

## Supplementary Results:

**Table S1.** Morphological parameters of the participants ( $n = 50$ ).

Variables	Unit	Control ( $n = 25$ )		Athletes ( $n = 25$ )		P
		Mean $\pm$ SD	CI	Mean $\pm$ SD	CI	
WBC	$10^9/L$	$5.80 \pm 1.43$	5.19-6.39	$6.25 \pm 1.46$	5.61-6.87	0.29
RBC	$10^{12}/L$	$5.14 \pm 0.27$	5.02-5.25	$5.05 \pm 0.27$	4.93-5.16	0.26
Haemoglobin	g/dL	$15.32 \pm 0.79$	15.00-15.64	$15.32 \pm 0.89$	14.93-15.71	1.00
Haematocrit	%	$43.99 \pm 2.02$	43.16-44.80	$43.91 \pm 2.15$	42.98-44.84	0.90
MCV	fL	$85.63 \pm 3.21$	84.33-86.93	$87.02 \pm 2.75$	85.83-88.21	0.11
MCH	pg	$29.85 \pm 1.56$	29.21-30.48	$30.35 \pm 1.17$	29.84-30.86	0.22
MCHC	g/dl	$34.84 \pm 0.97$	34.44-35.23	$34.90 \pm 0.59$	34.63-35.15	0.81
RDW	%	$12.44 \pm 0.45$	12.25-12.62	$12.52 \pm 0.56$	12.27-12.76	0.57
Platelets	G/l	$233.19 \pm 41.86$	216.28-250.10	$233.65 \pm 39.98$	216.36-250.94	0.96
MPV	fL	$11.13 \pm 0.85$	10.78-11.47	$10.62 \pm 0.78^*$	10.28-10.96	0.04
Neutrophils	G/l	$2.99 \pm 1.06$	2.55-3.42	$3.42 \pm 1.40$	2.81-4.02	0.23
Lymphocytes	$10^9/L$	$1.99 \pm 0.15$	1.72-2.25	$2.07 \pm 0.43$	1.88-2.26	0.60
Monocytes	$10^9/L$	$0.54 \pm 0.15$	0.48-0.60	$0.55 \pm 0.12$	0.49-0.59	0.92
Eosynocytes	$10^9/L$	$0.19 \pm 0.17$	0.12-0.26	$0.15 \pm 0.09$	0.11-0.19	0.31
Basophils	%	$0.04 \pm 0.02$	0.03-0.05	$0.04 \pm 0.01$	0.03-0.04	0.53
Glucose	mg/dl	$91.35 \pm 9.88$	87.35-95.33	$88.70 \pm 6.08$	86.06-91.32	0.27
T. CHOL	mg/dl	$149.81 \pm 25.76$	139.39-160.21	$152.74 \pm 29.16$	140.12-165.34	0.71
HDL	mg/dl	$45.92 \pm 11.49$	41.27-50.56	$54.70 \pm 11.72^*$	49.62-59.76	0.01
Triglyceride	Mg/dl	$71.38 \pm 25.83$	60.94-81.82	$68.09 \pm 28.23$	55.87-80.29	0.67
LDL	Mg/dl	$87.92 \pm 21.74$	79.14-96.70	$84.22 \pm 22.26$	74.58-93.84	0.56
non-HDL	Mg/dl	$101.31 \pm 24.41$	91.44-111.16	$97.91 \pm 25.88$	86.71-109.10	0.64
Iron (Fe)	$\mu g/l$	$121.73 \pm 56.11$	99.06-144.39	$132.17 \pm 59.70$	106.35-157.99	0.53

**Note:** WBC, white blood cells; RBC, red blood cells; MCV, mean corpuscular hemoglobin concentration; MCH, mean corpuscular haemoglobin; MCHC, mean corpuscular hemoglobin concentration; RDW, red cell distribution width; MPV, mean platelet volume; T. CHOL, total cholesterol; HDL, high-density lipoprotein; TG, triglyceride; LDL, low-density lipoprotein level.

\*significant difference vs control group at  $p < 0.05$

**Table S2.** Maximal anaerobic effort (double repeated WAnT) performance of the participants.

Variables	Unit	Control ( $n = 25$ )		Athletes ( $n = 25$ )		P
		Mean $\pm$ SD	CI	Mean $\pm$ SD	CI	
Relative peak power of the 1st WAnT	W/kg	$9.97 \pm 0.92$	9.59-10.34	$10.58 \pm 1.08^*$	10.13-11.03	0.03
Relative mean power of the 1st WAnT	W/kg	$7.88 \pm 0.66$	7.61-8.15	$8.50 \pm 0.54^*$	8.27-8.72	< 0.01
Relative peak power of the 2nd WAnT	W/kg	$7.35 \pm 0.65$	7.08-7.60	$7.96 \pm 0.69^*$	7.67-8.25	< 0.01
Relative mean power of the 2nd WAnT	W/kg	$5.58 \pm 0.49$	5.38-5.78	$6.20 \pm 0.56^*$	5.97-6.43	< 0.01

Change of relative peak power	W/kg	2.63 ± 0.98	2.22-3.02	2.62 ± 1.16	2.13-3.10	0.98
Change of relative mean power	W/kg	2.29 ± 0.64	2.03-2.55	2.29 ± 0.60	2.04-2.54	0.99

**Note:** WAnT, Wingate Anaerobic Test, \*significant difference vs control group at  $p < 0.05$

**Table S3.** Maximal aerobic effort (treadmill running till exhaustion - Bruce protocol) performance of the participants.

Variables	Unit	Control ( $n = 25$ )		Athletes ( $n = 25$ )		p
		Mean ± SD	CI	Mean ± SD	CI	
Maximal oxygen uptake	ml/min/kg	53.99 ± 5.28	51.75-56.22	62.23 ± 5.82*	59.72-64.75	< 0.01
Maximal ventilation	L/min	146.45 ± 23.42	136.56-156.35	159.78 ± 16.30*	152.73-166.83	0.03
Maximal RER	VCO <sub>2</sub> /VO <sub>2</sub>	1.16 ± 0.07	1.13-1.19	1.15 ± 0.05	1.13-1.17	0.53
Maximal heart rate	beats/min	189.04 ± 14.11	183.08-195.00	190.56 ± 11.39	185.63-195.49	0.68

**Note:** RER, the ratio of ventilation CO<sub>2</sub> expired to O<sub>2</sub> consumed, \*significant difference vs control group at  $p < 0.05$

**Table S4.** Two-way (2 groups × 4 repeated measures) ANOVA of serum cell free DNA (cfDNA) concentration induced by maximal effort in training and control group.

Effort	Effect	F	df	p-value	Effect size ( $\eta^2$ )	Post-hoc outcome
Anaerobic	Group	9.25	1, 48	<0.01	0.17	C < A
	RM	7.38	1, 48	<0.01	0.13	II > I, IV
	Group × RM	4.59	3, 144	<0.01	0.10	C-I > C-IV A-II > A-I, A-IV A-II > C-II
Aerobic	Group	1.08	1, 48	0.30	0.01	
	RM	4.63	1, 48	<0.01	0.03	II, III > I, IV
	Group × RM	3.44	3, 144	0.02	0.08	C-III > C-IV

**Note:** RM, repeated measures; C, controls; A, athletes; I, baseline; II, up to 5 minutes after the effort; III, 30 minutes after the effort; IV, 60 minutes after the effort

**Table S5.** Two-way (2 groups × 2 types of effort) ANOVA analysis of cfDNA change from baseline to up to 5 min after and 30 min and 60 min after maximal anaerobic and aerobic effort in training and control groups.

Variable	Effect	F	df	p-value	Effect size ( $\eta^2$ )	Post-hoc outcome
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cfDNA change immediately after maximal effort	Group	6.81	1, 48	0.01	0.014	C < A
	Effort	0.40	1, 48	0.12	0.01	
	Group × Effort	4.11	1, 48	0.05	0.08	A- MAnE > C- MAnE
cfDNA change 30 min after maximal effort	Group	1.26	1, 48	0.26	<0.01	
	Effort	0.02	1, 48	0.87	<0.01	
	Group × Effort	2.75	1, 48	0.10	0.02	
cfDNA change 60 min after maximal effort	Group	10.61	1, 48	<0.01	0.19	C < A
	Effort	0.69	1, 48	0.40	0.02	
	Group × Effort	0.21	1, 48	0.64	<0.01	

**Note:** C, control; A, Athletes; MAnE, maximal anaerobic effort.