

Supplementary Tables

Table S1. Differences between studied groups before the initiation and after completion of the exercise intervention.

NG - subjects with normal fasting glucose and normal glucose tolerance; IFG - subjects with impaired fasting glucose and normal glucose tolerance; IFG+IGT – subjects with impaired fasting glucose and impaired glucose tolerance; BMI – body mass index; HbA1c - Haemoglobin A1c; VAT – visceral adipose tissue; TG – triglycerides; HDL - high-density lipoprotein cholesterol; LDL - low-density lipoprotein cholesterol; VO₂max - maximal oxygen consumption; HOMA-IR - homeostatic model assessment for insulin resistance was calculated; HOMA-β - homeostatic model assessment of beta cell function. Presented are p-values of post-hoc tests. Bold and Italic values denote statistical significance at the p < 0.05 level.

	NG vs. IFG before	NG vs. IFG after	NG vs. IFG+IGT before	NG vs. IFG+IGT after	IFG vs. IFG+IGT before	IFG vs. IFG+IGT after
Weight (kg)	0.937	0.986	0.836	0.961	0.992	0.999
BMI (kg/m²)	0.518	0.700	0.040	0.108	0.377	0.517
HbA1c (%)	0.383	0.568	0.026	0.049	0.378	0.408
Glucose 0' (mg/dl)	<0.001	0.464	<0.001	0.073	0.045	0.594
Glucose 120' (mg/dl)	0.728	0.952	<0.001	0.684	<0.001	0.247
Insulin 0' (μU/mL)	0.365	0.973	<0.001	0.076	0.001	0.177
Insulin 120' (μU/mL)	0.114	0.996	<0.001	0.014	0.002	0.024
VAT mass (kg)	0.861	0.993	0.037	0.216	0.165	0.338
Total Chol. (mg/dl)	1.000	0.993	0.966	1.000	0.971	1.000
TG (mg/dl)	1.000	0.905	0.320	0.612	0.340	0.939
HDL (mg/dl)	0.691	0.495	0.995	0.956	0.994	0.998
LDL (mg/dl)	0.952	0.984	0.991	0.988	1.000	1.000
VO₂max (ml/kg/min)	0.326	0.999	0.283	1.000	0.977	0.996
HOMA-IR	0.028	0.877	<0.001	0.017	0.015	0.078
HOMA-β (%)	0.997	1.000	0.528	0.732	0.289	0.704
Fat mass (kg)	0.780	0.981	0.356	0.765	0.854	0.945
Lean mass (kg)	0.999	0.999	1.000	1.000	0.995	0.990

Table S2. MUSCLE mass-specific and mitochondria-specific respiratory capacity parameters in patients with Normoglycemia (NG), isolated Impaired Fasting Glucose (IFG) and Impaired Fasting Glucose and Impaired Glucose Tolerance (IFG + IGT), before and after 3 months of exercise intervention.

Presented are mean and standard error values. Bold and Italic values denote statistical significance at the $p < 0.05$ level.

CIP - complex I - linked OXPHOS capacity; *CI+IIP* - maximal complex I + II -linked OXPHOS capacity; *ETSmax* - maximal capacity of the electron transfer system; *Km* - Km for succinate titration; *CIP nor.* - complex I - linked OXPHOS capacity normalized per citrate synthase (CS) activity; *CI+IIP nor.* - maximal complex I + II -linked OXPHOS capacity normalized per citrate synthase activity; *ETSmax nor.* - maximal capacity of the electron transfer system normalized per citrate synthase activity; *Km nor.* - Km for succinate titration normalized per citrate synthase activity.

Parameter (unit)	Normoglycemia <i>n</i> = 19			IFG <i>n</i> = 27			IFG + IGT <i>n</i> = 8			<i>p</i> -Value			Post-hoc <i>p</i> -values		
										Time × Baseline			NG before vs. after	IFG before vs. after	IFG+IG before vs. after
	Before	After 3 m.	Before	After 3 m.	Before	After 3 m.	Baseline	Time	Diagnosi	s	3m.	3m.	3m.		
<i>CIP</i> (pmol mg-1 s-1)	18.19 (±2.32)	17.87 (±1.45)	19.22 (±1.48)	18.76 (±1.91)	21.99 (±1.23)	15.46 (±1.77)		0.085	0.845	0.093	0.721	0.883	0.078		
<i>CI+IIP</i> (pmol mg-1 s-1)	62.98 (±4.95)	78.85 (±5.68)	59.64 (±2.59)	71.08 (±4.54)	67.36 (±5.44)	70.81 (±7.20)		0.612	0.094	0.642	0.117	0.291	0.271		
<i>ETSmax</i> (pmol mg-1 s-1)	84.94 (±6.49)	97.89 (±6.95)	79.99 (±3.42)	93.22 (±5.68)	90.14 (±7.88)	91.90 (±10.34)		0.785	0.121	0.823	0.233	0.310	0.277		
<i>Km</i> (mM/L)	4.00 (±0.65)	3.44 (±0.56)	3.21 (±0.55)	3.22 (±0.51)	5.28 (±0.95)	6.68 (±1.20)		0.053	0.643	0.201	0.815	0.724	0.115		
<i>CIP nor.</i> (pmol mg-1 s-1 /CS activity)	0.42 (±0.05)	0.39 (±0.07)	0.57 (±0.06)	0.53 (±0.09)	0.78 (±0.05)	0.51 (±0.04)		0.104	0.964	0.152	0.772	0.907	0.069		
<i>CI+IIP nor.</i> (pmol mg-1 s-1 /CS activity)	1.73 (±0.22)	2.08 (±0.20)	1.97 (±0.09)	2.25 (±0.22)	2.47 (±0.34)	2.60 (±0.20)		0.628	0.152	0.883	0.180	0.437	0.347		

ETsmax nor. (pmol mg-1 s-1	2.60 (±0.21)	2.93 (±0.28)	2.70 (±0.06)	3.09 (±0.29)	3.30 (±0.46)	3.38 (±0.30)	0.834	0.376	0.923	0.331	0.526	0.295
Km nor. (mM/L	0.10 (±0.02)	0.09 (±0.03)	0.11 (±0.04)	0.11 (±0.03)	0.21 (±0.05)	0.27 (±0.03)	0.058	0.749	0.421	0.988	0.988	0.831
/CS activity)												

Table S3. ADIPOSE TISSUE mass-specific and mitochondria-specific respiratory capacity parameters in patients with Normoglycemia (NG), isolated Impaired Fasting Glucose (IFG) and Impaired Fasting Glucose and Impaired Glucose Tolerance (IFG + IGT), before and after 3 months of exercise intervention.

Presented are mean and standard error values. Bold and Italic values denote statistical significance at the p < 0.05 level.

CIP - complex I - linked OXPHOS capacity; CI+IIIP - maximal complex I + II -linked OXPHOS capacity; ETsmax - maximal capacity of the electron transfer system; Km - Km for succinate titration; CIP nor. - complex I - linked OXPHOS capacity normalized per citrate synthase (CS) activity; CI+IIIP nor. - maximal complex I + II -linked OXPHOS capacity normalized per citrate synthase activity; ETsmax nor. - maximal capacity of the electron transfer system normalized per citrate synthase activity; Km nor. - Km for succinate titration normalized per citrate synthase activity.

Parameter (unit)	Normoglycemia n = 19			IFG n = 27			IFG + IGT n = 8			p-Value			Post-hoc p-values		
										Time × Diagnosis vs. baseline			before vs. after		
	Before	After 3 m.	Before	After 3 m.	Before	After 3 m.	Baseline	Time	before	IFG	IFG+IG	T before	3m.	3m.	3m.
CIP (pmol mg-1 s-1)	0.38 (±0.04)	0.67 (±0.18)	0.45 (±0.04)	0.64 (±0.12)	0.40 (±0.20)	0.43 (±0.01)	0.428	0.030	0.079	0.011	0.021	0.040			
CI+IIIP (pmol mg-1 s-1)	0.93 (±0.09)	1.60 (±0.45)	1.18 (±0.06)	1.33 (±0.23)	0.94 (±0.20)	1.12 (±0.04)	0.137	0.039	0.257	0.004	0.014	0.041			
ETsmax (pmol mg-1 s-1)	1.12 (±0.10)	1.97 (±0.54)	1.29 (±0.10)	1.59 (±0.24)	1.15 (±0.15)	1.65 (±0.01)	0.201	0.009	0.303	0.004	0.013	0.008			

Km (mM/L)	1.81 (±0.41)	2.35 (±0.09)	1.66 (±0.51)	3.87 (±1.75)	2.65 (±1.23)	2.91 (±1.58)	0.752	0.097	0.674	0.782	0.080	0.29
CIP nor.												
(pmol mg-1 s-1 /CS activity)	0.26 (±0.03)	0.48 (±0.06)	0.32 (±0.03)	0.49 (±0.11)	0.30 (±0.03)	0.36 (±0.02)	0.539	0.042	0.081	0.018	0.029	0.042
CI+IIP nor.												
(pmol mg-1 s-1 /CS activity)	0.65 (±0.06)	1.28 (±0.08)	0.84 (±0.04)	1.02 (±0.21)	0.90 (±0.08)	0.95 (±0.01)	0.482	0.045	0.287	0.007	0.012	0.039
ETsmax nor.												
(pmol mg-1 s-1 /CS activity)	0.78 (±0.07)	1.36 (±0.10)	1.01 (±0.07)	1.28 (±0.21)	1.13 (±0.09)	1.35 (±0.11)	0.740	0.017	0.521	0.005	0.031	0.016
Km nor. (mM/L /CS activity)	1.33 (±0.33)	1.40 (±0.45)	1.16 (±0.33)	2.36 (±1.50)	1.90 (±0.88)	2.15 (±1.87)	0.813	0.103	0.731	0.871	0.098	0.18

MUSCLE

ADIPOSE TISSUE

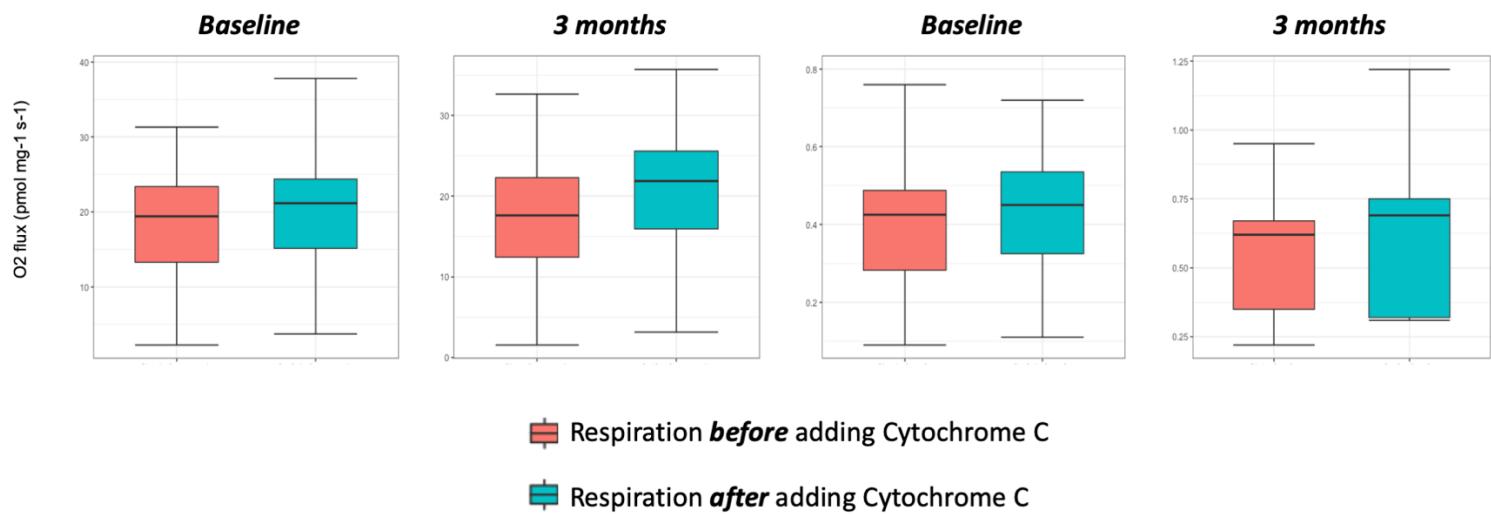


Figure S1. Changes in mitochondrial respiration after addition of Cytochrome C in adipose tissue and skeletal muscle. No significant differences were found when comparing respiration before and after addition of Cytochrome C, both before and after the exercise intervention, in adipose tissue and skeletal muscle, indicating that the integrity of the membrane was intact.