Table S1. These thirteen residues are in complete LD with each other, and hence identical frequency distributions and association results.

			Control[1]	Patient[1]	OR	Z	p	Fisher's
1	α31	E	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		Q	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
2	α37	E	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		G	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
3	α47	L	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		V	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
4	α48	F	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		L	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
5	α50	Q	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	4.24E-16
		R	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	
6	α72	I	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		S	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
7	α104	I	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	4.24E-16
		T	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	
8	α153	F	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		L	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
9	α158	D	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		E	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
10	α160	I	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		S	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
11	α172	E	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	4.24E-16
		K	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	
12	α212	F	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	4.24E-16
		L	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	
13	β135	D	153 (12.03)	485 (25.21)	2.10	9.26	1.96E-20	4.24E-16
		G	78 (6.13)	47 (2.44)	0.40	-5.20	2.00E-07	

Table S2. Associations of identified DQ8/9 and DQ2 motifs with their respective aminoacids (top two row panels), together with their intersection and union of aminoacids (bottom two row panels), with six autoantibody levels (six column panels). In each panel, estimated frequencies and their percentages among those negative and positive autoantibody levels, estimated ratio of odds, Z score and p-value. P-values are highlighted green or red, if they are significantly positive or negative, respectively, at the significance level of 5%.

	IAA					GADA					IA2A					ZnT8RA					ZnT8WA					ZnT8QA				
	Neg (%)	Pos (%)	OR	Z	p	Neg (%)	Pos (%)	OR	Z	p	Neg (%)	Pos (%)	OR	Z	p	Neg (%)	Pos (%)	OR	Z	p	Neg (%)	Pos (%)	OR	Z	p	Neg (%)	Pos (%)	OR	Z	p
A) DQ8/9 Carriers																														
QAD	567 (43.35)	271 (43.99)	1.01	0.31	7.54E-01	351 (47.05)	487 (41.34)	0.88	-2.90	3.70E-03	108 (28.72)	730 (47.16)	1.64	7.63	2.40E-14	373 (44.4)	465 (42.9)	0.97	-0.78	4.35E-01	385 (41.58)	453 (45.39)	1.09	1.99	4.68E-02	553 (43)	285 (44.67)	1.04	0.82	4.12E-01
QDD	13 (0.99)	16 (2.6)	2.61	2.71	6.65E-03	9 (1.21)	20 (1.7)	1.41	0.87	3.85E-01	5 (1.33)	24 (1.55)	1.17	0.32	7.51E-01	11 (1.31)	18 (1.66)	1.27	0.63	5.28E-01	15 (1.62)	14 (1.4)	0.87	-0.39	6.94E-01	19 (1.48)	10 (1.57)	1.06	0.15	8.78E-01
B) DQ2 Carriers																														
CAD	337 (25.76)	148 (24.03)	0.93	-0.86	3.92E-01	140 (18.77)	345 (29.29)	1.56	5.41	6.35E-08	142 (37.77)	343 (22.16)	0.59	-6.53	6.55E-11	227 (27.02)	258 (23.8)	0.88	-1.69	9.17E-02	248 (26.78)	237 (23.75)	0.89	-1.60	1.10E-01	345 (26.83)	140 (21.94)	0.82	-2.43	1.53E-02
KAG	28 (2.14)	13 (2.11)	0.99	-0.04	9.65E-01	10 (1.34)	31 (2.63)	1.96	1.93	5.34E-02	6 (1.6)	35 (2.26)	1.42	0.81	4.18E-01	18 (2.14)	23 (2.12)	0.99	-0.03	9.74E-01	21 (2.27)	20 (2)	0.88	-0.40	6.86E-01	25 (1.94)	16 (2.51)	1.29	0.82	4.15E-01
C) Carriers of either DQ8/9 , DQ2 or both																														
CAD	337 (25.76)	148 (24.03)	0.93	-0.86	3.92E-01	140 (18.77)	345 (29.29)	1.56	5.41	6.35E-08	142 (37.77)	343 (22.16)	0.59	-6.53	6.55E-11	227 (27.02)	258 (23.8)	0.88	-1.69	9.17E-02	248 (26.78)	237 (23.75)	0.89	-1.60	1.10E-01	345 (26.83)	140 (21.94)	0.82	-2.43	1.53E-02
KAG	28 (2.14)	13 (2.11)	0.99	-0.04	9.65E-01	10 (1.34)	31 (2.63)	1.96	1.93	5.34E-02	6 (1.6)	35 (2.26)	1.42	0.81	4.18E-01	18 (2.14)	23 (2.12)	0.99	-0.03	9.74E-01	21 (2.27)	20 (2)	0.88	-0.40	6.86E-01	25 (1.94)	16 (2.51)	1.29	0.82	4.15E-01
QAD	567 (43.35)	271 (43.99)	1.01	0.31	7.54E-01	351 (47.05)	487 (41.34)	0.88	-2.90	3.70E-03	108 (28.72)	730 (47.16)	1.64	7.63	2.40E-14	373 (44.4)	465 (42.9)	0.97	-0.78	4.35E-01	385 (41.58)	453 (45.39)	1.09	1.99	4.68E-02	553 (43)	285 (44.67)	1.04	0.82	4.12E-01
QDD	13 (0.99)	16 (2.6)	2.61	2.71	6.65E-03	9 (1.21)	20 (1.7)	1.41	0.87	3.85E-01	5 (1.33)	24 (1.55)	1.17	0.32	7.51E-01	11 (1.31)	18 (1.66)	1.27	0.63	5.28E-01	15 (1.62)	14 (1.4)	0.87	-0.39	6.94E-01	19 (1.48)	10 (1.57)	1.06	0.15	8.78E-01

Table S3. Three linkage-disequilibrium sets (LD set) present in both DQ8/9 and DQ2 clusters, and associated residues and their motifs

Cluster	Lead		Property	α22	α23	α31	α37	α44	α47	α48	α49	α50	α51	α53	α54	α72	α73	α104	α153	α158	α160	α172	α184	α212	β135
DQ8/9	α44	C																							
		K	resistant	F	T			**K**			H		L	F	-		L						A		
		Q	risk	Y	S			**Q**			R		F	R	F		V						T		
DQ2	α44	C	risk	Y				**C**			R		F												
		K	resistant	F				**K**			H		L												
		Q	risk	Y				**Q**			R		F												
DQ2	β135	D	risk			Q	G		V	L		Q				S		I	L	E	S	K		F	**D**
		G	risk/resistant			E	E		L	F		R				I		T	F	D	I	E		L	**G**

LD set 1: α44, α22, α23, α49, α51, α53, α54, α73, α184

LD set 2: α22, α44, α49, α51

LD set 3: α31, α37, α47, α48, α50, α72, α104, α153, α158, α160, α172 and α212