

Online-Only Supplemental Material

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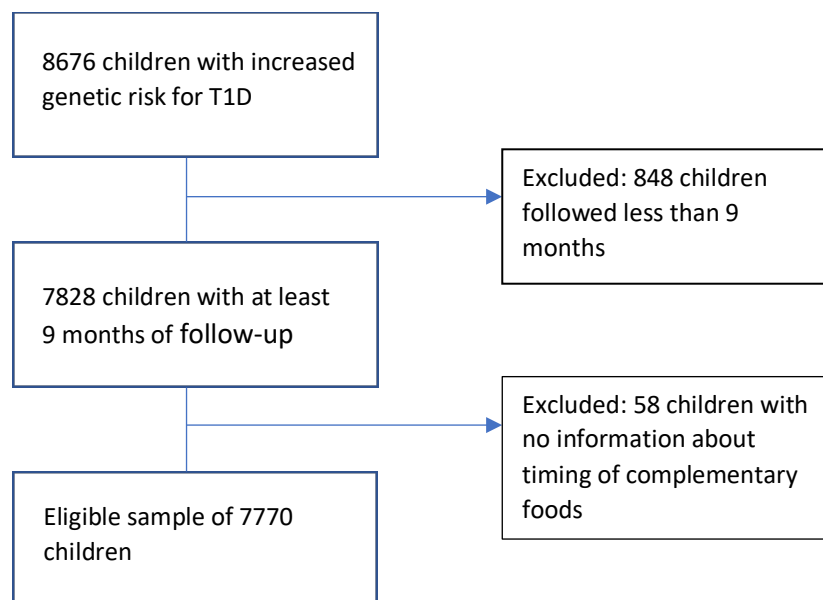
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Supplemental Figure S1. Study population

Supplemental Table S2. Population characteristics, high-risk HLA genotype, and timing of probiotic exposure in association with islet autoimmunity

		Any IA (n= 850)			IAA first (n=311)			GADA first (n=378)			Multiple AAB (n=490)		
Country	N	n(%)	HR (95%CI)	p	n(%)	HR (95%CI)	p	n(%)	HR (95%CI)	p	n(%)	HR (95%CI)	p
-Finland	1697	208 (12.3)	1.37 (1.12,1.67)	0.002	98 (5.8)	2.07 (1.51,2.82)	<0.001	72 (4.2)	0.90 (0.65, 1.23)	0.491	130 (7.7)	1.51 (1.16, 1.95)	0.002
-Germany	532	60 (11.3)	1.13 (0.84,1.52)	0.419	20 (3.8)	1.09 (0.66,1.80)	0.749	19 (3.6)	0.73 (1.00, 1.59)	0.215	42 (7.9)	1.23 (0.86, 1.77)	0.254
-Sweden	2329	292 (12.5)	1.31 (1.11,1.54)	0.002	95 (4.1)	1.32 (0.99,1.75)	0.059	144 (6.2)	1.26 (1.00, 1.59)	0.054	152 (6.5)	1.22 (0.98, 1.52)	0.083
-U.S.	3212	290 (9.0)	1		98 (3.1)	1		143 (4.5)	1		166 (5.2)	1	
First-degree relative with T1D													
-Yes	897	168 (18.7)	1.59 (1.39, 1.82)	<.001	68 (7.6)	1.53 (1.22, 1.91)	<.001	67 (7.5)	1.60 (1.31, 1.96)	<.001	114 (12.7)	2.01 (1.68, 2.41)	<.001
-No	6873	682 (9.9)	1		243 (3.5)	1		311 (4.5)	1		376 (5.5)	1	
Sex of the child													
-Female	3805	383 (10.1)	0.84 (0.73,0.96)	0.010	139 (3.7)	0.82 (0.66, 1.03)	0.087	174 (4.6)	0.87 (0.71, 1.07)	0.178	218 (5.7)	0.82 (0.68, 0.98)	0.026
-Male	3965	467 (11.8)	1		172 (4.3)	1		204 (5.2)	1		272 (6.9)	1	
HLA DR3/4													
-Yes	3042	414 (13.6)	2.04 (1.71, 2.44)	<.001	146 (4.8)	2.40 (1.82, 3.18)	<.001	187 (6.2)	1.85 (1.41, 2.43)	<.001	265 (8.7)	2.52 (2.02, 3.14)	<.001
-No	4728	436 (9.2)	1		165 (3.5)	1		191 (4.0)	1		225 (4.8)	1	
Probiotic, age at first exposure													
≤52 weeks	1712	197 (11.5)	0.94 (0.78, 1.12)	0.481	75 (4.4)	0.83 (0.62, 1.11)	0.215	81 (4.7)	1.04 (0.79, 1.38)	0.777	127 (7.4)	1.02 (0.81, 1.28)	0.877
>52 weeks, or never	6058	653 (10.8)	1		236 (3.9)	1		297 (4.9)	1		363 (6.0)	1	

AAB: autoantibodies

Supplemental Table S3. Duration of breastfeeding or timing of introduction of complementary foods and risk of any IA

Food exposure	Timing in months	Developed IA N (%)	Did not develop IA N (%)	Missing	Adjusted HR* HR (95% CI)	p
Exclusive breastfeeding	<4	664 (10.9)	5407 (89.1)	252	1.00 (0.85, 1.19)	0.984
	>=4	172 (11.9)	1275 (88.1)		1	
Any breastfeeding	<4	193 (9.5)	1843 (90.5)	321	0.92 (0.78, 1.08)	0.325
	>=4	639 (11.8)	4774 (88.2)		1	
Any infant formula	<4	628 (10.7)	5239 (89.3)	969	0.99 (0.75, 1.30)	0.928
	4-<6	46 (10.9)	377 (89.1)		0.92 (0.62, 1.36)	0.688
	>=6	58 (11.4)	453 (88.6)		1	
Any solid foods	<4	304 (10.0)	2728 (90.0)	0	1.09 (0.85, 1.40)	0.504
	4-<6	462 (11.8)	3459 (88.2)		1.18 (0.92, 1.50)	0.193
	>=6	84 (10.3)	733 (89.7)		1	
Cereals	<4	170 (9.1)	1693 (90.9)	24	0.94 (0.75, 1.19)	0.606
	4-<6	535 (11.8)	4016 (88.2)		1.10 (0.90, 1.34)	0.354
	>=6	144 (10.8)	1188 (89.2)		1	
Gluten containing cereals	<4	36 (7.1)	471 (92.9)	134	0.64 (0.46, 0.91)	0.013
	4-<6	322 (12.0)	2359 (88.0)		0.99 (0.84, 1.16)	0.892
	>=6	489 (11.0)	3959 (89.0)		1	
Cereals not containing gluten	<4	162 (9.3)	1579 (90.7)	29	0.94 (0.74, 1.18)	0.574
	4-<6	531 (11.6)	4058 (52.4)		1.05 (0.87, 1.28)	0.596
	>=6	156 (11.1)	1255 (88.9)		1	
Fruit & berries	<4	153 (8.8)	1590 (91.2)	37	0.85 (0.68, 1.05)	0.121
	4-<6	478 (11.8)	3587 (88.2)		1.02 (0.86, 1.21)	0.838
	>=6	216 (11.2)	1709 (88.8)		1	
Root vegetables	<4	151 (10.1)	1345 (89.9)	40	0.92 (0.73, 1.16)	0.475
	4-<6	502 (11.5)	3877 (88.5)		0.99 (0.83, 1.19)	0.950
	>=6	196 (10.6)	1659 (89.4)		1	
Other vegetables than roots	<4	50 (9.5)	475 (90.5)	72	0.96 (0.71, 1.29)	0.778
	4-<6	471 (11.2)	3721 (88.8)		0.99 (0.85, 1.15)	0.888
	>=6	326 (10.9)	2655 (89.1)		1	
Regular cow's milk	<4	29 (6.9)	392 (93.1)	398	0.70 (0.48, 1.01)	0.058
	4-<6	79 (10.6)	668 (89.4)		0.91 (0.72, 1.15)	0.424
	>=6	717 (11.6)	5487 (88.4)		1	
Meat (including all meat, poultry, fish, and seafood)	<4	8 (7.6)	97 (92.4)	146	0.79 (0.39, 1.59)	0.508
	4-<6	313 (11.6)	2392 (88.4)		0.97 (0.82, 1.14)	0.714
	>=6	523 (10.9)	4291 (89.1)		1	
Egg	<=9	568 (11.1)	4550 (88.9)	413	1.00 (0.86, 1.16)	0.946
	>9	261 (11.7)	1978 (88.3)		1	

*Adjusted for country, first degree family member with type 1 diabetes (FDR)- status, sex of the child, high-risk genotype (HLA DR3/4), probiotic exposure during the first year of life (52 weeks)

Supplemental Table S4. Duration of breastfeeding or timing of introduction of complementary foods and risk of IAA first

Food exposure	Timing in months	Developed IA N (%)	Did not develop IA N (%)	Missing	Adjusted HR* HR (95% CI)	p
Exclusive breastfeeding	<4	243 (4.0)	5828 (96.0)	252	0.97 (0.74, 1.28)	0.829
	>=4	65 (4.5)	1382 (95.5)		1	
Any breastfeeding	<4	70 (3.4)	1966 (96.6)	321	0.89 (0.68, 1.16)	0.396
	>=4	237 (4.4)	5176 (95.6)		1	
Any infant formula	<4	228 (3.9)	5639 (96.1)	969	0.88 (0.58, 1.35)	0.559
	4-<6	18 (4.3)	405 (95.7)		0.89 (0.49, 1.65)	0.718
	>=6	25 (4.9)	486 (95.1)		1	
Any solid foods	<4	116 (3.8)	2916 (96.2)	0	1.26 (0.82, 1.94)	0.302
	4-<6	168 (4.3)	3753 (95.7)		1.32 (0.87, 2.02)	0.192
	>=6	27 (3.3)	790 (96.7)		1	
Cereals	<4	65 (3.5)	1798 (96.5)	24	1.03 (0.70, 1.50)	0.900
	4-<6	195 (4.3)	4356 (95.7)		1.15 (0.83, 1.60)	0.389
	>=6	51 (3.8)	1281 (96.2)		1	
Gluten containing cereals	<4	14 (2.8)	493 (97.2)	134	0.69 (0.39, 1.20)	0.188
	4-<6	110 (4.1)	2571 (95.9)		0.90 (0.69, 1.18)	0.455
	>=6	186 (4.2)	4262 (95.8)		1	
Cereals not containing gluten	<4	61 (3.5)	1680 (96.5)	29	0.97 (0.67, 1.41)	0.868
	4-<6	193 (4.2)	4396 (95.8)		1.06 (0.78, 1.46)	0.703
	>=6	57 (4.0)	1354 (96.0)		1	
Fruit & berries	<4	58 (3.3)	1685 (96.7)	37	0.93 (0.65, 1.33)	0.680
	4-<6	181 (4.5)	3884 (95.5)		1.15 (0.86, 1.54)	0.339
	>=6	71 (3.7)	1854 (96.3)		1	
Root vegetables	<4	63 (4.2)	1433 (95.8)	40	1.03 (0.71, 1.50)	0.876
	4-<6	180 (4.1)	4199 (95.9)		1.00 (0.74, 1.36)	0.992
	>=6	68 (3.7)	1787 (96.3)		1	
Other vegetables than roots	<4	17 (3.2)	508 (96.8)	72	0.87 (0.52, 1.45)	0.597
	4-<6	174 (4.2)	4018 (95.8)		1.00 (0.78, 1.27)	0.973
	>=6	119 (4.0)	2862 (96.0)		1	
Regular cow's milk	<4	8 (1.9)	413 (98.1)	398	0.55 (0.27, 1.11)	0.097
	4-<6	28 (3.8)	719 (96.2)		0.92 (0.62, 1.37)	0.697
	>=6	262 (4.2)	5942 (95.8)		1	
Meat (including poultry, fish, and seafood)	<4	2 (1.9)	103 (98.1)	146	0.54 (0.14, 2.20)	0.393
	4-<6	109 (4.0)	2596 (96.0)		0.86 (0.66, 1.12)	0.253
	>=6	198 (4.1)	4616 (95.9)		1	
Egg	<=9	204 (4.0)	4914 (96.0)	413	0.94 (0.74, 1.21)	0.636
	>9	101 (4.5)	2138 (95.5)		1	

*Adjusted for country, first degree family member with type 1 diabetes (FDR)- status, sex of the child, high-risk genotype (HLA DR3/4), probiotic exposure during the first year of life (52 weeks)

Supplemental Table S5. Duration of breastfeeding or timing of introduction of complementary foods and risk of GADA first

Food exposure	Timing in months	Developed IA N (%)	Did not develop IA N (%)	Missing N	Adjusted HR* HR (95% CI)	p
Exclusive breastfeeding	<4	298 (4.9)	5773 (95.1)	252	1.04 (0.81, 1.35)	0.760
	>=4	73 (5.0)	1374 (95.0)		1	
Any breastfeeding	<4	75 (3.7)	1961 (96.3)	321	0.78 (0.61, 1.01)	0.061
	>=4	294 (5.4)	5119 (94.6)		1	
Any infant formula	<4	279 (4.8)	5588 (95.2)	969	0.85 (0.57, 1.27)	0.422
	4-<6	24 (5.7)	399 (94.3)		0.93 (0.53, 1.62)	0.798
	>=6	27 (5.3)	484 (94.7)		1	
Any solid foods	<4	123 (4.1)	2909 (95.9)	0	0.99 (0.68, 1.46)	0.963
	4-<6	219 (5.6)	3702 (94.4)		1.24 (0.86, 1.79)	0.256
	>=6	36 (4.4)	781 (95.6)		1	
Cereals	<4	65 (3.5)	1798 (96.5)	24	0.85 (0.59, 1.22)	0.368
	4-<6	255 (5.6)	4296 (94.4)		1.23 (0.91, 1.67)	0.186
	>=6	57 (4.3)	1275 (95.7)		1	
Gluten containing cereals	<4	13 (2.6)	494 (97.4)	134	0.53 (0.30, 0.95)	0.031
	4-<6	157 (5.9)	2524 (94.1)		1.12 (0.88, 1.42)	0.375
	>=6	207 (4.7)	4241 (95.3)		1	
Cereals not containing gluten	<4	62 (3.6)	1679 (96.4)	29	0.87 (0.60, 1.25)	0.446
	4-<6	255 (5.6)	4334 (94.4)		1.23 (0.91, 1.66)	0.178
	>=6	60 (4.3)	1351 (95.7)		1	
Fruit & berries	<4	62 (3.6)	1681 (96.4)	37	0.75 (0.54, 1.04)	0.089
	4-<6	216 (5.3)	3849 (94.7)		0.99 (0.77, 1.28)	0.965
	>=6	99 (5.1)	1826 (94.9)		1	
Root vegetables	<4	54 (3.6)	1442 (96.4)	40	0.77 (0.53, 1.11)	0.164
	4-<6	236 (5.4)	4143 (94.6)		1.05 (0.80, 1.38)	0.724
	>=6	88 (4.7)	1767 (95.3)		1	
Other vegetables than roots	<4	18 (3.4)	507 (96.6)	72	0.82 (0.50, 1.34)	0.430
	4-<6	220 (5.3)	3972 (94.7)		1.07 (0.86, 1.34)	0.547
	>=6	139 (4.7)	2842 (95.3)		1	
Regular cow's milk	<4	11 (2.6)	410 (97.4)	398	0.55 (0.30, 1.01)	0.053
	4-<6	38 (5.1)	709 (94.9)		0.92 (0.66, 1.30)	0.648
	>=6	323 (5.2)	5881 (94.8)		1	
Meat (including all meat, poultry, fish, and seafood)	<4	2 (1.9)	103 (98.1)	146	0.46 (0.12, 1.86)	0.278
	4-<6	146 (5.4)	2559 (94.6)		1.09 (0.85, 1.40)	0.488
	>=6	228 (4.7)	4586 (95.3)		1	
Egg	<=9	262 (5.1)	4856 (94.9)	413	1.05 (0.83, 1.32)	0.696
	>9	108 (4.8)	2131 (95.2)		1	

*Adjusted for country, first degree family member with type 1 diabetes (FDR)- status, sex of the child, high-risk genotype (HLA DR3/4), probiotic exposure during the first year of life (52 weeks)

Supplemental Table S6. Duration of breastfeeding or timing of introduction of complementary foods and risk of multiple autoantibodies

Food exposure	Timing in months	Developed IA N (%)	Did not develop IA N (%)	Missing N	Adjusted HR* HR (95% CI)	p
Exclusive breastfeeding	<4	380 (6.3)	5691 (93.7)	252	0.97 (0.78, 1.21)	0.807
	>=4	101 (7.0)	1346 (93.0)		1	
Any breastfeeding	<4	115 (5.7)	1921 (94.3)	321	0.94 (0.77, 1.17)	0.593
	>=4	363 (6.7)	5050 (93.3)		1	
Any infant formula	<4	366 (6.2)	5501 (93.8)	969	1.01 (0.71, 1.44)	0.949
	4-<6	21 (5.0)	402 (95.0)		0.75 (0.44, 1.29)	0.300
	>=6	35 (6.9)	476 (93.1)		1	
Any solid foods	<4	168 (5.5)	2864 (94.5)	0	1.06 (0.76, 1.46)	0.744
	4-<6	271 (6.9)	3650 (93.1)		1.23 (0.90, 1.68)	0.195
	>=6	51 (6.2)	766 (93.8)		1	
Cereals	<4	93 (5.0)	1770 (95.0)	24	0.86 (0.63, 1.16)	0.316
	4-<6	306 (6.7)	4245 (93.3)		1.07 (0.84, 1.38)	0.582
	>=6	91 (6.8)	1241 (93.2)		1	
Gluten containing cereals	<4	15 (3.0)	492 (97.0)	134	0.47 (0.28, 0.80)	0.005
	4-<6	180 (6.7)	2501 (93.3)		0.97 (0.78, 1.20)	0.760
	>=6	294 (6.6)	4154 (93.4)		1	
Cereals not containing gluten	<4	89 (5.1)	1652 (94.9)	86	0.88 (0.65, 1.20)	0.420
	4-<6	305 (6.7)	4284 (93.4)		1.07 (0.83, 1.37)	0.608
	>=6	96 (6.8)	1315 (93.2)		1	
Fruit & berries	<4	87 (5.0)	1656 (95.0)	94	0.81 (0.61, 1.06)	0.128
	4-<6	271 (6.7)	3794 (93.3)		0.99 (0.79, 1.24)	0.920
	>=6	131 (6.8)	1794 (93.2)		1	
Root vegetables	<4	82 (5.5)	1414 (94.5)	97	0.85 (0.62, 1.15)	0.282
	4-<6	289 (6.6)	4090 (93.4)		0.98 (0.78, 1.25)	0.892
	>=6	118 (6.4)	1737 (93.6)		1	
Other vegetables than roots	<4	26 (5.0)	499 (95.0)	129	0.83 (0.55, 1.25)	0.374
	4-<6	265 (6.3)	3927 (93.7)		0.95 (0.78, 1.15)	0.594
	>=6	198 (6.6)	2783 (93.4)		1	
Regular cow's milk	<4	19 (4.5)	402 (95.5)	398	0.82 (0.52, 1.31)	0.410
	4-<6	41 (5.5)	706 (94.5)		0.84 (0.61, 1.17)	0.309
	>=6	415 (6.7)	5789 (93.3)		1	
Meat (including poultry, fish, and seafood)	<4	5 (4.8)	100 (95.2)	203	0.80 (0.33, 1.94)	0.619
	4-<6	175 (6.5)	2530 (93.5)		0.97 (0.78, 1.20)	0.742
	>=6	306 (6.4)	4508 (93.6)		1	
Egg	<=9	311 (6.1)	4807 (93.9)	413	0.89 (0.74, 1.09)	0.255
	>9	167 (7.5)	2072 (92.5)		1	

*Adjusted for country, first degree family member with type 1 diabetes (FDR)- status, sex of the child, high-risk genotype (HLA DR3/4), probiotic exposure during the first year of life (52 weeks)

Supplemental table S7. Timing of introduction of selected complementary foods and risk of developing any IA by HLA genotype and by use of probiotics during the first 52 weeks of life.

Food exposure	N (Miss ig)	n affe cted	No HLA DR3/4 No probiotic exposure	N (Missi g)	n aff ected	No HLA DR3/4 Probiotic exposure	N (Missi g)	n affec ted	HLA DR3/4 No probiotic exposure	N (Missi g)	n affec ted	HLA DR3/4 Probiotic exposure
			HR (95% CI), p*			HR (95% CI), p*			HR (95% CI), p*			HR (95% CI), p*
Any solid food												
<4 months**	1424	111	0.91 (0.61, 1.37), 0.664	416	34	0.97 (0.51, 1.87), 0.933	943	123	1.61 (1.01, 2.56), 0.044	249	36	0.86 (0.44, 1.67), 0.655
4-<6 months	1869	184	1.05 (0.71, 1.54), 0.819	524	59	1.22 (0.67, 2.23), 0.522	1201	180	1.71 (1.08, 2.70), 0.021	327	39	0.67 (0.35, 1.29), 0.234
>=6 months	375	33	1	120	15	1	246	22	1	76	14	1
Cereals, any												
<4 months	890	65	0.90 (0.62, 1.32), 0.603	211	16	0.80 (0.42, 1.52), 0.499	611	70	1.24 (0.83, 1.86), 0.294	151	19	0.71 (0.38, 1.35), 0.300
4-<6 months	2198	213	1.06 (0.76, 1.46), 0.746	609	60	0.96 (0.60, 1.55), 0.877	1387	215	1.50 (1.05, 2.14), 0.028	357	47	0.76 (0.45, 1.31), 0.328
>=6 months	568	50	1	237	32	1	384	39	1	143	14	1
	(12)			(3)			(8)			(1)		
Gluten containing cereals												
<4 months	243	12	0.51 (0.28, 0.93), 0.029	51	2	0.41 (0.10, 1.70), 0.220	167	19	0.84 (0.51, 1.36), 0.469	46	3	0.67 (0.20, 2.21), 0.512
4-<6 months	1279	133	1.02 (0.79, 1.33), 0.861	345	29	0.80 (0.51, 1.28), 0.356	837	121	0.87 (0.67, 1.14), 0.309	220	39	1.64 (1.04, 2.61), 0.035
>=6 months	2075	182	1	648	77	1	1346	183	1	379	47	1
	(71)			(16)			(40)			(7)		
Non-gluten cereals												
<4 months	838	63	0.90 (0.62, 1.31), 0.589	191	16	0.91 (0.45, 1.75), 0.786	577	65	1.14 (0.77, 1.66), 0.529	135	18	0.76 (0.40, 1.44), 0.398
4-<6 months	2210	210	1.00 (0.73, 1.37), 0.986	620	60	0.97 (0.60, 1.58), 0.916	1391	214	1.38 (0.98, 1.95), 0.064	368	47	0.74 (0.44, 1.27), 0.278
>=6 months	605	55	1	245	32	1	413	45	1	148	24	1
	(15)			(4)			(9)			(1)		
Fruits & berries												
<4 months	794	51	0.69 (0.49, 0.98), 0.040	259	18	0.71 (0.38, 1.33), 0.288	547	65	1.03 (0.74, 1.44), 0.844	143	19	1.02 (0.53, 1.98), 0.952
4-<6 months	1908	187	0.94 (0.72, 1.24), 0.669	573	61	1.06 (0.65, 1.73), 0.827	1216	180	1.13 (0.85, 1.49), 0.413	368	50	0.97 (0.55, 1.71), 0.910
>=6 months	948	89	1	221	29	1	618	78	1	138	20	1
	(18)			(7)			(9)			(3)		
Egg												
<9 months	2465	223	0.97 (0.76, 1.15) 0.835	633	63	1.05 (0.70, 1.59), 0.817	1617	222	0.91 (0.72, 1.17), 0.466	403	60	1.36 (0.85, 2.18), 0.204
>9 months	997	94	1	356	41	1	666	98	1	220	28	1
	(206)			(71)			(107)			(29)		

*Adjusted for country, first degree family member with type 1 diabetes (FDR) -status, sex of the child