaatatgacagaaaattccaggggca gagtcattgattagcgcggacaaatccacgacctcagctctacatggagctga gcggcctaagctctgaaagacacggccatatattactgtgcgagagaaggg ggatatgtactgtggaagctgcacccaggagcactggggcctgggaac cctggtcacggtctcctcagcctccacacagagcccatccgtcttccccttgac ccgctgctgcaaaaacat
28	B10	TP1	T3_c9	productive	Homsap IGHV3-11*01 F	80.20833	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	cctcagtgaaaggtctcctgcaaggctgatgtgtggaatttcaccagcgaggga cagcgggggtccctgagactctcctgtgagcctctgcattcagcgtcagtgga ctactacatgaactggatccgccaggctccagggaagggtggaatgg atttcataatttagtaagagtggtggcaccatatattacgcagactctgtgaag ggccgatttaccgtctccagggaacaacgcgagagaactcaatgtttctgcag atgaacagcctcagagtcgaagattcggcggtttattattgtgcaagagatc caggagttaccgacgaaggatcaggctactatttcgatctctggggccggtg gcacccctggatcactgtctcctcagcctccacacagagcccatccgtcttcccct tgaccgcgtgctgcaaaaacat
29	B10	TP1	T3_c10	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	gggggtccctgagactctcctgtgagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaagggtggaatggatttca tattttagtaagagtggtggcaccatatattacgcagactctgtgaagggcc gatttaccgtctccagggaacaacgcgagaaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggcggtttattattgtgcaagagatccagga gttaccgacgaaggatcaggctactatttcgatctctggggccgtgacccc tggatcgtctcctcagcctccacacagagcccatccgtcttccccttgaccc gctgctgcaaaaacat

30	B10	TP1	T3_d1	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	86.79	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	ggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaaggggctggaatggatttca tattttagtaagagtgggtggcaccataatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcgagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttattatgtgcaagagatccagga gttaccgacgaaggatcaggctactatttcgatctctggggccgtggcacc cggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaacat
31	B10	TP1	T3_d2	productive	Homsap IGHV3-11*01 F	80.20833	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	cctcagtgaagggtcctgcgaaggctgatgtgtggaattcaccagcgcagga cagcgggtccctgagactctcctgtgcagcctctgcattcagcgtcagtga ctactacatgaactggatccgccaggctccagggaaggggctggaatgg atttcatatttagtaagagtgggtggcaccataatattacgcagactctgtgaag ggccgatttaccgtctccaggaaacaacgcgcgagaactcaatgtttctgcag atgaacagcctcagagtcgaagattcggccgtttattatgtgcaagagatc caggagttaccgacgaaggatcaggctactatttcgatctctggggccgtg gcacctgggtcactgtctcctcagcctccacacagagcccatccgtcttcccct tgacctgctgctgcaaaaacat
32	B10	TP1	T7_d3	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	86.79	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	ggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaaggggctggaatggatttca tattttagtaagagtgggtggcaccataatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcgagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttattatgtgcaagagatccagga gttaccgacgaaggatcaggctactatttcgatctctggggccgtggcacc cggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaacat
33	B10	TP1	T7_d4	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	ggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaaggggctggaatggatttca tattttagtaagagtgggtggcaccataatattacgcagactctgtgaaggcc gatttaccgtctccaggaaacaacgcgcgagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttattatgtgcaagagatccagga gttaccgacgaaggatcaggctactatttcgatctctggggccgtggcacc tggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaacat
34	B10	TP1	T3_d5	productive	Homsap IGHV3-11*01 F	88.52459	Homsap IGHJ2*01 F	88.68	Homsap IGHD3- 10*03 F	17	CARDPGVTDEGS GYFDLW	ggggtccctgagactctcctgtgcagcctctgcattcagcgtcagtgactact acatgaactggatccgccaggctccagggaaggggctggaatggatttca tattttagtaagagtgggtggcaccataatattacgcagactctgtgaagggcc gatttaccgtctccaggaaacaacgcgcgagaactcaatgtttctgcagatgaa cagcctcagagtcgaagattcggccgtttattatgtgcaagagatccagga gttaccgacgaaggatcaggctactatttcgatctctggggccgtggcacc tggtcactgtctcctcagcctccacacagagcccatccgtcttcccctgaccc gctgctgcaaaaacat
35	B1	TP3	4211	productive	IGHV1-8*01	94.6	IGHJ4*02	93.8	IGHD3-3*01	16	CARAGYDVWSAA PYFDYW	cctcagtgaagggttctctgaaggcttctggatacaccttcaccaattatgata tcaactgggtgcgacagggccactggacaagggttgagtggatgggatg gatgaaccctaacagtggtaacacagtctatgccagaagtccaggga gagtcaacctgaccaggaaacacctcatgagtacagcctacatggaactg actagcctgcgatctgaggacatggccgtttatttctgtgcgagagctggcta cgatgtttgagtgctgcacctaactttgactactggggccagggaaccccg gtcacctgtctcctcag

36	B1	TP3	4215	productive	IGHV3-9*01	98.8	IGHJ4*02	91.7	IGHD2-15*01	25	CAKDIAGGFFPGV DCSGGSCYSGFD YW	ggggtccctgagactctctgtgcagcctctggattcacctttgatgattatgcc atgcactgggtccggcaagctccagggaagggcctggagtgggcctcag gtattagttggaatagtggtagcataggctatgcggactctgtgaaggccg attcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaa cagtctgagagctgaggacacggcctgtattactgtgcaaaagatattgcc gggggccttttccgggcgtggattgtagtgggtgtagctgctactcgggcctt gactactggggccagggaacccctggtcaccgtctcctcag
37	B1	TP3	4225	productive	IGHV3-9*01	99.2	IGHJ4*02	91.7	IGHD2-15*01	25	CAKDIAGGFFPGV DCSGGSCYSGFD YW	ggggtccctgagactctctgtgcagcctctggattcacctttgatgattatgcc atgcactgggtccggcaagctccagggaagggcctggagtgggctcag gtattagttggaatagtggtagcataggctatgcggactctgtgaaggccg attcaccatctccagagacaacgccaagaactccctgtatctgcaaatgaa cagtctgagagctgaggacacggcctgtattactgtgcaaaagatattgcc gggggccttttccgggcgtggattgtagtgggtgtagctgctactcgggcctt gactactggggccagggaacccctggtcaccgtctcctcag
38	B1	TP3	42127	productive	D-REGION start	92.3	IGHJ4*02	89.6	IGHD2-8*01	19	CASEEKYCTNDG CFYSFFNYW	gactctcctgtgcagcctctggtattcacccctcagaacttatgaatgaactgg gtccgccaaggctccagggaaggggctggagtggattcatacactagcgg tagtggtaccaccatatactactacgcagactctgtgaggggcgctcactatct ccagagacgcgcgcgaactcactctatctgcaaatgaacgcctgcga gccgaagacacggcgttttattactgtgcgagcgaagagaaaatattgtact aatgatggatgcttttatagtttcttaattactggggccagggaacccctggtc accgtctcctcag
39	B1	TP3	42130	productive	IGHV1-8*01	94.5	IGHJ4*02	93.8	IGHD3-3*01	16	CARAGYDVWSAA PYFDYW	cctcagtgaaggtttctgcaaggcttctggatacaccttcaccaattatgata tcaactgggtgcgacaggccactggacaagggcttgagtggatgggatg gatgaaccctaacagtggtaacacagctatgccagaagttccaggggca ggtcaccatgaccagggaacacctccatgagtacagcctacatggaactg actagcctgcgatctgaggacatggccgtttattctgtgcgagagctggct
40	B2	TP3	6223	productive	IGHV3-21*01, or IGHV3- 21*02 or IGHV3-21*05	94.1	IGHJ4*02	97.9	IGHD3-10*01	24	CATEVTTYFGSG SYDEARRGYFYD YW	tctgggcaggggctggagtgggtctcatacattagcagtggtaggttac atatactatacagactcagtgaagggcgatcccatctccagagacaac gccaagaactcactgtacctgcaaatgaacgcctgagagccgagggaca cggctatatattactgtgcgacagaggtcacgtattactcggttcggggagt atgatgaagcaagaaggggtactactttgactactgggccaggggac cctggtaccgtctcctcag
41	B2	TP3	6227	productive	IGHV3-21*01, or IGHV3- 21*02 or IGHV3-21*05	93.9	IGHJ4*02	97.9	IGHD3-10*01	24	CATEVTTYFGSG SYDEARRGYFYD YW	ggggtccctgagactctctgtgcagcctctggattctccttcagaacctatga cgtgaactgggtccgccaaggctcctgggcaggggctggagtgggtctcata cattagcagtggtagtggtacatactatacagactcagtgaagggccg attcaccatctccagagacaacgccaagaactcactgtatctgcaaatgaa cagcctgagagccgaggacacggctatatattactgtgcgacagagggtca cgtattactcgggtcggggattatgatgaagcaagaaggggtactacttt gactactggggccaggggacccctggtcaccgtctcctcag

42	B2	TP3	6229	productive	IGHV3-21*01, or IGHV3-21*02	92.7	IGHJ4*02	89.6	IGHD2-15*01	19	CARDLTYCSGLSC YGYIDFW	tggggtccctgagactctcctgtgcagcctctggattcaccttcagttacctatg acatgaattgggtccgcccaggtccagggaaggggctggagtggtctca tccattagtagtggtatgtcaaaagatagactacgcagactcagtgaaagggc cgattcacctctccagagacaacgccaggaactcactgtatctacaaatg aacagcctgagagtcgagacacggctgtctattgtgcgagagatttg acttactgtagtggcttagttgtacgcgaaaatacatcgactctggggcca gggaacctgggtcgctctcctcag
43	B2	TP3	62123	productive	IGHV3-30*03, or IGHV3-30*18 or IGHV3-30-5*01	93.9	IGHJ2*01	90.6	IGHD3-9*01	21	CAKRGTAW EGLT GFYSYLYFNLW	tggggtccctgagactctcctgtgcagcctctggattcaccttcagtagtttgg catgcattgggtccgcccaggtccaggcaaggggctggagtggtggca gttatatcatatgatgggaaaaatgaattctttgcagactccgtgaagggcc gatttccatctccagagacaattccaagaacacactgtatctgcaaatgga cagcctgagagttgaggacacggctgtgtattactgtgcgaaacgcggaa cggctgggagggtgactggcttttagttacttatacttcaatctctgggg ccggggcacctgggtcactgtctcctcag
44	B2	TP3	62125	productive	IGHV3-30*03, or IGHV3-30*18 or IGHV3-30-5*01	93.9	IGHJ2*01	90.6	IGHD3-9*01	21	CAKRGTAW EGLT GFYSYLYFNLW	tggggtccctgagactctcctgtgcagcctctggattcaccttcagtagtttgg catgcattgggtccgcccaggtccaggcaaggggctggagtggtggca gttatatcatatgatgggaaaaatgaattctttgcagactccgtgaagggcc gatttccatctccagagacaattccaagaacacactgtatctgcaaatgga cagcctgagagttgaggacacggctgtgtattactgtgcgaaacgcggaa cggctgggagggtgactggcttttagttacttatacttcaatctctgggg ccggggcacctgggtcactgtctcctcag
45	B2	TP3	62227	productive	IGHV4-39*07	90.1	IGHJ4*02	93.8	IGHD3-3*01	18	CARGAGVVVIPKT GRHFDYW	gacctgtctcacctgcgctgtctgtgggtccatcagtagtactactacta ctggggctggatccgcccaggtccagggaaggggctggagtggaattggg agtgtttttatagtgggaggaccacttcaacccgtccctcaagagtcagat caccatatcagtagacacgtccaagaattatttccctgaaattgaactctgt gacggccgggacacggccatgtattactgtgcgaggggggaggagtg gtggttattccgaagacgggcccgcactttgactactggggccagggaacc ctgggtcacctgtctcctcag
46	B2	TP3	62246	productive	IGHV3-30*03, or IGHV3-30*18 or IGHV3-30-5*01	93.9	IGHJ2*01	90.6	IGHD3-9*01	21	CAKRGTAW EGLT GFYSYLYFNLW	gggggtccctgagactctcctgtgcagcctctggattcaccttcagtagtttggc atgcattgggtccgcccaggtccaggcaaggggctggagtggtggcagt tatatcatatgatgggaaaaatgaattctttgcagactccgtgaagggccga ttctccatctccagagacaattccaagaacacactgtatctgcaaatggaca gcctgagagttgaggacacggctgcgtattactgtgcgaaacgcggaaacg gcttgggagggtgactggcttttagttacttatacttcaatctctggggcc ggggcacctgggtcactgtctcctcag
47	B3	TP3	7223	productive	IGHV5-10-1*01, or IGHV5-10-1*03	92.2	IGHJ2*01	94.3	IGHD6-13*01	18	CARLSLEQQLVL GNWSFDLW	aaaaagcccgggggagtctctgaggtatctcctgtaagggttctgatacaa ctttaccagttactgtgcacctgggtgcgcagatgcccggaagggcctg gagtggaatggggagggaattaatcctagtgtactcttataccaacctaaagccgt cctccaaggccacgtcaccatgtcatctgacaagtccatcagctctgccttcc tgagtgagcagctctgcaggcctcggaacgcgcatgtattctgtgcgag acttcccttgagcaacagttgtacttgggaactggtccttcgatctctggg ccgtggcacctgggtcactgtctcctcag

48	B3	TP3	72120	productive	IGHV5-10-1*01, or IGHV5-10-1*03	93.4	IGHJ2*01	92.5	IGHD6-13*01	18	CARLSLEQQLVLGNWSFDLW	taaaaagcccggggagtcctgaagatctcctgtaagggttctggatacaa ctttaccagttactgtatcacctgggtgcgccagatgcccggaagggcctg gagtggaatggggaggattaactctagtgactcttataccaacctaagcccg cctccaaggccacgtcacctatgtcatctgacaagtcctacagctctgccttc tgcatggagcagctgtcaggcctcggacacgccatgtattctgtgcgag actctccctgagcaacagttggtacttgggaactggtcctcgatctctggg ccgtgccacctggtcactgtctcctcag
49	B3	TP3	72126	productive	IGHV5-10-1*01, or IGHV5-10-1*03	93.7	IGHJ2*01	94.3	IGHD6-13*01	18	CARLSLEQQLVLGNWSFDLW	aaaaagcccggggagtcctgaagatctcctgtaagggttctggatacaac tttaccagttactgtatcacctgggtgcgccagatgcccggaagggcctgg agtggatggggaggattaactctagtgactcttataccaacctaagccggtc ctccaaggccacgtcacctatgtcatctgacaagtcctacagctctgccttc gcagtgagcagctgtcaggcctcggacacgccatgtattctgtgcgag actctccctgagcaacagttggtacttgggaactggtccttcgatctctggg ccgtgccacctggtcactgtctcctcag
50	A26	TP3	2	productive	Homsap IGHV3-23*01 F, or Homsap IGHV3-23*04 F or Homsap IGHV3-23D*01 F	95.5102	Homsap IGHJ5*02 F	98.04	Homsap IGHD3-22*01 F	20	CAKGRISMIVVPQQNWFDPW	tggggtcctgagactcctgtgcagcctctggattcagttttgccacctatgc catgagctgggtccgccaggctccagggaaggggctggagtgggtctca ggtattagtgggagtggtgtagcacatattacgcagactccgtgaagggc cggttcacctatccagagacaactccaagaacacgctgtatctgcaaatg aacagcctgagagccgaggacacggccttatattactgtgcgaaggtgg tagaattagtatgatcgtggtgttctcaacagaaactggttcgacccctggg gccagggaacctgtgacccgtctcctcagcctccacacagagcccatccg tcttcccttgacccgctgctgcaaaaacat
51	A26	TP3	3	productive	Homsap IGHV3-23*01 F, or Homsap IGHV3-23*04 F or Homsap IGHV3-23D*01 F	95.5102	Homsap IGHJ5*02 F	98.04	Homsap IGHD3-22*01 F	20	CAKGRISMIVVPQQNWFDPW	tggggtcctgagactcctgtgcagcctctggattcagttttgccacctatgc catgagctgggtccgccaggctccagggaaggggctggagtgggtctca ggtattagtgggagtggtgtagcacatattacgcagactccgtgaagggc cggttcacctatccagagacaactccaagaacacgctgtatctgcaaatg aacagcctgagagccgaggacacggccttatattactgtgcgaaggtgg tagaattagtatgatcgtggtgttctcaacagaaactggttcgacccctggg gccagggaacctgtgacccgtctcctcagcctccacacagagcccatccg tcttcccttgacccgctgctgcaaaaacat
52	A26	TP3	4	productive	Homsap IGHV1-18*01 F	95.86777	Homsap IGHJ4*02 F	83.33	Homsap IGHD1-26*01 F	14	CARDYPYSGSYA HDSW	cctcagtgaaagtttctgcaaggcttctgattacacctttaccagctatgctat cagctgggtgcgacaggccccctggacaagggcttgagtggatgggatgg atcaacgcttacaaatggtaaggcaaaactatgcacagaacctccagggcag agtcacatgaccacagacacatccacgagcacagcctacatggaactg aggagcctgagatctgacgacacggccgtatatttctgtgcgagagattac ccgtatagtgggagctacgctcatgactcctggggccagggaaccttatc accgtctcctcagcctccacacagagcccatccgtcttcccttgacccgctg ctgcaaaaacata
53	A26	TP3	5	productive	Homsap IGHV3-23*01 F, or Homsap IGHV3-23*04 F or Homsap IGHV3-23D*01 F	95.10204	Homsap IGHJ5*02 F	98.04	Homsap IGHD3-22*01 F	20	CAKGRISMIVVPQQNWFDPW	tggggtcctgagactcctgtgcagcctctggattcagttttgccacctatgc catgagctgggtccgccaggctccagggaaggggctggagtgggtctca ggtattagtgggagtggtgtagcacatattacgcagactccgtgaagggc cggttcacctatccagagacgactccaagaacacgctgtatctgcaaatg aacagcctgagagccgaggacacggccttatattactgtgcgaaggtgg tagaattagtatgatcgtggtgttctcaacagaaactggttcgacccctggg gccagggaacctgtgacccgtctcctcagcctccacacagagcccatccg tcttcccttgacccgctgctgcaaaaacat

54	A26	TP3	6	productive	Homsap IGHV1-18*01 F	95.47325	Homsap IGHJ4*02 F	83.33	Homsap IGH1- 26*01 F	14	CARDYPYSGSYA HDSW	tcctcagtgaaaggttctctgcaaggctctgattacacctttaccagctatgcta tcagctgggtgcgacaggcccctggacaagggttgagtgatgggatgg atcaacgcttacaaatggtaaggcaaaactatgacagaaacctccagggcag agtcaccatgaccacagacacatccacgagcacagcctcatggaactg aggagcctgagatctgacgacgcccgtatattctgtgcgagagattac ccgtatagtgaggagctacgctcatgactcctggggccagggaaccttatc acggtctcctcagcctccacacagagcccatccgtcttcccctgacccgctg ctgcaaaaacat
55	A26	TP3	8	productive	Homsap IGHV3-23*01 F, or Homsap IGHV3-23*04 F or Homsap IGHV3- 23D*01 F	95.10204	Homsap IGHJ5*02 F	98.04	Homsap IGH3- 22*01 F	20	CAKGRISMIVV PQQNWDPW	tggggtcctgagactctctgtgcagcctctggattcagttttgccacctatgc catgagctgggtccgccaaggctccagggaagggtgagtggttctca ggtattagtgaggagtggtgtagcacatattacgcagactccgtgaagggc cggttcaccatctccagagacgactccaagaacacgctgtatctgcaaatg aacagcctgagagccgaggacacgcccattatattctgtgcgaaaggtgg tagaattagtatgactgtgtgttctctcaacagaaactggttcgacccctggg gccagggaacctgtgtacgctctcctcagcctccacacagagcccatccg tctcccctgacccgctgtgcaaaaacat
56	A26	TP3	9	productive	Homsap IGHV1-18*01 F	95.88477	Homsap IGHJ4*02 F	83.33	Homsap IGH1- 26*01 F	14	CARDYPYSGSYA HDSW	tcctcagtgaaaggtctctgcaaggcttctgattacacctttaccagctatgcta tcagctgggtgcgacaggcccctggacaagggttgagtgatgggatgg atcaacgcttacaaatggtaaggcaaaactatgacagaaacctccagggcag agtcaccatgaccacagacacatccacgagcacagcctcatggaactg aggagcctgagatctgacgacacgcccgtatattctgtgcgagagattac ccgtatagtgaggagctacgctcatgactcctggggccagggaaccttatc acggtctcctcagcctccacacagagcccatccgtcttcccctgacccgctg ctgcaaaaacat
57	A26	TP3	10	productive	Homsap IGHV3-23*01 F, or Homsap IGHV3-23*04 F or Homsap IGHV3- 23D*01 F	95.10204	Homsap IGHJ5*02 F	98.04	Homsap IGH3- 22*01 F	20	CAKGRISMIVV PQQNWDPW	tggggtcctgagactctctgtgcagcctctggattcagttttgccacctatgc catgagctgggtccgccaaggctccagggaagggtgagtggttctca ggtattagtgaggagtggtgtagcacatattacgcagactccgtgaagggc cggttcaccatctccagagacgactccaagaacacgctgtatctgcaaatg aacagcctgagagccgaggacacgcccattatattctgtgcgaaaggtgg tagaattagtatgactgtgtgttctctcaacagaaactggttcgacccctggg gccagggaacctgtgtacgctctcctcagcctccacacagagcccatccg tctcccctgacccgctgtgcaaaaacat
58	A26	TP3	11	productive	Homsap IGHV1-18*01 F	95.88477	Homsap IGHJ4*02 F	83.33	Homsap IGH1- 26*01 F	14	CARDYPYSGSYA HDSW	tcctcagtgaaaggtctctgcaaggcttctgattacacctttaccagctatgcta tcagctgggtgcgacaggcccctggacaagggttgagtgatgggatgg atcaacgcttacaaatggtaaggcaaaactatgacagaaacctccagggcag agtcaccatgaccacagacacatccacgagcacagcctcatggaactg aggagcctgagatctgacgacacgcccgtatattctgtgcgagagattac ccgtatagtgaggagctacgctcatgactcctggggccagggaaccttatc acggtctcctcagcctccacacagagcccatccgtcttcccctgacccgctg ctgcaaaaacat
59	A26	TP3	12	productive	Homsap IGHV1-18*01 F	95.88477	Homsap IGHJ4*02 F	83.33	Homsap IGH1- 26*01 F	14	CARDYPYSGSYA HDSW	tcctcagtgaaaggtctctgcaaggcttctgattacacctttaccagctatgcta tcagctgggtgcgacaggcccctggacaagggttgagtgatgggatgg atcaacgcttacaaatggtaaggcaaaactatgacagaaacctccagggcag agtcaccatgaccacagacacatccacgagcacagcctcatggaactg aggagcctgagatctgacgacacgcccgtatattctgtgcgagagattac ccgtatagtgaggagctacgctcatgactcctggggccagggaaccttatc acggtctcctcagcctccacacagagcccatccgtcttcccctgacccgctg ctgcaaaaacat

60	A26	TP3	13	productive	Homsap IGHV3-23*04 F	84.72222	Homsap IGHJ5*02 F	96.08	Homsap IGHD3- 22*01 F	20	CAKGGRISMIVVV PQQNWFDPW	tctcagtgaaaggtttcctgcaaggcgagtcctcagagactccccgggctttt ggggtccctgagactctcctgtgcaggactgtgtgggttcaccagcgagg acagtgggtccctgagactctcctgtgcagggtcttcagagactccccgg gcttttggggtccctgagactctcctgtgcagcctctggattcagtttgcacc tatgcatgagctgggtccgccaaggctccagggaagggtggagtggt ctcaggtattagtgggagtggtgtagcacatattacgcagactccgtgaa gggccggttcaccatctccagagacaactccaagaacacgctgtatctgca aatgaacagcctgagagccgaggacacggccttatattactgtgcgaaag gtggtagaattagtagatcggtgggttcctcaacagaactgggtcgacccc tggggccagggaaccctgggtcgccgtctcctcagcctccacacagagccc atccgtcttcccttgacccgctgctgcaaaaacat
61	A26	TP3	16	productive	Homsap IGHV1-18*01 F	95.86777	Homsap IGHJ4*02 F	83.33	Homsap IGHD1- 26*01 F	14	CARDYPYSGSYA HDSW	cctcagtgaaaggtttcctgcaaggcttctgattacaccttaccagctatgctat cagctgggtgcgacaggcccctggacaagggttgagtggatgggatgg atcaacgcttacaatggtaaggcaaaactatcacagaacctccagggcag agtcacatgaccacagacacatccacgagcacagcctacatggaactg aggagcctgagatctgacgacacggccgtatatttctgtgcgagagattac ccgtatagtgggagctacgctcatgactcctgggccagggaacccctatc accgtctctcagcctccacacagagcccatccgtcttcccttgacccgctg ctgcaaaaacata

Table S7. Overview of IgE VH sequences obtained before (TP1: blue) and after (TP3: red) the birch pollen season for the different patients. Germline sequence identities are shown for each IgE VH sequence (right).

Donor ID	N	TP	V-GENE and allele	V-REGION identity %
B1	1	1	IGHV4-31*11	88,6
	2	3	IGHV3-48*03	92,3
	3	3	IGHV1-8*01	94,6
	4	3	IGHV1-8*01	94,5
	5	3	IGHV3-9*01	98,8
	6	3	IGHV3-9*01	99,2
B2	7	1	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,1
	8	1	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,9
	9	1	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	96,1
	10	1	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	87,3
	11	1	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	87,3
	12	1	IGHV3-30*01, or IGHV3-33*09	93,8
	13	3	IGHV3-21*01, or IGHV3-21*02 or IGHV3-21*05	94,1
	14	3	IGHV3-21*01, or IGHV3-21*02 or IGHV3-21*05	93,9
	15	3	IGHV3-21*01, or IGHV3-21*02	92,7
	16	3	IGHV3-30*03, or IGHV3-30*18 or IGHV3-30-5*01	93,9
	17	3	IGHV3-30*03, or IGHV3-30*18 or IGHV3-30-5*01	93,9
	18	3	IGHV3-30*03, or IGHV3-30*18 or IGHV3-30-5*01	93,9
	19	3	IGHV4-39*07	90,1
B3	20	1	IGHV3-49*03, or IGHV3-49*05	90,3
	21	1	IGHV3-49*03, or IGHV3-49*05	90,4
	22	1	IGHV3-49*03, or IGHV3-49*05	91,2
	23	1	IGHV3-49*03, or IGHV3-49*05	79,3
	24	3	IGHV5-10*1*01, or IGHV5-10-1*03	92,2
	25	3	IGHV5-10*1*01, or IGHV5-10-1*03	93,4
	26	3	IGHV5-10*1*01, or IGHV5-10-1*03	93,7
B10	27	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	88,8
	28	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	88,8
	29	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	88,4
	30	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	88,4
	31	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	89,3
	32	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	87,7
	33	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	89,3
	34	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	88,8
	35	1	IGHV1-69*04, or IGHV1-69*09 or IGHV1-69*10	89,3
	36	1	IGHV3-11*01	88,5
	37	1	IGHV3-11*01	88,5
	38	1	IGHV3-11*01	88,5
	39	1	IGHV3-11*01	88,5
	40	1	IGHV3-11*01	88,5
	41	1	IGHV3-11*01	88,1
	42	1	IGHV3-11*01	80,2
	43	1	IGHV3-11*01	88,5
	44	1	IGHV3-11*01	88,5
	45	1	IGHV3-11*01	80,2
	46	1	IGHV3-11*01	88,5
A26	47	1	IGHV3-11*01	88,5
	48	1	IGHV3-11*01	88,5
	49	1	IGHV5-51*01	93,3
	50	3	IGHV1-18*01	95,9
	51	3	IGHV1-18*01	95,5
	52	3	IGHV1-18*01	95,9
	53	3	IGHV1-18*01	95,9
	54	3	IGHV1-18*01	95,9
	55	3	IGHV1-18*01	95,9
	56	3	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,5
	57	3	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,5
	58	3	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,1
	59	3	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,1
	60	3	IGHV3-23*01, or IGHV3-23*04 or IGHV3-23D*01	95,1
	61	3	IGHV3-23*04	84,7

IGHV1-8

IGHV1-18

IGHV1-69

IGHV3-9

IGHV3-11

IGHV3-21

IGHV3-23

IGHV3-30

IGHV3-48

IGHV3-49

IGHV4-31

IGHV4-39

IGHV5-10-1

IGHV5-51

Figure S7. Alignments of amino acid sequences of the IgE VH sequences obtained before (TP1: blue) and after the birch pollen season (TP3: red) for each donor. The alleles of the IGHC genes are indicated near the sequences, CDR1, CDR2 and CDR3 regions are coloured in yellow, red and blue, respectively. Alignments were build using MUSCLE algorithm using the Unipro UGENE package. A + indicates when 2 sequences share the same amino acid at a given position.

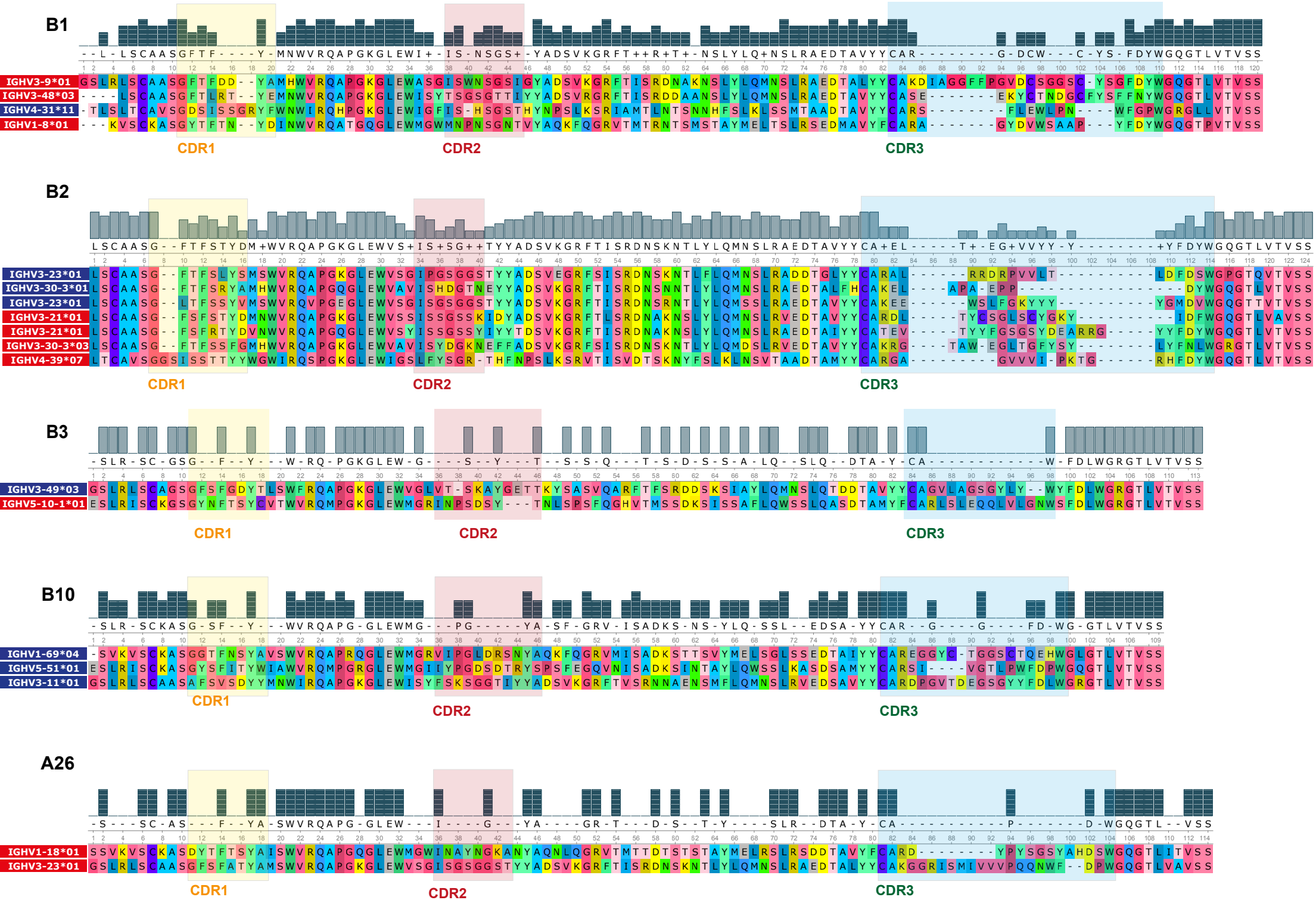


Figure S8. Alignments of amino acid sequences of the IgE VH sequences obtained in 2019 and 2021 in this study in Moscow and in the years 2002-2005 in Vienna by K. Marth et al. [34] The alleles of the IGHC genes are indicated near the sequences, CDR1, CDR2 and CDR3 regions are colored in yellow, red and blue, respectively. Sequences are indicated with donor ID, time and sequence N, corresponding Figure 4C. Sequences obtained by Marth et al., start with GQ and are numbered as submitted to Genbank (<https://www.ncbi.nlm.nih.gov/nuccore>). Alignments were build using MUSCLE algorithm using the Unipro UGENE package. A + indicates when 2 sequences share the same amino acid at a given position.

