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Influence of sex, age, pubertal maturation and body mass index on circulating white blood cell counts in healthy European adolescents—the HELENA study

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Article

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Supplementary table 1. Relative values (%) of white blood cell types in European adolescents, according to age categories and stratified for sex.

Age range (years)	Boys					Girls				
	12.5-13.9	14-14.9	15-15.9	16-17.5	R	12.5-13.9	14-14.9	15-15.9	16-17.5	R
N	48	55	46	49		56	48	63	40	
Neutrophils	10 th 40.2^{§§}	39.1^{§§}	42.3	44.3[§]	0.255^{**}	43.6 ^{§§}	43.0 ^{§§}	43.1	49.1 [§]	0.123
	25 th 44.0^{§§}	44.9^{§§}	48.3	47.2[§]		47.7 ^{§§}	49.0 ^{§§}	48.3	55.8 [§]	
	50 th 49.6^{§§}	49.4^{§§}	51.3	53.1[§]		54.5 ^{§§}	55.9 ^{§§}	56.6	58.6 [§]	
	75 th 55.5^{§§}	54.5^{§§}	60.4	59.2[§]		61.3 ^{§§}	61.7 ^{§§}	63.8	60.6 [§]	
	90 th 60.0^{§§}	59.1^{§§}	65.2	65.2[§]		67.5 ^{§§}	71.2 ^{§§}	67.4	66.3 [§]	
Lymphocytes	10 th 29.2^{§§}	27.9[§]	25.9	25.0[§]	-0.265^{**}	23.8 ^{§§}	19.6 [§]	21.8	24.0 [§]	-0.106
	25 th 34.2^{§§}	32.9[§]	27.8	31.5[§]		29.5 ^{§§}	29.6 [§]	26.0	28.6 [§]	
	50 th 39.0^{§§}	38.0[§]	36.7	35.3[§]		34.0 ^{§§}	33.6 [§]	32.7	32.6 [§]	
	75 th 44.9^{§§}	42.5[§]	40.3	40.9[§]		40.5 ^{§§}	40.2 [§]	39.3	34.3 [§]	
	90 th 48.0^{§§}	46.3[§]	42.3	44.4[§]		44.5 ^{§§}	46.9 [§]	44.2	37.9 [§]	
Monocytes	10 th 5.4	5.9 ^{§§}	5.1	5.3	-0.006	5.0	4.8 ^{§§}	5.3	4.9	-0.020
	25 th 6.4	6.6 ^{§§}	6.3	6.1		6.3	5.4 ^{§§}	6.4	5.6	
	50 th 7.8	8.3 ^{§§}	7.9	7.8		7.5	7.0 ^{§§}	7.5	6.7	
	75 th 8.8	9.7 ^{§§}	9.4	9.1		8.9	8.4 ^{§§}	8.8	8.6	
	90 th 10.2	10.6 ^{§§}	11.0	10.7		10.5	9.9 ^{§§}	10.0	10.0	
Eosinophils	10 th 1.1	1.4 ^{§§}	0.8	1.1	-0.089	0.8	0.7 ^{§§}	0.9	0.7	-0.080
	25 th 1.7	2.0 ^{§§}	1.2	1.8		1.4	1.0 ^{§§}	1.2	1.1	
	50 th 2.3	3.0 ^{§§}	2.5	2.5		2.3	2.0 ^{§§}	1.9	2.1	
	75 th 3.0	4.0 ^{§§}	3.7	3.2		3.7	3.1 ^{§§}	2.8	2.9	
	90 th 5.2	6.1 ^{§§}	6.7	5.0		6.1	4.2 ^{§§}	5.0	4.0	
Basophils	10 th 0.1	0.2	0.2	0.2	-0.060	0.1	0.1	0.2	0.2	-0.072
	25 th 0.4	0.2	0.3	0.3		0.3	0.2	0.3	0.3	
	50 th 0.6	0.5	0.4	0.5		0.5	0.4	0.5	0.4	
	75 th 0.8	0.9	0.7	0.7		0.7	0.8	0.8	0.6	
	90 th 1.0	1.2	0.9	1.0		1.0	1.0	1.1	1.0	

Data are presented as percentiles 10th, 25th, 50th (median), 75th, and 90th. [§]Significant differences between boys and girls for a given age category, as assessed by the Mann-Whitney U test; [§] $P < 0.05$, ^{§§} $P < 0.01$. R is the partial correlation coefficient between cell counts and age, controlling for centre; bold rows indicate significant correlations, * $P < 0.05$, ** $P < 0.01$.

Supplementary table 2. Relative counts (%) of selected lymphocyte subsets in European adolescents, according to age and stratified for sex.

Age range (years)	Boys					Girls				
	12.5-13.9	14-14.9	15-15.9	16-17.5	R	12.5-13.9	14-14.9	15-15.9	16-17.5	R
N	36	49	41	45		39	42	50	26	
CD45 ⁺ CD3 ⁺	10 th 58.1	59.6	58.8 [§]	57.5	0.019	58.0	59.0	62.1 [§]	62.7	0.116
	25 th 64.3	63.3	63.4 [§]	63.8		62.8	63.5	67.9 [§]	65.9	
	50 th 68.3	67.9	68.8 [§]	67.5		68.3	70.5	71.6 [§]	70.5	
	75 th 73.1	72.4	73.3 [§]	73.6		74.5	74.2	74.9 [§]	76.7	
	90 th 74.9	76.6	77.3 [§]	75.8		76.8	76.3	79.6 [§]	80.1	
CD45 ⁺ CD4 ⁺	10 th 30.8	30.0	31.4 ^{§§}	25.9	0.012	31.2	29.3	32.5^{§§}	30.8	0.170*
	25 th 33.6	33.6	34.3 ^{§§}	33.3		33.7	33.9	36.3^{§§}	35.7	
	50 th 36.1	38.2	37.4 ^{§§}	38.0		37.7	36.2	40.1^{§§}	40.0	
	75 th 38.7	41.8	39.3 ^{§§}	41.7		40.7	41.1	45.2^{§§}	46.2	
	90 th 45.5	45.3	43.4 ^{§§}	42.9		43.6	44.1	47.1^{§§}	52.9	
CD45 ⁺ CD8 ⁺	10 th 18.8	19.2	18.0	16.7	-0.049	19.4	21.4	21.3	18.8	-0.027
	25 th 23.2	21.7	21.8	19.7		22.1	22.7	23.2	21.6	
	50 th 27.5	26.4	27.6	24.5		26.2	25.4	26.9	25.4	
	75 th 30.7	30.6	30.3	30.3		29.7	32.5	30.2	29.1	
	90 th 33.3	35.2	34.8	34.3		33.1	36.7	34.5	34.4	
CD45 ⁺ CD3 ⁻ CD16 ⁺ 56 ⁺	10 th 8.4	6.5	8.4	9.3	0.077	7.8	9.6	8.2	6.1	0.007
	25 th 12.3	10.9	11.5	13.4		10.0	11.2	11.4	9.0	
	50 th 15.1	13.1	14.9	16.9		13.0	15.2	13.4	14.7	
	75 th 18.3	18.3	21.1	21.2		18.3	19.0	17.1	20.5	
	90 th 22.9	25.3	25.3	25.6		26.1	23.8	21.5	26.5	
CD45 ⁺ CD3 ⁻ CD19 ⁺	10 th 8.4	8.1	7.7	6.8	-0.208**	8.3	6.9	6.6	5.0	-0.317**
	25 th 9.4	9.8	10.1	9.0		11.3	10.1	8.7	7.1	
	50 th 12.1	13.2	12.0	11.4		14.7	11.7	10.8	9.8	
	75 th 15.9	17.0	15.5	13.0		16.5	14.8	13.2	13.1	
	90 th 19.9	21.3	17.9	15.1		20.3	18.1	16.0	15.5	
CD3 ⁺ CD45RA ⁺	10 th 50.3	51.2^{§§}	41.9	46.5[§]	-0.180*	48.2	46.5^{§§}	44.7	44.6[§]	-0.217**
	25 th 57.1	58.9^{§§}	54.4	52.1[§]		55.8	52.3^{§§}	52.7	50.9[§]	
	50 th 62.3	63.5^{§§}	59.1	60.0[§]		60.2	55.8^{§§}	58.6	54.5[§]	
	75 th 67.9	69.1^{§§}	66.9	63.2[§]		68.1	62.3^{§§}	64.4	58.3[§]	
	90 th 70.5	72.9^{§§}	70.0	68.9[§]		73.5	69.8^{§§}	66.9	61.8[§]	
CD3 ⁺ CD45RO ⁺	10 th 29.0	27.6^{§§}	28.7	30.6[§]	0.198*	26.5	30.2^{§§}	32.5	37.7[§]	0.242**
	25 th 31.6	30.7^{§§}	31.8	36.0[§]		30.8	37.5^{§§}	35.4	41.6[§]	
	50 th 36.4	34.6^{§§}	40.2	39.9[§]		39.1	43.8^{§§}	40.4	45.2[§]	
	75 th 42.0	39.7^{§§}	45.5	45.8[§]		44.4	47.4^{§§}	46.2	49.9[§]	
	90 th 50.0	47.8^{§§}	57.1	53.2[§]		49.9	51.7^{§§}	52.6	55.3[§]	

CD4 ⁺ CD45RA ⁺	10 th	45.2	46.9^{§§}	43.0	39.5	-0.203^{**}	47.8	39.7^{§§}	40.1	38.4	-0.292^{**}
	25 th	53.3	53.1^{§§}	49.1	45.8		54.4	48.1^{§§}	48.3	41.4	
	50 th	60.2	62.2^{§§}	56.1	54.5		61.1	55.9^{§§}	55.4	50.5	
	75 th	64.6	66.7^{§§}	60.7	60.3		67.0	61.4^{§§}	62.1	56.0	
	90 th	71.2	71.9^{§§}	68.7	67.1		71.6	68.7^{§§}	66.1	59.8	
CD4 ⁺ CD45RO ⁺	10 th	28.4	27.8^{§§}	30.6	32.7	0.203^{**}	27.7	31.3^{§§}	32.1	38.6	0.292^{**}
	25 th	35.4	33.1^{§§}	37.1	39.6		32.6	38.6^{§§}	38.0	44.0	
	50 th	39.6	37.7^{§§}	43.9	44.8		37.2	44.0^{§§}	43.7	49.3	
	75 th	46.5	46.7^{§§}	50.8	53.3		45.8	51.8^{§§}	51.7	58.6	
	90 th	55.3	53.3^{§§}	55.9	60.5		52.6	59.8^{§§}	59.1	61.6	
CD8 ⁺ CD45RA ⁺	10 th	57.5	60.0 ^{§§}	56.7	51.6	-0.114	51.0	46.8 ^{§§}	54.5	55.8	-0.028
	25 th	63.3	68.3 ^{§§}	66.0	55.4		62.9	59.5 ^{§§}	61.6	61.5	
	50 th	71.9	71.5 ^{§§}	70.2	68.4		69.9	66.0 ^{§§}	69.2	67.0	
	75 th	77.8	80.4 ^{§§}	79.2	74.1		77.1	72.4 ^{§§}	75.4	70.0	
	90 th	83.2	84.0 ^{§§}	81.0	83.6		83.5	79.0 ^{§§}	79.5	77.1	
CD8 ⁺ CD45RO ⁺	10 th	16.5	15.2 ^{§§}	18.0	15.6	0.099	16.8	20.9 ^{§§}	19.4	22.9	0.033
	25 th	22.3	19.5 ^{§§}	20.7	24.3		22.7	27.6 ^{§§}	24.4	30.0	
	50 th	27.2	28.0 ^{§§}	29.4	31.6		29.5	33.7 ^{§§}	30.8	32.7	
	75 th	34.5	31.3 ^{§§}	33.4	44.4		37.2	40.1 ^{§§}	38.7	38.4	
	90 th	42.1	39.9 ^{§§}	43.3	47.3		49.2	52.4 ^{§§}	45.5	44.2	

Data are presented as percentiles 10th, 25th, 50th (median), 75th, and 90th. Lymphocyte populations are designated by their cell markers, and defined by the anchor marker, which appears in first place of the subset name. § Significant differences between sexes for a given age category, as assessed by the Mann-Whitney U test; §*P*<0.05, §§*P*<0.01. R is the partial correlation coefficient between cell percentages and age, controlling for centre; bold rows indicate significant correlations, **P*<0.05, ***P*<0.01.

Supplementary table 3. Relative values (%) of white blood cell types in European adolescents, according to Tanner stages and stratified for sex.

Tanner stage	N	Boys				P	Girls				P
		I+II	III	IV	V		I+II	III	IV	V	
Neutrophils	10 th	29.2	40.2	40.4	45.0	0.165	32.8	38.4	43.3	45.9	0.128
	25 th	43.3	43.0	44.4	48.4		36.4	44.6	48.7	51.7	
	50 th	49.4	52.1	49.4	52.3		48.5	55.1	56.7	56.7	
	75 th	53.0	57.1	56.3	60.7		53.8	66.2	61.6	61.4	
	90 th	63.4	63.8	60.3	68.9		-	72.0	66.6	66.6	
Lymphocytes	10 th	27.3	25.6	29.8	22.9	0.026	27.0	18.7	23.9	22.5	0.288
	25 th	35.4	31.4	33.2	27.1		31.3	25.7	28.9	28.9	
	50 th	38.3	38.4	39.9	35.3		38.4	33.9	33.5	33.2	
	75 th	46.3	44.0	43.5	39.7		46.9	39.7	39.2	37.2	
	90 th	61.8	47.2	46.8	42.3		-	46.1	44.3	42.3	
Monocytes	10 th	4.9	5.3	5.4	5.5	0.293	4.0	5.0	5.0	4.9	0.194
	25 th	5.8	6.1	6.1	6.6		7.0	5.9	6.0	5.6	
	50 th	8.0	7.1	7.7	7.9		8.3	7.0	7.2	7.1	
	75 th	8.9	8.5	9.4	9.1		10.6	8.7	8.8	8.0	
	90 th	10.2	11.1	10.5	10.8		-	9.9	10.6	9.1	
Eosinophils	10 th	1.4	1.0	1.0	0.9	0.852	1.0	0.8	0.7	1.0	0.099
	25 th	2.1	1.9	1.8	1.7		1.4	1.2	1.1	1.5	
	50 th	2.9	2.3	2.5	2.6		2.6	2.9	2.0	2.2	
	75 th	3.5	3.8	3.6	3.6		3.2	4.7	3.1	3.1	
	90 th	5.7	6.8	5.6	5.4		-	9.4	4.1	5.7	
Basophils	10 th	0.1	0.0	0.2	0.2	0.582	0.0	0.0	0.2	0.2	0.010
	25 th	0.3	0.2	0.3	0.3		0.1	0.1	0.3	0.4	
	50 th	0.6	0.4	0.4	0.5		0.5	0.4	0.4	0.6	
	75 th	0.8	0.9	0.6	0.9		1.2	0.8	0.6	0.9	
	90 th	1.3	1.2	0.9	1.0		-	1.0	0.9	1.2	

Data are presented as percentiles 10th, 25th, 50th (median), 75th, and 90th. Bold rows indicate significant differences between Tanner stages, as assessed by analysis of covariance (ANCOVA), controlling for centre and age, $P < 0.05$.

Supplementary table 4. Relative counts (%) of selected lymphocyte subsets in European adolescents, according to Tanner stages and stratified for sex.

Tanner stage N	Boys					Girls					
	I+II 9	III 26	IV 67	V 52	<i>P</i>	I+II 7	III 19	IV 65	V 55	<i>P</i>	
CD45+CD3+	10 th	64.3	58.2	60.0	56.0	0.764	55.0	59.4	57.0	60.7	0.138
	25 th	64.7	65.0	63.2	63.5		60.4	62.7	64.9	67.9	
	50 th	67.8	69.9	67.0	69.2		63.2	68.7	69.8	72.9	
	75 th	73.4	73.5	71.6	73.0		72.8	72.5	73.1	76.3	
	90 th	-	76.5	75.3	77.2		-	74.5	76.7	79.9	
CD45+CD4+	10 th	31.6	31.7	31.3	28.2	0.520	29.3	31.3	30.7	31.2	0.832
	25 th	33.3	33.4	34.8	32.0		32.3	32.8	34.4	34.0	
	50 th	35.7	36.9	38.2	37.8		39.6	37.5	38.2	39.6	
	75 th	37.1	39.0	41.6	41.7		43.7	40.3	42.7	43.8	
	90 th	37.7	43.4	45.2	45.2		-	45.1	46.9	46.6	
CD45+CD8+	10 th	25.6	19.3	17.9	16.8	0.624	18.7	19.3	20.0	21.2	0.087
	25 th	26.4	22.3	21.2	20.8		19.7	21.5	22.2	23.2	
	50 th	27.6	28.5	25.2	27.0		22.8	26.0	24.5	27.9	
	75 th	31.0	31.3	29.1	30.1		28.9	31.3	29.0	33.6	
	90 th	32.7	34.8	33.8	37.7		-	36.3	31.7	35.0	
CD45+CD3-CD16+56+	10 th	11.1	7.9	7.4	8.6	0.617	6.6	9.7	8.9	7.9	0.417
	25 th	11.8	12.1	9.9	12.6		9.6	11.3	11.6	11.1	
	50 th	14.9	14.5	15.1	15.2		15.5	13.8	14.7	13.8	
	75 th	20.3	18.2	20.7	21.6		23.6	17.4	19.4	18.2	
	90 th	-	24.4	25.0	28.4		-	26.2	24.1	22.0	
CD45+CD3-CD19+	10 th	7.8	8.5	7.6	6.8	0.453	7.0	7.3	7.0	6.6	0.378
	25 th	9.7	10.0	9.7	9.2		10.6	9.5	9.9	7.6	
	50 th	10.5	12.2	12.2	11.8		14.7	14.1	11.8	10.7	
	75 th	13.4	15.0	15.4	15.5		19.1	16.8	15.2	14.0	
	90 th	-	19.8	21.0	16.8		-	17.6	18.0	18.2	
CD3+CD45RA+	10 th	53.2	48.4	47.0	44.3	0.572	57.6	47.4	45.4	46.0	0.145
	25 th	58.8	53.6	57.2	56.4		64.1	53.3	53.4	50.6	
	50 th	64.9	60.5	61.4	60.3		68.1	62.0	58.6	54.6	
	75 th	69.9	65.4	67.6	68.0		71.7	70.9	64.3	61.6	
	90 th	73.4	69.1	69.8	70.9		-	72.4	66.9	66.4	
CD3+CD45RO+	10 th	26.8	30.6	29.1	28.5	0.406	25.1	27.3	32.3	34.9	0.149
	25 th	30.1	33.3	31.6	31.1		27.3	28.9	35.5	38.3	
	50 th	35.1	39.2	37.1	39.5		32.1	37.5	41.3	44.3	
	75 th	41.2	46.3	41.7	43.5		36.1	46.4	46.4	48.5	
	90 th	43.9	51.9	52.6	55.5		-	52.4	53.0	52.0	

CD4 ⁺ CD45RA ⁺	10 th	43.0	45.5	39.7	43.3	0.753	61.1	48.6	39.5	38.9	0.117
	25 th	58.6	47.1	52.8	51.1		62.1	55.3	48.7	46.7	
	50 th	61.5	54.9	57.5	55.9		64.7	60.8	57.4	52.8	
	75 th	67.4	63.7	66.0	63.2		68.3	69.1	62.4	58.6	
	90 th	71.2	71.8	71.1	69.3		-	71.2	67.4	65.7	
CD4 ⁺ CD45RO ⁺	10 th	28.7	28.6	28.4	30.6	0.596	25.3	28.6	31.0	34.0	0.143
	25 th	33.1	36.2	33.4	36.7		31.7	30.8	37.5	41.3	
	50 th	38.5	45.3	41.3	44.0		35.4	37.5	41.9	47.2	
	75 th	41.9	52.7	47.1	48.6		37.2	44.7	51.3	53.4	
	90 th	58.6	54.3	60.3	55.9		-	51.4	60.2	61.1	
CD8 ⁺ CD45RA ⁺	10 th	65.9	58.6	55.2	50.5	0.625	46.9	52.0	53.2	54.4	0.349
	25 th	66.8	63.9	65.6	62.7		69.8	60.4	62.0	60.4	
	50 th	76.7	70.1	69.9	71.6		75.8	67.5	67.7	65.3	
	75 th	82.2	75.3	77.3	79.5		84.3	77.0	73.5	72.8	
	90 th	-	80.6	82.4	85.1		-	84.5	79.9	79.5	
CD8 ⁺ CD45RO ⁺	10 th	14.1	19.6	17.1	14.6	0.387	10.3	15.4	19.1	20.5	0.298
	25 th	17.8	24.4	22.3	19.8		15.3	22.8	26.5	26.9	
	50 th	24.7	30.0	28.5	27.8		25.0	33.0	31.2	34.1	
	75 th	33.0	35.7	33.3	37.2		30.6	39.8	37.2	39.4	
	90 th	-	41.3	44.9	47.5		-	48.1	45.5	45.5	

Data are presented as percentiles 10th, 25th, 50th (median), 75th, and 90th. Lymphocyte populations are designated by their cell membrane markers, and defined by the anchor marker, which appears in first place of the subset name. Bold rows indicate significant differences between Tanner stages, as assessed by analysis of covariance (ANCOVA), controlling for age and centre, $P < 0.05$.

Supplementary table 5. Relative values (%) of white blood cell types in European adolescents, according to BMI z-scores and stratified for sex.

		Boys					Girls						
BMI z-scores		Q1	Q2	Q3	Q4			Q1	Q2	Q3	Q4		
N		43	42	42	43	<i>P</i>	<i>R</i>	41	41	38	39	<i>P</i>	<i>R</i>
Neutrophils	10 th	41.0	41.4	40.2	44.0	0.337	-0.076	41.8	43.6	43.6	47.2	0.022	0.181*
	25 th	47.3	45.6	43.2	45.1			46.7	49.2	50.5	53.4		
	50 th	51.1	51.7	50.0	51.4			54.0	56.5	59.1	58.3		
	75 th	59.2	57.8	54.5	55.6			59.0	61.0	63.3	64.7		
	90 th	67.9	61.8	60.9	60.2			66.5	66.3	69.2	67.5		
Lymphocytes	10 th	23.3	25.6	27.6	29.0	0.204	0.169*	24.9	23.9	22.5	21.9	0.009	-0.185**
	25 th	28.7	32.0	30.7	34.3			31.3	29.1	26.3	25.7		
	50 th	36.3	35.3	38.1	39.1			34.5	33.6	30.9	32.1		
	75 th	41.7	42.2	42.1	43.5			43.2	40.4	36.6	36.5		
	90 th	45.9	45.3	46.7	44.7			46.7	44.8	42.9	40.7		
Monocytes	10 th	5.3	5.8	5.8	5.2	0.467	-0.023	5.3	4.8	5.1	5.0	0.415	-0.110
	25 th	6.3	6.6	6.3	6.1			6.2	5.8	6.1	5.7		
	50 th	7.5	8.2	8.2	8.0			7.9	7.1	7.6	6.9		
	75 th	8.6	9.6	9.6	9.0			8.8	9.0	8.6	7.9		
	90 th	10.1	11.0	11.4	9.7			10.6	10.4	9.9	9.7		
Eosinophils	10 th	1.1	1.5	1.0	0.7	0.005	-0.132	1.1	0.9	0.7	0.7	0.568	-0.065
	25 th	1.7	2.0	2.0	1.6			1.3	1.3	1.0	1.1		
	50 th	2.5	2.7	3.1	2.0			2.3	2.2	2.0	1.9		
	75 th	3.9	3.3	5.0	2.8			3.0	3.1	3.3	3.0		
	90 th	4.6	5.4	9.5	3.7			5.5	4.4	4.2	5.4		
Basophils	10 th	0.2	0.2	0.0	0.2	0.212	-0.161*	0.2	0.2	0.1	0.1	0.436	-0.060
	25 th	0.4	0.3	0.2	0.3			0.3	0.3	0.3	0.2		
	50 th	0.6	0.4	0.5	0.4			0.5	0.4	0.4	0.5		
	75 th	1.0	0.7	0.8	0.6			0.8	0.8	0.7	0.7		
	90 th	1.2	1.1	1.0	1.0			1.1	1.0	1.0	1.0		

Data are presented as percentiles 10th, 25th, 50th (median), 75th, and 90th. Bold rows indicate significant differences between quartiles of standardized body mass index (BMI z-scores), as assessed by analysis of covariance (ANCOVA), controlling for centre, $P < 0.05$. *R* is the partial correlation coefficient between cell percentages and BMI z-scores, controlling for centre, * $P < 0.05$, ** $P < 0.01$.

Supplementary table 6. Relative counts (%) of selected lymphocyte subsets in European adolescents, according to BMI z-scores and stratified for sex.

BMI z-scores N	Boys						Girls						
	Q1 43	Q2 42	Q3 42	Q4 43	<i>P</i>	<i>R</i>	Q1 41	Q2 41	Q3 38	Q4 39	<i>P</i>	<i>R</i>	
CD45+CD3+	10 th	60.8	59.1	58.0	56.5	0.785	-0.034	57.4	59.3	59.7	62.0	0.191	0.093
	25 th	64.4	63.2	62.2	64.6								
	50 th	69.3	68.9	68.0	67.2								
	75 th	73.0	73.1	73.1	73.4								
	90 th	77.1	76.0	76.2	75.7								
CD45+CD4+	10 th	28.0	32.2	30.3	29.1	0.150	-0.154*	29.3	32.7	31.5	31.3	0.322	0.152
	25 th	34.5	35.0	33.3	32.6								
	50 th	39.0	37.4	36.7	36.7								
	75 th	43.5	40.6	39.0	39.4								
	90 th	46.5	45.7	42.2	42.8								
CD45+CD8+	10 th	16.8	17.3	17.8	18.9	0.685	0.114	19.3	21.0	20.6	21.2	0.990	-0.006
	25 th	20.6	20.2	22.7	22.7								
	50 th	24.2	26.9	26.1	27.6								
	75 th	30.3	29.4	28.9	32.5								
	90 th	35.6	33.8	32.7	35.9								
CD45+CD3-CD16+56+	10 th	9.0	8.1	6.8	8.4	0.569	0.054	6.7	7.9	8.9	8.8	0.874	0.009
	25 th	12.0	11.8	10.1	12.1								
	50 th	14.6	15.5	14.3	15.4								
	75 th	18.3	21.3	18.5	20.1								
	90 th	24.2	24.5	24.0	27.2								
CD45+CD3-CD19+	10 th	8.0	9.0	7.5	7.6	0.246	0.054	6.6	5.9	8.1	6.7	0.524	-0.067
	25 th	9.2	9.8	10.5	10.1								
	50 th	11.7	11.0	13.9	12.1								
	75 th	14.5	13.7	17.8	15.2								
	90 th	16.9	16.3	19.6	19.2								
CD3+CD45RA+	10 th	50.0	48.5	47.8	44.3	0.064	-0.156*	45.4	44.9	51.8	45.5	0.135	-0.111
	25 th	58.8	56.1	55.7	54.5								
	50 th	64.1	61.2	61.2	59.2								
	75 th	69.3	63.8	67.1	63.7								
	90 th	71.5	69.5	70.4	69.2								
CD3+CD45RO+	10 th	28.2	29.7	29.0	29.8	0.129	0.142	29.0	29.5	29.3	34.9	0.308	0.089
	25 th	30.4	34.1	32.0	35.6								
	50 th	35.6	37.6	38.4	40.1								
	75 th	41.1	43.3	44.3	44.7								
	90 th	49.9	51.5	51.9	55.6								

CD4+CD45RA+	10 th	44.5	44.8	42.5	41.3	0.043	-0.183*	41.0	42.6	39.5	38.9	0.103	-0.147
	25 th	53.4	51.8	51.4	46.4			51.2	48.7	48.6	43.3		
	50 th	60.4	56.4	58.2	55.4			55.9	56.5	57.0	51.6		
	75 th	66.8	62.5	63.6	62.2			61.8	65.9	63.3	59.3		
	90 th	71.8	70.3	70.4	65.4			68.1	69.5	67.3	63.5		
CD4+CD45RO+	10 th	27.3	29.1	29.5	34.2	0.036	0.192*	31.4	30.2	32.7	36.2	0.090	0.161*
	25 th	33.0	36.1	36.5	38.1			37.3	33.9	36.7	39.6		
	50 th	39.4	43.4	41.1	44.1			43.9	43.5	42.3	48.3		
	75 th	46.3	47.8	48.6	53.5			48.6	51.1	51.4	56.6		
	90 th	55.3	54.4	56.7	58.8			58.8	56.9	60.7	61.2		
CD8+CD45RA+	10 th	53.8	58.7	52.9	54.4	0.384	-0.122	54.6	47.8	57.0	49.7	0.042	-0.062
	25 th	68.2	64.4	64.7	64.4			62.1	60.5	62.6	59.7		
	50 th	72.3	69.5	70.5	69.8			67.7	65.9	69.9	66.3		
	75 th	80.5	77.3	79.1	76.2			75.1	72.0	78.5	72.1		
	90 th	83.1	81.5	83.2	84.9			83.4	77.8	84.4	76.3		
CD8+CD45RO+	10 th	16.9	17.7	16.4	15.1	0.516	0.106	16.8	21.2	15.6	23.5	0.039	0.059
	25 th	19.5	21.6	20.6	22.4			24.8	28.0	21.3	27.9		
	50 th	27.4	28.0	29.5	30.0			32.0	33.7	30.1	33.4		
	75 th	31.3	34.0	35.3	34.5			37.9	39.9	36.7	40.0		
	90 th	46.2	41.6	47.1	45.6			45.4	52.5	42.4	50.8		

Data are presented as percentiles 10th, 25th, 50th (median), 75th, and 90th. Lymphocyte populations are designated by their cell membrane markers, and defined by the anchor marker, which appears in first place of the subset name. Bold rows indicate significant differences between quartiles of standardized body mass index (BMI z-scores), as assessed by analysis of covariance (ANCOVA), controlling for centre, $P < 0.05$. R is the partial correlation coefficient between cell percentages and BMI z-scores, controlling for centre; * $P < 0.05$, ** $P < 0.01$.