

Second HLA-A Allele	UParis (A29 EUR Carriers)			GHS cohort #1 (A29 EUR)			GHS cohort #2 (A29 EUR)			UKB (A29 EUR)		
	Cases n=286	Ctrls n=108	OR (LCI-UCI) p-val	Carriers n=4014	OR (LCI-UCI) p-val	Carriers n=2829	OR (LCI-UCI) p-val	Carriers n=38,543	OR (LCI-UCI) p-val	Carriers n=38,543	OR (LCI-UCI) p-val	
A*01:01 (29,30,31,32,33)	41	4	3.44 (1.38-97.53) 2.23E-03	247	2.63 (1.43-3.76) 1.29E-05	164	2.69 (1.48-3.92) 1.07E-08	2410	2.51 (1.76-3.82) 0.00000000	2410	2.51 (1.76-3.82) 0.00000000	
A*02:01	13	1	5.38 (0.76-282.84) 0.12	45	4.31 (1.41-12.6) 0.16E-05	20	6.60 (2.98-14.3) 0.00000000	346	4.60 (2.99-8.09) 0.00000000	346	4.60 (2.99-8.09) 1.28E-05	
A*03:01	0	0	inf (0.77-inf) 0.67	39	3.43 (1.48-7.23) 0.00000000	32	2.93 (1.18-6.89) 0.02	253	4.99 (2.16-11.56) 0.00000000	253	4.99 (2.16-11.56) 1.63E-04	
A*03:01	26	15	0.63 (0.31-1.35) 0.20	592	0.59 (0.38-0.90) 0.01	380	0.63 (0.40-0.97) 0.03	5497	0.60 (0.38-0.90) 0.00000000	5497	0.60 (0.38-0.90) 0.01	
A*01:01	71	17	1.81 (0.99-3.48) 0.04	662	1.73 (1.29-2.31) 2.67E-04	448	1.74 (1.28-2.33) 0.00000000	7411	1.39 (1.05-1.83) 0.02	7411	1.39 (1.05-1.83) 0.02	
A*02:01	0	0	inf (0.34-inf) 0.10	193	3.29 (1.94-5.63) 0.00000000	105	3.27 (1.68-6.82) 0.00000000	1323	6.30 (3.96-10.0) 0.00000000	1323	6.30 (3.96-10.0) 0.00000000	
A*02:01	64	24	1.03 (0.59-1.85) 1.00	1085	0.80 (0.59-1.08) 0.14	756	0.78 (0.57-1.04) 0.09	10680	0.75 (0.56-1.00) 0.05	10680	0.75 (0.56-1.00) 0.05	
A*24:02	10	1	3.48 (0.86-173.12) 0.30	48	3.87 (1.37-10.2) 0.00000000	37	2.70 (1.18-5.81) 0.02	780	3.83 (2.46-5.92) 0.00000000	780	3.83 (2.46-5.92) 0.00000000	
A*26:01	8	3	1.03 (0.24-6.13) 1.00	115	1.00 (0.42-2.07) 1.00	91	0.85 (0.35-1.78) 0.86	834	1.30 (0.55-2.62) 0.41	834	1.30 (0.55-2.62) 0.41	
A*25:01	3	2	0.57 (0.06-6.96) 0.62	101	0.42 (0.08-1.28) 0.16	47	0.62 (0.12-1.94) 0.62	673	0.60 (0.12-1.77) 0.50	673	0.60 (0.12-1.77) 0.50	
A*24:02	23	11	0.79 (0.35-1.86) 0.55	356	0.92 (0.57-1.44) 0.83	249	0.89 (0.55-1.40) 0.74	2801	1.12 (0.69-1.72) 0.57	2801	1.12 (0.69-1.72) 0.57	
A*01:01	0	2	1.78 (0.36-16.65) 0.73	119	1.13 (0.59-2.19) 0.71	76	1.19 (0.51-2.39) 0.67	1418	4.20 (2.54-6.92) 0.00000000	1418	4.20 (2.54-6.92) 0.00000000	
A*11:01	14	10	0.52 (0.21-1.34) 0.16	255	0.78 (0.41-1.36) 0.44	177	0.76 (0.40-1.33) 0.44	2278	0.82 (0.44-1.40) 0.61	2278	0.82 (0.44-1.40) 0.61	
A*23:01	6	2	1.16 (0.20-11.91) 1.00	94	0.92 (0.33-2.10) 1.00	61	0.96 (0.34-2.24) 1.00	672	1.21 (0.44-2.68) 0.65	672	1.21 (0.44-2.68) 0.65	
A*68:01	9	8	0.42 (0.14-1.27) 0.09	128	1.01 (0.45-2.01) 0.86	100	0.87 (0.38-1.76) 0.87	1142	1.07 (0.48-2.06) 0.86	1142	1.07 (0.48-2.06) 0.86	
A*19 all (29,30,31,32,33)	44	8	2.07 (0.92-4.64) 0.08	399	1.49 (1.02-2.18) 0.04	269	1.58 (1.07-2.34) 0.02	3739	1.51 (1.04-2.18) 0.03	3739	1.51 (1.04-2.18) 0.03	

Figure 1

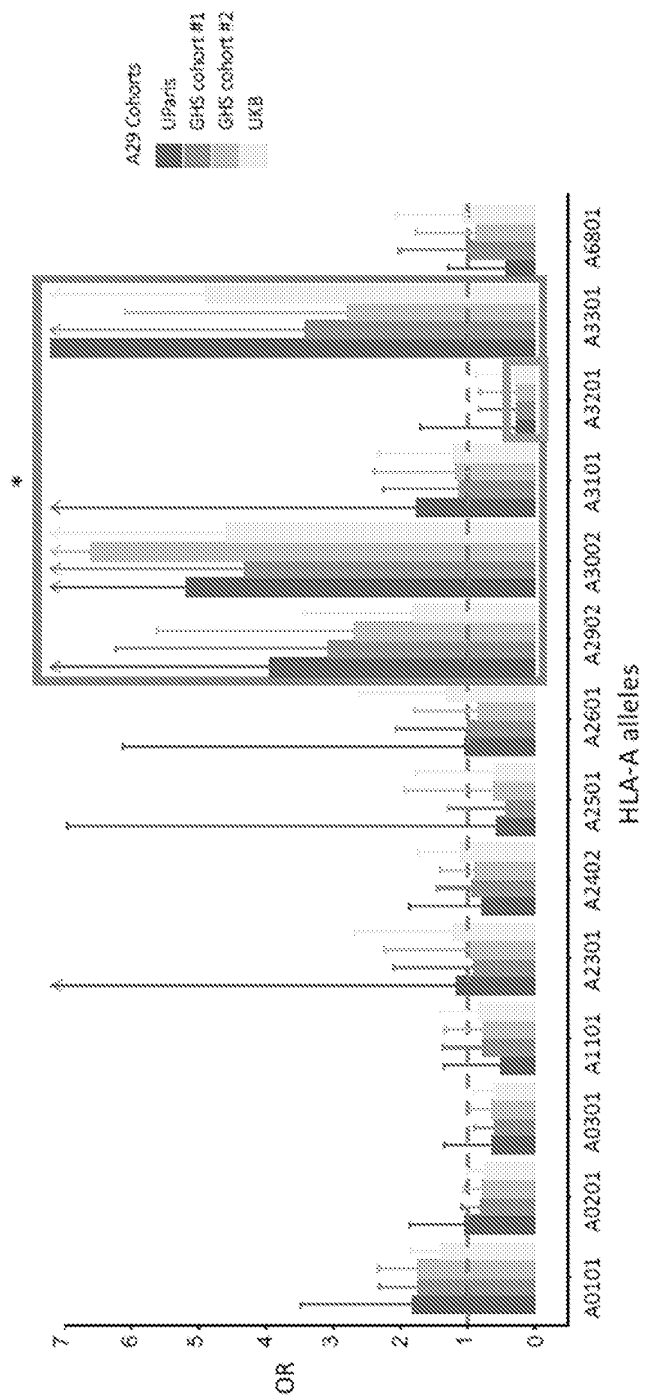


Figure 2

Second HLA-A Allele	UParis (A29 EUR Carriers)				GHS cohort #1 (A29 EUR)				GHS cohort #2 (A29 EUR)				UKB* (A29 EUR)			
	Cases n=286	Ctrls n=108	OR (LCI-UCI)	p-val	Carriers n=4014	OR (LCI-UCI)	p-val	Carriers n=2829	OR (LCI-UCI)	p-val	Carriers n=38,543	OR (LCI-UCI)	p-val			
A*01:01 [29,30,31,32,33]	41	4	4.05 (1.40-11.77)	0.01	247	2.21 (1.47-3.33)	1.58E-04	164	2.49 (1.53-3.91)	2.54E-06	2416	2.24 (1.52-3.30)	4.57E-05			
A*02:01	43	1	4.32 (0.55-33.79)	0.16	45	2.78 (1.31-5.93)	7.59E-03	29	4.28 (1.83-9.92)	7.58E-04	365	4.91 (2.55-7.84)	4.99E-05			
A*03:01	9	0	8.24 (0.40-163.46)	0.36	39	3.12 (1.23-7.88)	0.01	32	2.69 (1.18-6.20)	0.02	255	2.59 (1.50-4.51)	0.14			
A*03:01	26	15	0.71 (0.35-1.45)	0.35	592	0.69 (0.45-1.06)	0.11	380	0.72 (0.46-1.14)	0.16	5497	0.65 (0.43-1.01)	0.05			
A*01:01	71	17	1.84 (1.01-3.35)	0.05	662	1.57 (1.15-2.16)	0.00	448	1.59 (1.15-2.19)	0.01	7411	1.82 (1.35-2.45)	0.00			
A*23:01	3	4	0.22 (0.06-1.04)	0.36	152	0.30 (0.09-0.93)	4.58E-02	105	0.22 (0.08-0.53)	2.62E-02	1323	0.28 (0.08-0.99)	3.35E-02			
A*02:01	64	24	0.97 (0.56-1.68)	0.92	1085	0.87 (0.64-1.20)	0.41	756	0.87 (0.63-1.20)	0.41	10680	0.82 (0.61-1.11)	0.20			
A*23:02	10	1	3.25 (0.40-26.32)	0.27	43	1.83 (0.50-6.29)	0.15	37	1.84 (0.54-6.46)	0.12	753	2.10 (1.05-4.23)	0.04			
A*26:01	8	3	1.09 (0.28-4.26)	0.90	115	0.87 (0.39-1.91)	0.72	91	0.91 (0.40-2.09)	0.82	834	0.73 (0.33-1.61)	0.44			
A*25:01	3	2	0.55 (0.08-3.61)	0.54	101	0.57 (0.16-2.01)	0.38	47	0.69 (0.18-2.62)	0.59	673	0.66 (0.20-2.15)	0.49			
A*24:02	23	11	0.85 (0.39-1.85)	0.67	356	0.99 (0.61-1.61)	0.97	249	1.06 (0.65-1.74)	0.81	2801	1.00 (0.63-1.59)	0.99			
A*01:01	9	2	1.75 (0.37-8.33)	0.46	115	1.42 (0.58-2.97)	0.36	75	1.57 (0.72-3.41)	0.26	1916	1.24 (0.58-2.64)	0.57			
A*11:01	14	10	0.55 (0.23-1.34)	0.19	255	0.81 (0.45-1.48)	0.50	177	0.83 (0.45-1.53)	0.54	2278	0.82 (0.46-1.45)	0.49			
A*03:01	6	2	1.06 (0.21-5.47)	0.94	94	0.85 (0.34-2.17)	0.74	61	0.73 (0.28-1.95)	0.53	672	0.85 (0.35-2.10)	0.73			
A*68:01	9	8	0.42 (0.16-1.15)	0.09	128	0.95 (0.45-2.04)	0.90	100	0.76 (0.35-1.67)	0.50	1142	1.43 (0.70-2.91)	0.33			
A*01:01 [29,30,31,32,33]	44	8	2.07 (0.92-4.64)	0.08	399	1.49 (1.02-2.18)	0.04	269	1.58 (1.07-2.34)	0.02	3739	1.51 (1.04-2.19)	0.03			

Figure 3

Gene	Variant	Variant type	Study	OR (LCI-UCI)	p-value	Hom OR	Case MAF	Control MAF	Meta OR (LCI-UCI)	Meta p-value
ERAP2-LNPEP	rs10044354 5:96984791:C:T	Intronic	Kuiper et al.	2.3 (1.69-3.61)	1.21E-06		0.63	0.42	1.95 (1.55-2.44)	6.20E-09
			UParis	1.55 (1.13-2.11)	5.80E-03	2.6 (1.3-5.15)	0.52	0.41		

Figure 4

Gene	Variant	Variant type	Study	OR (LCI-UCI)	p-value	Hom OR	Case MAF	Control MAF	Meta OR (LCI-UCI)	Meta p-value
ERAP2	rs2248374 5:96900192:A:G	Splice region	Kuiper et al.	0.44 (0.31-0.63)	6.60E-06		0.33	0.53	0.56 (0.45-0.70)	2.39E-07
			UParis	0.68 (0.5-0.92)	1.40E-02	0.45 (0.23-0.87)	0.43	0.53		

Figure 5

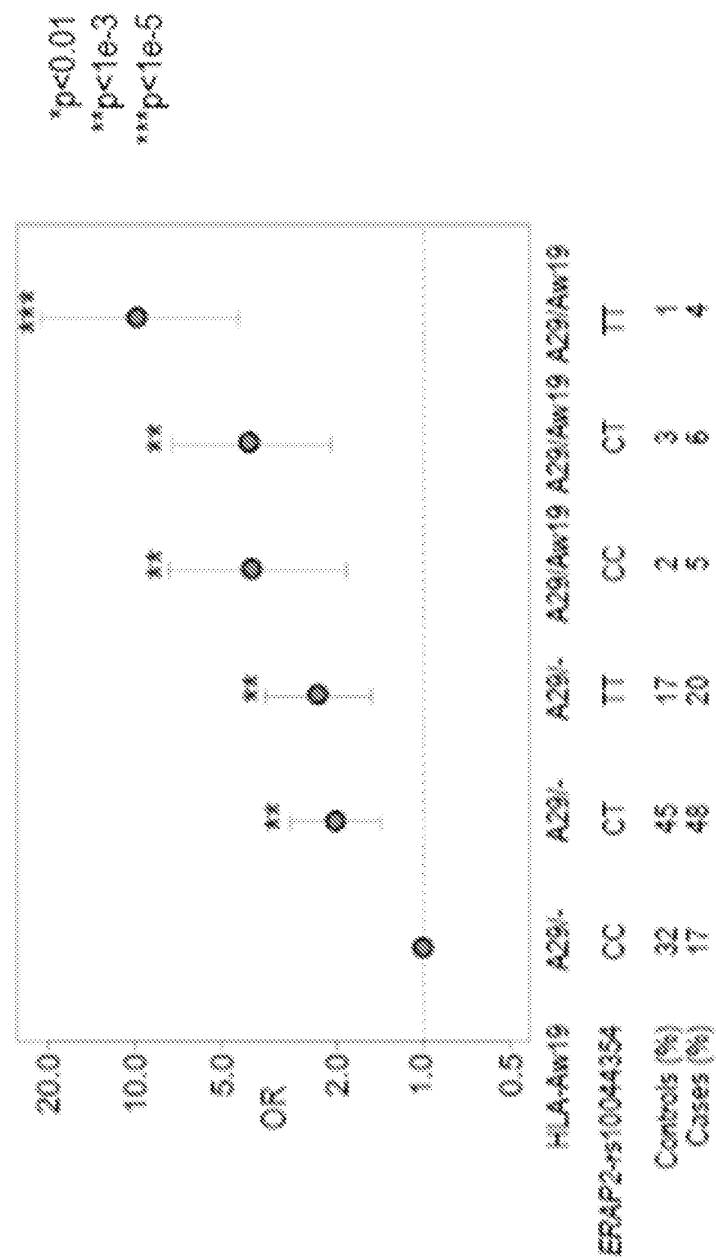


Figure 6

Aw19	ERAP2- rs10044354	case_n	contr_n	case_F	controlF	OR	OR CI_low	OR CI_high	P
A29/-	CC	46	1296	0.167	0.319	1.000	NA	NA	NA
A29/-	CT	132	1842	0.478	0.453	2.019	1.421	2.911	3.95E-05
A29/-	TT	56	681	0.203	0.167	2.316	1.522	3.539	4.51E-05
A29/Aw19	CC	13	94	0.047	0.023	3.891	1.861	7.644	2.13E-04
A29/Aw19	CT	17	119	0.062	0.029	4.019	2.092	7.413	2.32E-05
A29/Aw19	TT	12	34	0.043	0.008	9.902	4.378	21.197	1.16E-07

Figure 7

