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Table S1 – Part 1

Study interventions. IG=Intervention group; HC=Healthy controls; CG=Control group; HIIT=High-Intensity-Interval-Training; MICT=Moderate-intensity training; PAH=Pulmonary artery hypertension.

AUTHOR, YEAR	METHOD	CELL TYPE	STUDY POPULATION	PARTICIPANTS (N)	AGE	$\dot{V}O_2$PEAK AT BASELINE (ML/KG/MIN)	EXERCISE PROGRAM	DURATION	FREQUENCY, INTENSITY, VOLUME PER SESSION	CONTROL/ HEALTHY GROUP
Janssen et al. (2022)	Seahorse	PBMCs	Healthy; Young females adults	N: 31 High fit: 15 Low fit: 16	High fit: median: 21.8 (21.6-23.7) Low fit: Median: 24.0 (21.3-25.5)	High fit: 50.4 (49.0-54.0) Low fit: 35.1 (32.2-35.7)	Single bout of exercise	-	60 min, 70% $\dot{V}O_2$peak	High-fit≥47 Low-fit≤37
Liepinsh et al. (2020)	Oxygraph	PBMCs	Healthy sedentary adults	N: 12	Mean: 36.2±7.3	Mean: 33.3±1.3	low-intensity cycling exercise	-	60 min, 50 W	-
Stampley et al. (2023)	Oxygraph	PBMCs and subtypes	Collegiate swimmers	N: 11	Median: 20 (IQ: 20, 20)	-	Maximal exercise swimming bout	-	Until exhaustion	-
Theall et al. (2021)	Oxygraph	PBMCs	Healthy active adults	N: 21	Mean: 27.0 ±5.4	Mean: 36.5±6.3	Single bout of exercise	-	30 min at 65-75% $\dot{V}O_2$peak	-
Hedges et al. (2019)	Oxygraph	PBMCs	Young healthy men	N: 10	Mean: 24.7 ±1.3	-	HIIT	2 weeks	3 days/ week, 8-12 intervals with 60s Wpeak with 75s 30W	-
Kocher et al. (2017)	Seahorse	PBMCs	Sedentary HIV+ patients	N: 7	Range: 36 - 58 years	-	Light Aerobic exercise	12 weeks	3 days/ week, 20-40 min, 50-80% HRR	-
Noz et al. (2019)	Oxygraph	PBMCs	Participants with increased cardiovascular risk	N: 16	Mean: 64±6	-	Low-intensity physical activity	16 weeks	At least 2 minutes after 30minutes sedentary behavior	-
Brand et al. (2020)	Oxygraph	Lymphocytes	Occupational burnout	N: 24 IG: 12 HC: 12	IG: Mean: 45.8±6.8 HC: Mean: 45.65±6.86	-	intervention involving physical activity	12 weeks	3 days/ week, 60 min, 60-75% HF_{max}	HC without burnout
Tsai et al. (2016)	Oxygraph	Lymphocytes	Healthy sedentary males	N: 60 HIIT: 20 MICT: 20 CG: 20	HIIT: Mean: 23.0±1.7 MICT: Mean: 22.1±0.9 CG: Mean: 22.5±1.3	HIIT: Mean: 34.0±1.4 MICT: Mean: 33.1±1.2 CG: Mean: 32.2±1.0	Cycling HIIT or MICT under hypoxic stress	6 weeks	5 days/ week, 30 min/ day HIIT: 5 intervals with 3 min 80% and 3 min 40% of $\dot{V}O_2$peak MICT: 30 min at 60% $\dot{V}O_2$peak	CG without exercise
Andonian et al. (2022)	Seahorse	CD4+ T cells	Rheumatoid arthritis	N: 12	Mean: 63.9±7.2	Mean: 24.9±6.6	HIIT	10 weeks	3 days/ week, 10 intervals with 60-90s with 80-90% and 50-60% HRR	-
Lin et al. (2022)	Oxygraph	NK cells	Sedentary young males	N: 60 HIIT: 20 MICT: 20 CG: 20	HIIT: Mean: 22.2±2.1 MICT: Mean: 22.3±2.8 CG: Mean: 22.6±2.7	HIIT: Mean: 33.5±4.8 MICT: Mean: 33.2±4.5 CG: Mean: 32.2±4.1	HIIT or MICT graded exercise test before and after interventions	6 weeks	5 days/ week HIIT: 5 intervals with 3min 80% and 3 min 40% of $\dot{V}O_2$peak MICT: 30 min at 60% $\dot{V}O_2$peak	CG without exercise
Hsu et al. (2019)	Oxygraph	Platelets	Stroke patients	N: 30 IG: 15 CG: 15	IG: Mean: 55.7±3.0 CG: Mean: 57.8±3.9	mL/min: IG: Mean: 11.55± 8.0 CG: Mean: 11.65±7.6	Cycling + general rehabilitation	4 weeks	5 days/ week, 30 min at 60% $\dot{V}O_2$peak	CG: general rehabilitation
Lin et al. (2021)	Oxygraph	Platelets	Peripheral artery disease	IG: 20 CG: 20	IG: Mean: 71.1±1.5 CG: Mean: 70.5± 1.9	mL/min: IG: Mean: 12.3±0.6 CG: Mean: 12.4±0.4	Cycling + general rehabilitation	12 weeks	3 days/ week, 30 min at ventilator threshold (VT)	CG: General rehabilitation

Table S1 – Part 2

Study interventions. IG=Intervention group; HC=Healthy controls; CG=Control group; HIIT=High-Intensity-Interval-Training; MICT=Moderate-intensity training; PAH=Pulmonary artery hypertension.

AUTHOR, YEAR	METHOD	CELL TYPE	STUDY POPULATION	PARTICIPANTS (N)	AGE	VO_2PEAK AT BASELINE (ML/KG/MIN)	EXERCISE PROGRAM	DURATION	FREQUENCY, INTENSITY, VOLUME PER SESSION	CONTROL/ HEALTHY GROUP
Bartlett et al. (2020)	Seahorse	Neutrophils	Prediabetic overweight-obese older adults	N: 16 IG: 10 HC: 6	IG: Mean: 71±5 HC: Mean: 23±1	-	low-volume high-intensity interval walking	10 weeks	3 days/ week, 30 min, 10 intervals with 60s 50-60% HRR and 80-90% HRR	HC: healthy young adults
Li et al. (2015)	Oxygraph	PBMCs	Early-stage heart failure patients	N: 49 IG: 25 HC: 24	IG: Mean: 49±3 HC: Mean: 47±3	-	-	-	-	HC
Shirakawa et al. (2019)	Oxygraph	PBMCs	Mild CHF (NYHA class I-II) or moderate to severe CHF (NYHA class III)	N: 62 NYHA class I-II: 31 NYHA class III: 31	NYHA class I-II: Mean: 63±13 NYHA class III: Mean: 61±14	NYHA class I-II: Mean: 19.5±4.6 NYHA class III: Mean: 14.5±4.3	-	-	-	-
Sommer et al. (2022)	Oxygraph	PBMCs	Pulmonary Arterial Hypertension	N: 39 In patient PAH: 14 Outpatient PAH: 15 CG: 10	Inpatient: Median: 59 (50; 70) Outpatient: 59 (49; 64) CG: 56 (28;68)	-	-	-	-	CG
Tyrrell et al. (2015)	Seahorse	PBMCs	Overweight, obese older adults	N: 15	Mean: 68.3±3.5	-	-	-	-	-
Zhou et al. (2020)	Oxygraph	PBMCs	Heart failure hospitalized patients	N: IG: 19 HC: 19	IG: Mean: 51.8±14.1 HC: Mean: 42.3±8.0	-	-	-	-	HC
Gamradt et al. (2021)	Seahorse	T cells	Major depressive disorder	N: 56 IG: 28 HC: 28	IG: Mean: 32.2±11.7 HC: Mean: 32.2±10.5	-	-	-	-	CG

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Table S2 – Part 1

Overview and summary of the findings across the included studies. OXPHOS=Oxidative phosphorylation; C=Correlation.

AUTHOR, YEAR	CELL TYPE	VARIABLES	ACUTE	TRAINING	IG VS. CG	CORRELATION
Janssen et al. (2022)	PBMCs	PBMC number	↓	-	↔	-
		PBMC composition	↔	-	↔	-
		Basal respiration	↔	-	↑	-
		Maximal respiration	↔	-	↑	-
		Mitochondrial respiratory capacity	↔	-	↑	-
		Spare respiratory capacity	↔	-	↑	-
		ATP linked respiration	↔	-	↑	-
		Proton leak	↔	-	↑	-
Liepinsh et al. (2020)	PBMCs	Basal respiration	↑	-	-	-
		FA-dependent leak	↑	-	-	-
		OXPHOS	↑	-	-	-
		FA-dependent OXPHOS coupling efficiency	↑	-	-	-
		Complex-IV-linked respiration at OXPHOS state	↔	-	-	-
Stampley et al. (2023)	PBMCs	PBMC number	↑	-	-	-
		Basal respiration	↑	-	-	-
		Other states	↔	-	-	-
		Flux control ratio	↑	-	-	-
Theall et al. (2021)	PBMCs	Total mitochondrial respiration	↔	-	-	-
Hedges et al. (2019)	PBMCs	$\dot{V}O_2$peak	-	↑	-	-
		Total mitochondrial respiration	-	↔	-	-
Kocher et al. (2017)	PBMCs	$\dot{V}O_2$peak	-	↑	-	No C. between $\dot{V}O_2$peak and mitochondrial function.
		Total mitochondrial respiration	-	↑	-	
		Basal respiration	-	↔	-	
		Respiratory capacity	-	↑	-	
		Spare respiratory capacity	-	↑	-	
		Non-mitochondrial respiration	-	↑	-	
Noz et al. (2019)	PBMCs	Basal respiration	-	↔	-	-
		Maximal respiration	-	↓	-	
Brand et al. (2020)	Lymphocytes	Total mitochondrial respiration	-	↑	↓	Positive C. between symptoms of depression and burnout with mitochondrial activity.
		OXPHOS	-	↑	↓	
		Maximal respiration	-	↑	↓	
		Symptoms of depression and burnout	-	↓	↓	
Tsai et al. (2016)	Lymphocytes	$\dot{V}O_2$peak	-	↑	↑	-
		Total mitochondrial respiration	-	↑	↑	
		OXPHOS	-	↑	↑	
		ATP linked respiration	↓	↑	↑	
		Reserve capacity	↓	↑	↑	
Andonian et al. (2022)	CD4+ T cells	$\dot{V}O_2$peak	-	↑	-	Positive C. between CRF and changes in basal and maximal respiration.
		Total mitochondrial respiration	-	↔	-	
Lin et al. (2022)	NK cells	$\dot{V}O_2$peak	-	-	-	Positive C. between changes of $\dot{V}O_2$peak and changes in reserve and maximal respiration.
		Maximal respiration	↑	↑	-	
		Reserve oxygen capacity	↑	↑	-	

Table S2 – Part 2

Overview and summary of the findings across the included studies. OXPHOS=Oxidative phosphorylation; C=Correlation.

AUTHOR, YEAR	CELL TYPE	VARIABLES	ACUTE	TRAINING	IG VS. CG	CORRELATION
Hsu et al. (2019)	Platelets	$\dot{V}O_2$peak	-	↑	↑	Positive C. between changes of $\dot{V}O_2$peak and changes in OXPHOS and maximal respiration.
		Routine respiration	-	↔	↔	
		OXPHOS	-	↑	↑	
		Maximal respiration	-	↑	↑	
		Oxidative stress	-	↓	↓	
		Pro-inflammatory status	-	↓	↓	
Lin et al. (2021)	Platelets	$\dot{V}O_2$peak	-	↑	↑	Positive C. between changes of $\dot{V}O_2$peak and changes of OXPHOS and maximal respiration.
		Maximal respiration	-	↑	↑	
		OXPHOS	-	↑	↑	
		Oxidative stress	-	↓	↓	
		Pro-inflammatory status	-	↓	↓	
Bartlett et al. (2020)	Neutrophils	Basal respiration	-	↑	–	Negative C. between relative $\dot{V}O_2$peak and changes in HbA1c and fasting glucose.
		Maximal respiration	-	↑	–	Positive C. between relative $\dot{V}O_2$peak and fasting insulin.
		ATP production	-	↑	–	
		Proton leak	-	↓	–	
Li et al. (2015)	PBMCs	Total mitochondrial respiration	-	-	↓	Negative C. between mitochondrial respiratory function and oxidative stress and inflammation.
		Basal respiration	-	-	↓	Negative C. between mitochondrial respiratory function and TNF-α, IL-6, CRP, SOD.
		Maximal respiration	-	-	↓	Negative C. between mitochondrial respiratory function and cardiometabolic risk factors.
		Anti-oxidative capacity	-	-	↓	
Shirakawa et al. (2019)	PBMCs	$\dot{V}O_2$peak	-	-	↓	Negative C. between $\dot{V}O_2$peak and mitochondrial ROS levels.
		Mitochondrial respiratory capacity	-	-	↓	
		Maximal respiration	-	-	↓	
		Mitochondrial ROS generation	-	-	↑	
Sommer et al. (2022)	PBMCs	Mitochondrial respiration	-	-	↔	Negative C. between mitochondrial respiration and disease severity.
Tyrell et al. (2015)	PBMCs	-	-	-	–	Positive C. between spare respiratory capacity and maximal respiration and knee extensor strength.
						Negative C. between basal respiration, maximal respiration, spare respiratory capacity and IL-6.
Zhou et al. (2020)	PBMCs	Maximal respiration	-	-	↓	-
		Pro-inflammatory gene expression	-	-	↑	
Gamradt et al. (2021)	T cells	Total mitochondrial respiration	-	-	↓	Negative C. between basal respiration, ATP-linked respiration, spare respiratory capacity and clinical-rated depression severity.
		Basal respiration	-	-	↓	
		ATP production	-	-	↓	
		Spare respiratory capacity	-	-	↓	