

## SUPPLEMENTARY MATERIAL

Supplementary Table 1.A: Healthy Controls

Subject		2	5	6	7	8	9	15	16	18	19	26	27	28	29	30	31	49
sex		1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	1	2
age		58	52	31	51	64	34	57	47	64	45	32	48	53	33	63	27	31
atopy		No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No
slgE	Apis mellifera	0.01	0.01	0.06	0.69	0.01	0.03	0.01	0.01	0.02	0.01	0	0.01	0	0.01	0.01	0.07	0
	Apis m 1	0	0	1.79	0.27	0	0.1	0.01	0	0.09	0.01	0	0	0	0	0	0	0
	Apis m 2	0	0	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0
	Apis m 3	0	0	0	0.1	0	0.01	0	0	0	0	0	0	0	0	0	0	0
	Apis m 4	0	0	0	0.06	0	0.01	0	0	0	0	0.02	0.01	0	0	0.01	0	0.01
	Apis m 5	0	0	0.01	3.69	0.02	0.02	0	0	0.01	0.01	0	0	0	0	0	0	0
	Apis m 10	0.01	0	0.02	0.17	0.02	0.02	0	0	0	0.01	0	0	0	0	0.01	0	0
slgG4	Apis mellifera	0.117	0	0.023	0.045	0.099	0.006	0.024	1.178	0.019	0.044	0.026	0.016	0.006	0.007	0.015	0.052	0
	Apis m 1	0.006	0	0.132	0.008	0.022	0.011	0.074	0.042	0.038	0.085	0.036	0.017	0	0	0.005	0.005	0
	Apis m 2	0.005	0	0	0.019	0.012	0.048	0.010	0.018	0.008	0.026	0.016	0.006	0	0	0	0.001	0
	Apis m 3	0.013	0	0.013	0.013	0.020	0.000	0.010	0.016	0.011	0.024	0.026	0.010	0	0	0.001	0	0
	Apis m 4	0.158	0.242	0.026	0.126	0.036	0.223	0.018	0.049	0.024	0.057	0.036	0.014	0	0	0	0.006	0
	Apis m 5	0.0471	0.0133	0.031	0.077	0.053	0	0.033	0.049	0.025	0.046	0.030	0.014	0.002	0.005	0.014	0.018	0.006
	Apis m 10	0.028	0	0.018	0.019	0.036	0.005	0.016	0.033	0.013	0.043	0.056	0.018	0.002	0.011	0.015	0	0
BAT	HLA-DR (0.1 mg/ml)	27.5	11.8	9	16.7	19.2	23.1	35	11.4	21.3	35.7	22.9	17.4	21.7	24	16.3	15.4	25.6
	CD63+ (0.1 mg/ml)	0.7	1.3	4.6	1.5	1.6	1.1	0.4	2.8	0	0.2	0.4	1.4	0.5	0.4	0.6	0.3	0.1
	HLA-DR (1 mg/ml)	31	15.2	11.3	13.3	25.4	23.6	38.5	13.9	15.8	38.4	19.2	17.6	25.6	24.3	21	14	27.1
	CD63+ (1 mg/ml)	0.5	1.6	2.5	1.2	0.7	2.2	1	2.3	0.1	0.4	1.3	0.4	1.1	0.2	1.7	0.4	0.4
CYTOKINES	TH1 (0.1 mg/ml)	15	11.6	8.3	15.5	9.3	8.2	16.8	17	11.8	15.9	20.6	1.6	10.5	10.9	7.8	18.3	2.5
	TH2 (0.1 mg/ml)	0.5	0.5	0	0.3	0.9	0.6	0.8	1.5	2	1.8	1.5	0.1	1.7	0.7	0.4	0.6	0
	TH17 (0.1 mg/ml)	1.5	1.7	0.2	0.1	0.7	1.2	0.8	1	0.9	0.8	0.9	0.9	0.7	0.9	0.5	0.9	0.6
	TH1 (1 mg/ml)	15.5	11.7	4.4	3.7	10.3	8.6	20.5	23.7	11.9	8	17.1	23.3	11.4	13.8	9.4	16.6	2.6
	TH2 (1 mg/ml)	0.7	0.2	0.2	0.1	0.9	0.3	0.7	2.2	1.9	0.1	0.9	0.8	1	0.8	0.6	0.3	0
	TH17 (1 mg/ml)	1.1	1.4	0.4	0.1	0.9	0.5	1	1.1	0.7	0.1	0.6	1.2	0.6	1.2	0.6	0.7	0.4
CTLA-4+	12	13.2	11.3	23.2	7.7	0.6	3	4.2	46.7	50.6	18.6	14.7	15.6	19	13.7	20.2	6.9	
IL-10	10.457	59.071	45.285	32.027	37.823	n.d.	26.957	3.26	4.11	11.076	21.645	87.882	59.761	98.353	27.289	31.111	26.623	
IL-4	145.156	145.345	169.543	778.739	104.876	n.d.	471.606	362.3	504.373	528.277	212.995	179.806	524.807	488.796	244.403	173.452	60.576	
Helios-	93.9	90.7	89.5	91.4	91.6	92.4	95.3	93.3	95.2	95	97.5	97.2	97.9	95.9	94.3	98.5	93.3	

slgE: specific IgE; slgG4: specific IgG4; BAT: basophil activation test. Atopy was defined as aeroallergen or food sensitization.

Supplementary Table 1.B: Allergic Patients

Subject	3	10	11	12	13	14	17	20	21	23	24	45	46	47	48	50	51	52	53	54	
sex	F	M	M	M	M	F	M	F	F	M	M	M	F	M	M	M	M	M	M	M	
age	52	65	49	43	28	25	46	68	41	30	18	51	54	32	21	32	48	40	39	26	
exposure	Beekeeper	Builder	Truck driver	Harvester	Beekeeper	Beekeeper	Beekeeper	Retired	Beekeeper	Beekeeper	Beekeeper	Beekeeper	Teacher	Harvester	Beekeeper	Beekeeper	Beekeeper	Beekeeper	Sealer	Harvester	
exposition time (years)	>10	>10	-	>10	5 to 10	5 to 10	>10	-	>10	>10	<5	>10	-	-	<5	5 to 10	>10	>10	-	5 to 10	
atopy	NO	NO	NO	YES	NO	NO	YES	YES	NO	NO	NO	NO	YES	YES	YES	YES	NO	NO	YES	YES	
anaphylaxis	Grade 3	Grade 3	Grade 2	Grade 3	Grade 3	Grade 2	Grade 3	Grade 3	Grade 2	Grade 3	Grade 3	Grade 2	Grade 2	Grade 3	Grade 3	Grade 2	Grade 3	Grade 3	Grade 2	Grade 3	
rema score	<2	<2	<2	>2	<2	<2	<2	<2	<2	>2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	
slgE	Apis mellifera	36.5	11.7	6.96	0.29	6.75	3.48	7.98	0.37	0.54	0.24	238	0.22	8.4	27.1	16	24.6	1.16	5.88	57.8	8.09
	Apis m 1	36.7	3.31	2.19	0.2	0.63	4.18	0	0.48	0.65	0	88.9	0.16	0.37	4.59	0.09	3.76	0.66	1.55	54.8	0.67
	Apis m 2	0	0	6.12	0	0	0	0	0	0	0	2.56	0	0	0.03	0	0.16	0	0.03	0	2.59
	Apis m 3	0	0.25	0	0	0.17	0	4.66	0	0	0	10.8	0	0	0.02	0.01	4.8	0.06	0.01	0.24	0.07
	Apis m 4	0.18	0.1	0.09	0	0.21	0.16	0.06	0	0	0	2.62	0.02	0.39	5.96	4.23	1.99	0.05	0.3	0.46	0.1
	Apis m 5	0	0.78	0.01	0	1.45	0.07	0.84	0	0	0	11.6	0.01	2.03	0.23	0.42	15.5	0	0.95	0.56	12.3
Apis m 10	0	7.52	1.66	0	0.28	0.2	20.6	0	0.04	0.86	1.54	0.01	0.15	32.3	2.18	125	0	5.8	0.4	37.6	
slgG4	Apis mellifera	286	4481	86.6	19.7	161	6.56	176	112	27	0.06	899	2.26	501	1315	192	996	1406	91	217	1340
	Apis m 1	300	4267	41.4	6.25	39.7	17	40.9	192	76.8	10.3	767	20.7	26.4	2017	24.9	62.3	896	35.3	251	315
	Apis m 2	0.06	69.3	46.6	26.1	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	1.75	0.06	0.06	0.06	0.06	0.06
	Apis m 3	0.06	673	0.06	24.4	0.06	0.06	17.5	0.06	0.06	1.28	5.18	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	11.4
	Apis m 4	12	766	15	21	25	2	50	22	24	12	41	105	124	319	25	28	154	27	31	52
	Apis m 5	7.02	66.8	16.3	41.1	27.2	12.3	34.7	21.7	21.6	13.7	9.51	4.98	0.06	4.24	14	29.8	14.4	53.9	21.5	12.4
Apis m 10	14.6	120	25.3	46.2	1.48	0.06	0.06	0.06	0.06	0.06	4.12	0.96	12.6	54.6	15.4	27.9	11.2	12	25.7	6.36	
BAT	HLA-DR (0.1 mg/ml)	23.9	17.4	18	25.4	28.7	15.5	19.5	13.5	20.6	29.9	15.4	47.5	17.3	39.9	19.2	20.2	15.1	35.7	20.9	95.8
	CD63+ (0.1 mg/ml)	1.9	1.7	0	0.8	0	17.5	6.4	0.2	0.7	1.7	7.6	0.6	0.2	45.4	1.7	7.3	0	6.7	3.1	1.9
	HLA-DR (1 mg/ml)	31.3	24.4	16.5	15.4	27.7	21.5	12.1	4.5	24.3	33.2	18.2	50.5	17.5	43.4	26.6	22.3	16.2	39.6	22.1	95
CYTOKINES	CD63+ (1 mg/ml)	5.8	64.5	5	70.2	65.5	55.2	72.3	60.1	65.7	3.1	78.6	39.9	5.4	77.8	64.2	62.5	68.7	89.6	85.6	54.4
	TH1 (0.1 mg/ml)	11.1	20.2	11	8.1	10.3	12.3	20.2	26.5	10.4	8.3	3.6	19.1	11.8	1.2	1	2.8	6.7	10.4	8.2	23.9
	TH2 (0.1 mg/ml)	0.2	0.9	1.1	0.5	1	0.4	1.2	2.4	0.4	0.8	1.2	1.4	0.9	0.1	0.1	0	0.1	1.5	0.4	3.8
	TH17 (0.1 mg/ml)	0.3	2.1	1.2	0.8	0.6	0.9	0.6	0.8	0.8	1.9	0.5	0.9	0.8	0	0.1	0.3	0.1	0.7	0.3	1.1
	TH1 (1 mg/ml)	17	24.2	11.1	11.7	10.4	14.2	24.7	29.5	8.3	7.9	6	20.5	10.9	2	0.5	4.5	5	8.4	5	19.7
	TH2 (1 mg/ml)	0.7	1.4	0.9	0.6	0.5	0.5	1.1	2.7	0.4	0.5	1.1	1.1	0.8	0	0	0	0	0.8	0.4	2.8
TH17 (1 mg/ml)	1	2.4	1.1	1.1	0.5	1.3	1.2	1	0.8	1.9	0.8	1.1	1.1	0.1	0.1	0.3	0.1	0.3	0.1	0.8	
CTLA-4+	0	0.4	2.2	14.7	0	17.7	5.9	10.6	31.8	5	32	24	30.2	12.7	7.5	3.4	2.4	18.2	16.7	9.6	
IL-10	n.d.	n.d.	n.d.	16,254	30,181	18,031	5,793	23,495	33,818	24.21	32,027	64,736	6,755	14,353	41,097	19.69	6.69	9.27	9.8	17.18	
IL-4	n.d.	n.d.	n.d.	277.41	248,057	320,453	325,612	699,852	181,293	300,018	441,856	288,042	202,466	83,804	165,059	142,104	437,619	374,827	331,741	1866.745	
Helios-	54.7	38.4	71	46	46.6	94.7	87	79.6	81.9	82.4	83.4	90.7	94.9	87.3	49.7	37	74.7	67.9	73.4	56.6	
Tryptase (µg/l)	4.18	4.59	3.29	8.79	3.92	3.15	5.98	4.88	1.74	10.2	2.37	4.97	4.76	5.46	10.20	2.94	4.39	4.65	1.60	3.23	

slgE: specific IgE; slgG4: specific IgG4; BAT: basophil activation test. Atopy was defined as aeroallergen or food sensitization.

Supplementary Table 1.C: Tolerant Beekeepers

Subject	1	4	22	25	32	33	34	35	36	37	38	39	40	41	42	43	44
sex	2	1	1	1	1	2	1	1	2	1	1	1	2	1	1	1	1
age	52	65	49	43	28	25	46	68	41	30	18	51	54	32	21	32	48
Sting/year	>200	>200	>200	50	>200	>200	>200	>200	50	>200	>200	>200	>200	>200	>200	>200	50
atopy	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	No	Yes
slgE	Apis mellifera	0.21	0.18	0.94	7.86	0.25	1.33	0.48	1.83	0.28	1.33	1.27	1.67	0.61	0.61	0.24	0.67
	Apis m 1	0.05	0.02	0.23	0.74	0.11	0.13	0.18	0.74	0.1	0.18	0.39	0.68	0.09	0.24	0.08	1.01
	Apis m 2	0.18	0.13	0.34	1.48	0	1.35	0.13	0.52	0.16	0.37	0.24	0.64	0.25	0.65	0.15	0.18
	Apis m 3	0.01	0.02	0.01	0	0	0	0	0.74	0	0.02	0	0	0.02	0	0	0
	Apis m 4	0.01	0.03	0.05	0.05	0.01	0.04	0.03	0.08	0.02	0.1	0.07	0.05	0.24	0.01	0.01	0.02
	Apis m 5	0.03	0.14	0.07	0	0.03	0	0.01	0	0	0.26	0.12	0.12	0.18	0.05	0	0.17
	Apis m 10	0.12	0	0.72	1.08	0.09	0.12	0.01	0.41	0	0.05	0.06	1.27	0.04	0.15	0	0.11
slgG4	Apis mellifera	21.000	18.943	21.980	5.374	27.872	13.442	24.582	2.742	17.130	23.389	29.430	3.689	27.307	29.587	21.387	15.003
	Apis m 1	20.547	13.570	12.741	2.860	17.973	4.155	18.131	2.737	9.692	20.909	24.914	2.381	17.670	20.930	18.043	11.471
	Apis m 2	6.645	3.767	9.737	1.383	9.252	5.174	3.740	0.555	4.689	8.582	9.775	0.021	3.220	9.915	16.866	2.649
	Apis m 3	1.173	1.537	4.836	0.027	0.463	0.003	0.839	0.010	0.340	0.749	2.398	0	1.097	0.291	0.830	0.136
	Apis m 4	13.731	3.935	16.245	0.455	19.354	4.338	4.393	0.470	6.233	12.702	8.047	1.244	16.514	5.839	15.886	2.082
	Apis m 5	1.444	1.032	5.951	0.017	0.924	0.084	0.958	0.008	0.224	1.622	1.168	0.007	2.889	0.556	0.744	0.797
	Apis m 10	1.194	1.621	1.669	0.022	2.890	0.117	1.097	0.034	0.875	1.482	3.576	0.061	0.987	1.470	0.187	0.055
BAT	HLA-DR (0.1 mg/ml)	28.3	17.1	22.7	31.7	14.5	37	59.7	41.5	11.3	37	31.9	50.9	21.4	10.4	23.5	19
	CD63+ (0.1 mg/ml)	0.7	0.9	0.5	0	1.7	0.4	0.6	0	0	0.9	0.8	0	0.5	1	0.2	0.5
	HLA-DR (1 mg/ml)	28.9	20.4	24	33.4	12.5	40.4	61.7	43.6	12.2	40.4	30.4	57.2	22.5	15.5	21.9	23.1
	CD63+ (1 mg/ml)	0.7	1	4.5	28.3	0.4	18.2	0.9	56.9	0	0.8	17.2	9.1	34.3	1.5	0.4	24.2
CYTOKINES	TH1 (0.1 mg/ml)	4.8	4.8	7.9	6.7	8.8	2.6	2.2	5.4	3.5	8.4	8.6	5.6	3.1	2.2	1.9	3.9
	TH2 (0.1 mg/ml)	0.4	0.3	0.2	0.2	1.3	0	0	0.1	0	0.6	0.2	0.2	0.1	0.1	0.1	0.4
	TH17 (0.1 mg/ml)	0.8	0.7	0.6	0.6	0.4	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3
	TH1 (1 mg/ml)	3.7	6.6	7.8	9.9	13.3	2.5	2.2	4.9	4.3	10.5	8.9	6	6.1	2	2	12.8
	TH2 (1 mg/ml)	0.2	0.2	0.1	0.7	2.8	0	0	0	0.1	0.4	0.1	0.1	0.1	0.1	0.1	0.4
	TH17 (1 mg/ml)	0.7	1	0.7	1	0.9	0.2	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.5
CTLA-4+	13.4	1	20.9	16.9	29.2	37.6	39.1	32	50.8	28.4	20.5	32.9	25.8	13.9	24.3	32	
IL-10	11.076	n.d.	58.379	41.365	38.147	37.264	103.695	25.947	72.186	82.326	74.971	30.803	118.275	44.255	56.048	59.302	
IL-4	128.522	n.d.	216.357	421.551	272.709	119.057	394.516	120.827	175.304	683.273	466.935	149.834	201.369	95.311	148.907	433.301	
Helios-	62.7	94.1	76.7	61.1	88	82.4	80.4	88.9	91.5	94.5	77.8	92.5	91	96.1	95.8	98	

slgE: specific IgE; slgG4: specific IgG4; BAT: basophil activation test. Atopy was defined as aeroallergen or food sensitization.