

Supplementary table 1. Liver histology in healthy humans (control, CON) and in people with NASH and without (OBE) and with type 2 diabetes (T2D).

Parameter	CON	OBE	T2D
Volumetric liver fat fraction (%)	1.8±2.9	38.5±21.8 [#]	47.7±16.9 [#]
Lobular inflammation grade (0/1/2/3)	14/0/0/0	3/24/3/0	0/3/12/0
Hepatocellular ballooning grade (0/1/2)	12/0/0	0/24/6	0/11/4
Fibrosis stage (0/1/2/3/4)	13/1/0/0/0	11/15/3/1/0	7/4/2/1/1

Mean±SD or n. #<0.05 vs CON from one-way ANCOVA.

Suppl. Table 2. Hepatic and plasma advanced glycation endproducts

Tissue	Parameter	CON	OBE	T2D
Liver	MG-H1 (pmol/mg)	57.4 (54.9;67.2)	109.1 (82.1;134.7) [#]	59.2 (39.6; 133.4)
	G-H1 (pmol/mg)	58.4 (19.6; 82.1)	76.3 (53.1; 89.8)	52.7 (35.7; 66.6)
	carboxyethyl- lysine (pmol/mg)	2614±652	2640±651	2662±1424
	carboxymethyl- lysine (pmol/mg)	702 (691;1059)	907 (614; 1801)	798 (629; 933)
	FL (pmol/mg)	344 (274;355)	386 (334;436)	392 (351;449) [#]
	3-nitro-tyrosine (pmol/mg)	351 (315;426)	438 (334;557)	276 (213;363)
	argpyrimidine (pmol/mg)	25.6 (24.6;27.4)	26.5 (25.0;27.7)	25.9 (24.5;27.2)
Plasma	MG-H1 (nmol/l)	18.8 (9.0;27.8)	8.8 (6.6;28.9)	31.8 (24.2;46.5) [*]
	G-H1 (nmol/l)	130 (108;214)	146 (98;163)	151 (150;159)
	carboxyethyl- lysine (nmol/l)	8.9 (3.0;11.2)	6.4 (3.8;11.1)	11.3 (7.9;16.1)

carboxymethyl-lysine (nmol/l)	163 (150;180)	121 (58;137)	147 (129;176)
FL (nmol/l)	56.3 (36.6;82.0)	26.5 (22.6;28.7) [#]	47.8 (40.3;61.4)
3-nitro-tyrosine (nmol/l)	11.2 (8.3;11.8)	7.8 (5.1;9.3)	8.0 (5.8;11.8)
argpyrimidine (nmol/l)	17.0 (16.7;17.2)	17.0 (16.7;17.5)	17.1 (17.0;17.2)

Mean±SD or median (q1;q3), *p<0.05 vs OBE, #p<0.05 vs CON from one-way ANCOVA.

CON – lean healthy humans, FL - fructosyl-lysine or fructosamine, G-H1 – glyoxal-derived hydroimidazolone isomer 1, MG-H1 - methylglyoxal-derived hydroimidazolone isomer 1, OBE – people with NASH but without type 2 diabetes, T2D – people with NASH and type 2 diabetes

Suppl. Table 3. Spearman correlation analysis in NASH patients with and without type 2 diabetes (selected results, complete list available in supplementary table 4).

Parameter	Variable	r	P value
Hepatic β OX-linked maximum mitochondrial respiration per CSA	Fasting blood glucose	-0.42	0.017
	Fasting EGP	-0.45	0.048
	Hepatic TBARS	-0.47	0.028
Hepatic TCA-linked maximum mitochondrial respiration per CSA	Hepatic TBARS	-0.42	0.045
	Hepatic carboxymethyl lysine	-0.78	0.0005
Hepatic H ₂ O ₂ emission	Hepatic ETC complex II	-0.48	0.030
	Hepatic ETC complex III	-0.54	0.008
	Hepatic ETC complex V	-0.54	0.040
Plasma MG-H1	Fasting blood glucose	0.61	0.019

Spearman correlations adjusted for age, sex and BMI. CSA – citrate synthase activity, ETC – electron transport chain, EGP – endogenous glucose production, MG-H1 - methylglyoxal-derived hydroimidazolone isomer 1, TBARS – thiobarbituric acid reactive species, TCA – tricarboxylic acid cycle, β OX – β -oxidation

Suppl. Table 4. Spearman correlation analysis in NASH patients with and without type 2 diabetes.

Variable	with	Adjustment	Spearman r	P value
ln_Q_state_u_box	ln_HCL	age sex BMI	-0.31	0.075
ln_Q_state_u_box	ln_mal_box	age sex BMI	0.21	0.241
ln_Q_state_u_box	ln_mal_oct	age sex BMI	0.31	0.061
ln_Q_state_u_box	ln_b_oxid	age sex BMI	0.46	0.004
ln_Q_state_u_box	ln_state_three_CI_box	age sex BMI	0.45	0.006
ln_Q_state_u_box	ln_state_three_CI_CII_box	age sex BMI	0.58	0.000
ln_Q_state_u_box	ln_cyt_C_box	age sex BMI	0.64	0.000
ln_Q_state_u_box	ln_state_u_box	age sex BMI	0.80	0.000
ln_Q_state_u_box	ln_mal_glycolysis	age sex BMI	-0.05	0.780
ln_Q_state_u_box	ln_mal_pyr	age sex BMI	-0.10	0.561
ln_Q_state_u_box	ln_state_three_CI_pyr	age sex BMI	0.42	0.011
ln_Q_state_u_box	ln_state_three_CI_pyr_glut	age sex BMI	0.31	0.060
ln_Q_state_u_box	ln_state_three_Ci_CII_pyr	age sex BMI	0.42	0.010
ln_Q_state_u_box	ln_cyt_c_pyr	age sex BMI	0.46	0.005
ln_Q_state_u_box	ln_state_u_pyr	age sex BMI	0.45	0.005

ln_Q_state_u_box	ln_mal_TCA	age sex BMI	-0.21	0.275
ln_Q_state_u_box	ln_mal_glut	age sex BMI	-0.06	0.730
ln_Q_state_u_box	ln_state_three_CI	age sex BMI	0.13	0.434
ln_Q_state_u_box	ln_state_three_CI_CII	age sex BMI	0.30	0.077
ln_Q_state_u_box	ln_cyt_c_TCA	age sex BMI	0.24	0.169
ln_Q_state_u_box	ln_state_u	age sex BMI	0.33	0.048
ln_Q_state_u_box	ln_Q_mal_box	age sex BMI	0.57	0.001
ln_Q_state_u_box	ln_Q_mal_oct	age sex BMI	0.64	0.000
ln_Q_state_u_box	ln_Q_b_oxid	age sex BMI	0.77	0.000
ln_Q_state_u_box	ln_Q_state_three_CI_box	age sex BMI	0.81	0.000
ln_Q_state_u_box	ln_Q_state_three_CI_CII_box	age sex BMI	0.93	0.000
ln_Q_state_u_box	ln_Q_cyt_C_box	age sex BMI	0.91	0.000
ln_Q_state_u_box	ln_Q_mal_glycolysis	age sex BMI	0.37	0.047
ln_Q_state_u_box	ln_Q_mal_pyr	age sex BMI	0.31	0.072
ln_Q_state_u_box	ln_Q_state_three_CI_pyr	age sex BMI	0.69	0.000
ln_Q_state_u_box	ln_Q_state_three_CI_pyr_glut	age sex BMI	0.69	0.000
ln_Q_state_u_box	ln_Q_state_three_Ci_CII_pyr	age sex BMI	0.83	0.000
ln_Q_state_u_box	ln_Q_cyt_c_pyr	age sex BMI	0.79	0.000

ln_Q_state_u_box	ln_Q_state_u_pyr	age sex BMI	0.81	0.000
ln_Q_state_u_box	ln_Q_mal_TCA	age sex BMI	0.12	0.519
ln_Q_state_u_box	ln_Q_mal_glut	age sex BMI	0.43	0.008
ln_Q_state_u_box	ln_Q_state_three_CI	age sex BMI	0.50	0.002
ln_Q_state_u_box	ln_Q_state_three_CI_CII	age sex BMI	0.79	0.000
ln_Q_state_u_box	ln_Q_cyt_c_TCA	age sex BMI	0.67	0.000
ln_Q_state_u_box	ln_Q_state_u	age sex BMI	0.78	0.000
ln_Q_state_u_box	ln_mal_box_mito	age sex BMI	-0.46	0.154
ln_Q_state_u_box	ln_mal_oct_mito	age sex BMI	-0.02	0.949
ln_Q_state_u_box	ln_box_mito	age sex BMI	-0.33	0.185
ln_Q_state_u_box	ln_oligo_box_mito	age sex BMI	-0.09	0.713
ln_Q_state_u_box	ln_max_box_mito	age sex BMI	-0.33	0.176
ln_Q_state_u_box	ln_mal_TCA_mito	age sex BMI	0.35	0.168
ln_Q_state_u_box	ln_mal_glut_mito	age sex BMI	0.29	0.226
ln_Q_state_u_box	ln_CI_mito	age sex BMI	0.28	0.203
ln_Q_state_u_box	ln_CI_CII_mito	age sex BMI	-0.11	0.636
ln_Q_state_u_box	ln_cyt_c_TCA_mito	age sex BMI	-0.21	0.351
ln_Q_state_u_box	ln_max_TCA_mito	age sex BMI	-0.15	0.513

ln_Q_state_u_box	ln_CSA	age sex BMI	-0.74	0.000
ln_Q_state_u_box	ln_M_Value	age sex BMI	0.03	0.888
ln_Q_state_u_box	ln_Insulin	age sex BMI	-0.18	0.384
ln_Q_state_u_box	ln_FFA	age sex BMI	0.18	0.357
ln_Q_state_u_box	ln_AdipoIR	age sex BMI	0.09	0.680
ln_Q_state_u_box	ln_bEGP	age sex BMI	-0.45	0.048
ln_Q_state_u_box	ln_EGP_suppr	age sex BMI	0.35	0.143
ln_Q_state_u_box	ln_HIS	age sex BMI	0.03	0.895
ln_Q_state_u_box	ln_CAT	age sex BMI	0.26	0.251
ln_Q_state_u_box	ln_TBARS	age sex BMI	-0.47	0.028
ln_Q_state_u_box	ln_V_ATP5A	age sex BMI	-0.30	0.149
ln_Q_state_u_box	ln_III_UQCRC2	age sex BMI	-0.06	0.788
ln_Q_state_u_box	ln_II_SDHB	age sex BMI	-0.33	0.105
ln_Q_state_u_box	ln_I_NDUFB8	age sex BMI	-0.44	0.029
ln_Q_state_u_box	ln_IV_COX_IV	age sex BMI	-0.22	0.284
ln_Q_state_u_box	ln_OPA1	age sex BMI	-0.29	0.164
ln_Q_state_u_box	ln_MFN1	age sex BMI	-0.24	0.269
ln_Q_state_u_box	ln_MFN2	age sex BMI	-0.39	0.053

ln_Q_state_u_box	ln_Fis	age sex BMI	-0.17	0.462
ln_Q_state_u_box	ln_MFF	age sex BMI	0.26	0.216
ln_Q_state_u_box	ln_PARKIN	age sex BMI	-0.13	0.544
ln_Q_state_u_box	ln_pPARKIN	age sex BMI	0.14	0.506
ln_Q_state_u_box	ln_pPARKIN_PARKIN	age sex BMI	0.28	0.179
ln_Q_state_u_box	ln_DRP1	age sex BMI	0.51	0.014
ln_Q_state_u_box	ln_pDRP1	age sex BMI	0.24	0.249
ln_Q_state_u_box	ln_pDRP1_DRP1	age sex BMI	-0.10	0.667
ln_Q_state_u_box	ln_PINK1	age sex BMI	0.20	0.346
ln_Q_state_u_box	ln_pPINK	age sex BMI	-0.36	0.078
ln_Q_state_u_box	ln_pPINK_PINK	age sex BMI	-0.42	0.036
ln_Q_state_u_box	ln_NF_kB	age sex BMI	0.04	0.854
ln_Q_state_u_box	ln_IRE1	age sex BMI	0.32	0.123
ln_Q_state_u_box	ln_PERK	age sex BMI	-0.24	0.257
ln_Q_state_u_box	ln_BiP	age sex BMI	0.31	0.136
ln_Q_state_u_box	ln_ATF4	age sex BMI	-0.04	0.857
ln_Q_state_u_box	ln_eIF2	age sex BMI	0.11	0.609
ln_Q_state_u_box	ln_phospho_eIF2	age sex BMI	0.08	0.694

ln_Q_state_u_box	ln_Liver_MG_H1	age sex BMI	0.31	0.350
ln_Q_state_u_box	ln_Liver_CML	age sex BMI	-0.59	0.056
ln_Q_state_u_box	ln_Liver_FL	age sex BMI	-0.16	0.631
ln_Q_state_u_box	ln_Liver_3NT	age sex BMI	0.17	0.614
ln_Q_state_u_box	ln_Liver_Argyprimidine	age sex BMI	0.04	0.905
ln_Q_state_u_box	ln_Plasma_MG_H1	age sex BMI	-0.27	0.417
ln_Q_state_u_box	ln_Plasma_CEL	age sex BMI	0.17	0.608
ln_Q_state_u_box	ln_Plasm_G_H1	age sex BMI	0.28	0.441
ln_Q_state_u_box	ln_Plasm_CML	age sex BMI	0.51	0.107
ln_Q_state_u_box	ln_Plasma_FL	age sex BMI	0.06	0.860
ln_Q_state_u_box	ln_Plasma_3NT	age sex BMI	-0.03	0.927
ln_Q_state_u_box	ln_Plasa_Argyprimidine	age sex BMI	-0.34	0.299
ln_Q_state_u_box	NAFLD_Score	age sex BMI	-0.23	0.174
ln_Q_state_u_box	Lobular_inflammation	age sex BMI	0.14	0.409
ln_Q_state_u_box	Portal_inflammation	age sex BMI	-0.32	0.054
ln_Q_state_u_box	Ballooning	age sex BMI	0.03	0.881
ln_Q_state_u_box	Fibrosis	age sex BMI	-0.34	0.039
ln_Q_state_u_box	FPG	age sex BMI	-0.42	0.017

ln_Q_state_u_box	HbA1c	age sex BMI	-0.31	0.077
ln_Q_state_u_box	H2O2	age sex BMI	-0.02	0.920
ln_Q_state_u_box	Liver_CEL	age sex BMI	0.23	0.502
ln_Q_state_u_box	Liver_G_H1	age sex BMI	-0.38	0.245
ln_Q_state_u_box	HCL	age sex BMI	-0.28	0.088
ln_Q_state_u_pyr	ln_HCL	age sex BMI	-0.16	0.346
ln_Q_state_u_pyr	ln_mal_box	age sex BMI	0.30	0.091
ln_Q_state_u_pyr	ln_mal_oct	age sex BMI	0.34	0.038
ln_Q_state_u_pyr	ln_b_oxid	age sex BMI	0.58	0.000
ln_Q_state_u_pyr	ln_state_three_CI_box	age sex BMI	0.45	0.005
ln_Q_state_u_pyr	ln_state_three_CI_CII_box	age sex BMI	0.44	0.007
ln_Q_state_u_pyr	ln_cyt_C_box	age sex BMI	0.54	0.001
ln_Q_state_u_pyr	ln_state_u_box	age sex BMI	0.55	0.000
ln_Q_state_u_pyr	ln_mal_glycolysis	age sex BMI	0.05	0.787
ln_Q_state_u_pyr	ln_mal_pyr	age sex BMI	0.12	0.486
ln_Q_state_u_pyr	ln_state_three_CI_pyr	age sex BMI	0.51	0.001
ln_Q_state_u_pyr	ln_state_three_CI_pyr_glut	age sex BMI	0.48	0.003
ln_Q_state_u_pyr	ln_state_three_Ci_CII_pyr	age sex BMI	0.57	0.000

ln_Q_state_u_pyr	ln_cyt_c_pyr	age sex BMI	0.66	0.000
ln_Q_state_u_pyr	ln_state_u_pyr	age sex BMI	0.76	0.000
ln_Q_state_u_pyr	ln_mal_TCA	age sex BMI	-0.06	0.761
ln_Q_state_u_pyr	ln_mal_glut	age sex BMI	0.00	0.976
ln_Q_state_u_pyr	ln_state_three_CI	age sex BMI	0.26	0.110
ln_Q_state_u_pyr	ln_state_three_CI_CII	age sex BMI	0.39	0.017
ln_Q_state_u_pyr	ln_cyt_c_TCA	age sex BMI	0.33	0.049
ln_Q_state_u_pyr	ln_state_u	age sex BMI	0.35	0.036
ln_Q_state_u_pyr	ln_Q_mal_box	age sex BMI	0.64	0.000
ln_Q_state_u_pyr	ln_Q_mal_oct	age sex BMI	0.64	0.000
ln_Q_state_u_pyr	ln_Q_b_oxid	age sex BMI	0.86	0.000
ln_Q_state_u_pyr	ln_Q_state_three_CI_box	age sex BMI	0.80	0.000
ln_Q_state_u_pyr	ln_Q_state_three_CI_CII_box	age sex BMI	0.82	0.000
ln_Q_state_u_pyr	ln_Q_cyt_C_box	age sex BMI	0.84	0.000
ln_Q_state_u_pyr	ln_Q_state_u_box	age sex BMI	0.81	0.000
ln_Q_state_u_pyr	ln_Q_mal_glycolysis	age sex BMI	0.40	0.025
ln_Q_state_u_pyr	ln_Q_mal_pyr	age sex BMI	0.51	0.002
ln_Q_state_u_pyr	ln_Q_state_three_CI_pyr	age sex BMI	0.77	0.000

ln_Q_state_u_pyr	ln_Q_state_three_CI_pyr_glut	age sex BMI	0.77	0.000
ln_Q_state_u_pyr	ln_Q_state_three_Ci_CII_pyr	age sex BMI	0.91	0.000
ln_Q_state_u_pyr	ln_Q_cyt_c_pyr	age sex BMI	0.93	0.000
ln_Q_state_u_pyr	ln_Q_mal_TCA	age sex BMI	0.21	0.247
ln_Q_state_u_pyr	ln_Q_mal_glut	age sex BMI	0.47	0.003
ln_Q_state_u_pyr	ln_Q_state_three_CI	age sex BMI	0.60	0.000
ln_Q_state_u_pyr	ln_Q_state_three_CI_CII	age sex BMI	0.82	0.000
ln_Q_state_u_pyr	ln_Q_cyt_c_TCA	age sex BMI	0.75	0.000
ln_Q_state_u_pyr	ln_Q_state_u	age sex BMI	0.81	0.000
ln_Q_state_u_pyr	ln_mal_box_mito	age sex BMI	-0.37	0.232
ln_Q_state_u_pyr	ln_mal_oct_mito	age sex BMI	0.07	0.779
ln_Q_state_u_pyr	ln_box_mito	age sex BMI	-0.17	0.489
ln_Q_state_u_pyr	ln_oligo_box_mito	age sex BMI	-0.22	0.365
ln_Q_state_u_pyr	ln_max_box_mito	age sex BMI	-0.16	0.509
ln_Q_state_u_pyr	ln_mal_TCA_mito	age sex BMI	0.29	0.267
ln_Q_state_u_pyr	ln_mal_glut_mito	age sex BMI	0.26	0.274
ln_Q_state_u_pyr	ln_CI_mito	age sex BMI	0.24	0.279
ln_Q_state_u_pyr	ln_CI_CII_mito	age sex BMI	-0.09	0.677

ln_Q_state_u_pyr	ln_cyt_c_TCA_mito	age sex BMI	-0.21	0.351
ln_Q_state_u_pyr	ln_max_TCA_mito	age sex BMI	-0.19	0.392
ln_Q_state_u_pyr	ln_CSA	age sex BMI	-0.73	0.000
ln_Q_state_u_pyr	ln_M_Value	age sex BMI	0.08	0.739
ln_Q_state_u_pyr	ln_Insulin	age sex BMI	-0.18	0.356
ln_Q_state_u_pyr	ln_FFA	age sex BMI	0.16	0.402
ln_Q_state_u_pyr	ln_AdipoIR	age sex BMI	0.00	0.988
ln_Q_state_u_pyr	ln_bEGP	age sex BMI	-0.41	0.073
ln_Q_state_u_pyr	ln_EGP_suppr	age sex BMI	0.28	0.239
ln_Q_state_u_pyr	ln_HIS	age sex BMI	0.33	0.179
ln_Q_state_u_pyr	ln_CAT	age sex BMI	0.38	0.077
ln_Q_state_u_pyr	ln_TBARS	age sex BMI	-0.24	0.263
ln_Q_state_u_pyr	ln_V_ATP5A	age sex BMI	-0.07	0.745
ln_Q_state_u_pyr	ln_III_UQCRC2	age sex BMI	0.17	0.409
ln_Q_state_u_pyr	ln_II_SDHB	age sex BMI	-0.20	0.320
ln_Q_state_u_pyr	ln_I_NDUFB8	age sex BMI	-0.27	0.176
ln_Q_state_u_pyr	ln_IV_COX_IV	age sex BMI	-0.08	0.688
ln_Q_state_u_pyr	ln_OPA1	age sex BMI	-0.26	0.202

ln_Q_state_u_pyr	ln_MFN1	age sex BMI	-0.21	0.313
ln_Q_state_u_pyr	ln_MFN2	age sex BMI	-0.35	0.082
ln_Q_state_u_pyr	ln_Fis	age sex BMI	-0.07	0.766
ln_Q_state_u_pyr	ln_MFF	age sex BMI	0.22	0.301
ln_Q_state_u_pyr	ln_PARKIN	age sex BMI	-0.17	0.423
ln_Q_state_u_pyr	ln_pPARKIN	age sex BMI	-0.13	0.533
ln_Q_state_u_pyr	ln_pPARKIN_PARKIN	age sex BMI	0.13	0.518
ln_Q_state_u_pyr	ln_DRP1	age sex BMI	0.38	0.075
ln_Q_state_u_pyr	ln_pDRP1	age sex BMI	0.19	0.342
ln_Q_state_u_pyr	ln_pDRP1_DRP1	age sex BMI	0.08	0.701
ln_Q_state_u_pyr	ln_PINK1	age sex BMI	0.21	0.295
ln_Q_state_u_pyr	ln_pPINK	age sex BMI	-0.37	0.066
ln_Q_state_u_pyr	ln_pPINK_PINK	age sex BMI	-0.46	0.017
ln_Q_state_u_pyr	ln_NF_kB	age sex BMI	-0.01	0.970
ln_Q_state_u_pyr	ln_IRE1	age sex BMI	0.32	0.109
ln_Q_state_u_pyr	ln_PERK	age sex BMI	-0.13	0.540
ln_Q_state_u_pyr	ln_BiP	age sex BMI	0.19	0.351
ln_Q_state_u_pyr	ln_ATF4	age sex BMI	-0.20	0.327

ln_Q_state_u_pyr	ln_eIF2	age sex BMI	-0.16	0.427
ln_Q_state_u_pyr	ln_phospho_eIF2	age sex BMI	0.12	0.550
ln_Q_state_u_pyr	ln_Liver_MG_H1	age sex BMI	0.13	0.681
ln_Q_state_u_pyr	ln_Liver_CML	age sex BMI	-0.55	0.063
ln_Q_state_u_pyr	ln_Liver_FL	age sex BMI	-0.23	0.479
ln_Q_state_u_pyr	ln_Liver_3NT	age sex BMI	0.31	0.319
ln_Q_state_u_pyr	ln_Liver_Argyprimidine	age sex BMI	0.08	0.793
ln_Q_state_u_pyr	ln_Plasma_MG_H1	age sex BMI	-0.26	0.417
ln_Q_state_u_pyr	ln_Plasma_CEL	age sex BMI	0.06	0.852
ln_Q_state_u_pyr	ln_Plasma_G_H1	age sex BMI	0.05	0.879
ln_Q_state_u_pyr	ln_Plasma_CML	age sex BMI	0.35	0.269
ln_Q_state_u_pyr	ln_Plasma_FL	age sex BMI	-0.24	0.449
ln_Q_state_u_pyr	ln_Plasma_3NT	age sex BMI	0.08	0.797
ln_Q_state_u_pyr	ln_Plasma_Argyprimidine	age sex BMI	0.09	0.789
ln_Q_state_u_pyr	NAFLD_Score	age sex BMI	-0.13	0.442
ln_Q_state_u_pyr	Lobular_inflammation	age sex BMI	0.20	0.234
ln_Q_state_u_pyr	Portal_inflammation	age sex BMI	-0.31	0.061
ln_Q_state_u_pyr	Ballooning	age sex BMI	0.18	0.277

ln_Q_state_u_pyr	Fibrosis	age sex BMI	-0.26	0.114
ln_Q_state_u_pyr	FPG	age sex BMI	-0.34	0.054
ln_Q_state_u_pyr	HbA1c	age sex BMI	-0.17	0.343
ln_Q_state_u_pyr	H2O2	age sex BMI	-0.12	0.550
ln_Q_state_u_pyr	Liver_CEL	age sex BMI	0.03	0.923
ln_Q_state_u_pyr	Liver_G_H1	age sex BMI	0.08	0.809
ln_Q_state_u_pyr	HCL	age sex BMI	-0.14	0.401
ln_Q_state_u	ln_HCL	age sex BMI	-0.32	0.062
ln_Q_state_u	ln_mal_box	age sex BMI	0.26	0.159
ln_Q_state_u	ln_mal_oct	age sex BMI	0.37	0.026
ln_Q_state_u	ln_b_oxid	age sex BMI	0.42	0.012
ln_Q_state_u	ln_state_three_CI_box	age sex BMI	0.47	0.004
ln_Q_state_u	ln_state_three_CI_CII_box	age sex BMI	0.43	0.009
ln_Q_state_u	ln_cyt_C_box	age sex BMI	0.43	0.009
ln_Q_state_u	ln_state_u_box	age sex BMI	0.58	0.000
ln_Q_state_u	ln_mal_glycolysis	age sex BMI	0.04	0.853
ln_Q_state_u	ln_mal_pyr	age sex BMI	0.19	0.268
ln_Q_state_u	ln_state_three_CI_pyr	age sex BMI	0.50	0.002

ln_Q_state_u	ln_state_three_CI_pyr_glut	age sex BMI	0.39	0.017
ln_Q_state_u	ln_state_three_Ci_CII_pyr	age sex BMI	0.40	0.016
ln_Q_state_u	ln_cyt_c_pyr	age sex BMI	0.47	0.003
ln_Q_state_u	ln_state_u_pyr	age sex BMI	0.50	0.002
ln_Q_state_u	ln_mal_TCA	age sex BMI	0.14	0.465
ln_Q_state_u	ln_mal_glut	age sex BMI	0.25	0.133
ln_Q_state_u	ln_state_three_CI	age sex BMI	0.55	0.000
ln_Q_state_u	ln_state_three_CI_CII	age sex BMI	0.56	0.000
ln_Q_state_u	ln_cyt_c_TCA	age sex BMI	0.60	0.000
ln_Q_state_u	ln_state_u	age sex BMI	0.69	0.000
ln_Q_state_u	ln_Q_mal_box	age sex BMI	0.61	0.000
ln_Q_state_u	ln_Q_mal_oct	age sex BMI	0.68	0.000
ln_Q_state_u	ln_Q_b_oxid	age sex BMI	0.74	0.000
ln_Q_state_u	ln_Q_state_three_CI_box	age sex BMI	0.82	0.000
ln_Q_state_u	ln_Q_state_three_CI_CII_box	age sex BMI	0.76	0.000
ln_Q_state_u	ln_Q_cyt_C_box	age sex BMI	0.72	0.000
ln_Q_state_u	ln_Q_state_u_box	age sex BMI	0.78	0.000
ln_Q_state_u	ln_Q_mal_glycolysis	age sex BMI	0.46	0.011

ln_Q_state_u	ln_Q_mal_pyr	age sex BMI	0.58	0.000
ln_Q_state_u	ln_Q_state_three_CI_pyr	age sex BMI	0.74	0.000
ln_Q_state_u	ln_Q_state_three_CI_pyr_glut	age sex BMI	0.74	0.000
ln_Q_state_u	ln_Q_state_three_Ci_CII_pyr	age sex BMI	0.77	0.000
ln_Q_state_u	ln_Q_cyt_c_pyr	age sex BMI	0.79	0.000
ln_Q_state_u	ln_Q_state_u_pyr	age sex BMI	0.81	0.000
ln_Q_state_u	ln_Q_mal_TCA	age sex BMI	0.42	0.020
ln_Q_state_u	ln_Q_mal_glut	age sex BMI	0.74	0.000
ln_Q_state_u	ln_Q_state_three_CI	age sex BMI	0.82	0.000
ln_Q_state_u	ln_Q_state_three_CI_CII	age sex BMI	0.93	0.000
ln_Q_state_u	ln_Q_cyt_c_TCA	age sex BMI	0.93	0.000
ln_Q_state_u	ln_mal_box_mito	age sex BMI	-0.15	0.650
ln_Q_state_u	ln_mal_oct_mito	age sex BMI	0.10	0.711
ln_Q_state_u	ln_box_mito	age sex BMI	0.00	0.991
ln_Q_state_u	ln_oligo_box_mito	age sex BMI	-0.10	0.697
ln_Q_state_u	ln_max_box_mito	age sex BMI	-0.23	0.354
ln_Q_state_u	ln_mal_TCA_mito	age sex BMI	0.22	0.422
ln_Q_state_u	ln_mal_glut_mito	age sex BMI	0.16	0.516

ln_Q_state_u	ln_CI_mito	age sex BMI	0.17	0.452
ln_Q_state_u	ln_CI_CII_mito	age sex BMI	-0.21	0.352
ln_Q_state_u	ln_cyt_c_TCA_mito	age sex BMI	-0.31	0.184
ln_Q_state_u	ln_max_TCA_mito	age sex BMI	-0.23	0.319
ln_Q_state_u	ln_CSA	age sex BMI	-0.70	0.000
ln_Q_state_u	ln_M_Value	age sex BMI	-0.07	0.781
ln_Q_state_u	ln_Insulin	age sex BMI	-0.19	0.349
ln_Q_state_u	ln_FFA	age sex BMI	0.17	0.395
ln_Q_state_u	ln_AdipoIR	age sex BMI	-0.01	0.955
ln_Q_state_u	ln_bEGP	age sex BMI	-0.45	0.051
ln_Q_state_u	ln_EGP_suppr	age sex BMI	0.43	0.072
ln_Q_state_u	ln_HIS	age sex BMI	0.16	0.534
ln_Q_state_u	ln_CAT	age sex BMI	0.16	0.463
ln_Q_state_u	ln_TBARS	age sex BMI	-0.42	0.045
ln_Q_state_u	ln_V_ATP5A	age sex BMI	-0.22	0.299
ln_Q_state_u	ln_III_UQCRC2	age sex BMI	0.17	0.411
ln_Q_state_u	ln_II_SDHB	age sex BMI	-0.36	0.074
ln_Q_state_u	ln_I_NDUFB8	age sex BMI	-0.44	0.026

ln_Q_state_u	ln_IV_COX_IV	age sex BMI	-0.09	0.651
ln_Q_state_u	ln_OPA1	age sex BMI	-0.29	0.145
ln_Q_state_u	ln_MFN1	age sex BMI	-0.22	0.283
ln_Q_state_u	ln_MFN2	age sex BMI	-0.42	0.033
ln_Q_state_u	ln_Fis	age sex BMI	-0.13	0.566
ln_Q_state_u	ln_MFF	age sex BMI	0.35	0.086
ln_Q_state_u	ln_PARKIN	age sex BMI	-0.05	0.819
ln_Q_state_u	ln_pPARKIN	age sex BMI	-0.02	0.936
ln_Q_state_u	ln_pPARKIN_PARKIN	age sex BMI	0.07	0.730
ln_Q_state_u	ln_DRP1	age sex BMI	0.54	0.008
ln_Q_state_u	ln_pDRP1	age sex BMI	0.21	0.303
ln_Q_state_u	ln_pDRP1_DRP1	age sex BMI	-0.12	0.593
ln_Q_state_u	ln_PINK1	age sex BMI	0.09	0.658
ln_Q_state_u	ln_pPINK	age sex BMI	-0.57	0.002
ln_Q_state_u	ln_pPINK_PINK	age sex BMI	-0.45	0.021
ln_Q_state_u	ln_NF_kB	age sex BMI	-0.07	0.743
ln_Q_state_u	ln_IRE1	age sex BMI	0.38	0.055
ln_Q_state_u	ln_PERK	age sex BMI	-0.01	0.977

ln_Q_state_u	ln_BiP	age sex BMI	0.10	0.640
ln_Q_state_u	ln_ATF4	age sex BMI	-0.21	0.292
ln_Q_state_u	ln_eIF2	age sex BMI	-0.13	0.525
ln_Q_state_u	ln_phospho_eIF2	age sex BMI	-0.03	0.895
ln_Q_state_u	ln_Liver_MG_H1	age sex BMI	0.00	0.995
ln_Q_state_u	ln_Liver_CML	age sex BMI	-0.78	0.005
ln_Q_state_u	ln_Liver_FL	age sex BMI	0.29	0.393
ln_Q_state_u	ln_Liver_3NT	age sex BMI	-0.09	0.782
ln_Q_state_u	ln_Liver_Argyprimidine	age sex BMI	0.14	0.682
ln_Q_state_u	ln_Plasma_MG_H1	age sex BMI	-0.42	0.204
ln_Q_state_u	ln_Plasma_CEL	age sex BMI	0.00	0.990
ln_Q_state_u	ln_Plasm_G_H1	age sex BMI	-0.40	0.257
ln_Q_state_u	ln_Plasm_CML	age sex BMI	0.20	0.555
ln_Q_state_u	ln_Plasma_FL	age sex BMI	-0.29	0.379
ln_Q_state_u	ln_Plasma_3NT	age sex BMI	0.24	0.483
ln_Q_state_u	ln_Plasa_Argyprimidine	age sex BMI	0.24	0.478
ln_Q_state_u	NAFLD_Score	age sex BMI	-0.17	0.319
ln_Q_state_u	Lobular_inflammation	age sex BMI	0.29	0.081

ln_Q_state_u	Portal_inflammation	age sex BMI	-0.26	0.120
ln_Q_state_u	Ballooning	age sex BMI	0.32	0.058
ln_Q_state_u	Fibrosis	age sex BMI	-0.22	0.199
ln_Q_state_u	FPG	age sex BMI	-0.32	0.073
ln_Q_state_u	HbA1c	age sex BMI	-0.22	0.207
ln_Q_state_u	H2O2	age sex BMI	-0.15	0.467
ln_Q_state_u	Liver_CEL	age sex BMI	0.24	0.480
ln_Q_state_u	Liver_G_H1	age sex BMI	0.10	0.773
ln_Q_state_u	HCL	age sex BMI	-0.21	0.214
H2O2	ln_HCL	age sex BMI	0.13	0.485
H2O2	ln_mal_box	age sex BMI	-0.13	0.490
H2O2	ln_mal_oct	age sex BMI	0.09	0.610
H2O2	ln_b_oxid	age sex BMI	-0.06	0.750
H2O2	ln_state_three_CI_box	age sex BMI	0.05	0.796
H2O2	ln_state_three_CI_CII_box	age sex BMI	-0.02	0.923
H2O2	ln_cyt_C_box	age sex BMI	-0.02	0.927
H2O2	ln_state_u_box	age sex BMI	0.10	0.587
H2O2	ln_mal_glycolysis	age sex BMI	-0.24	0.231

H2O2	ln_mal_pyr	age sex BMI	-0.10	0.591
H2O2	ln_state_three_CI_pyr	age sex BMI	-0.02	0.917
H2O2	ln_state_three_CI_pyr_glut	age sex BMI	-0.15	0.399
H2O2	ln_state_three_Ci_CII_pyr	age sex BMI	-0.27	0.133
H2O2	ln_cyt_c_pyr	age sex BMI	-0.27	0.125
H2O2	ln_state_u_pyr	age sex BMI	-0.10	0.597
H2O2	ln_mal_TCA	age sex BMI	-0.06	0.781
H2O2	ln_mal_glut	age sex BMI	0.10	0.582
H2O2	ln_state_three_CI	age sex BMI	-0.03	0.847
H2O2	ln_state_three_CI_CII	age sex BMI	-0.21	0.240
H2O2	ln_cyt_c_TCA	age sex BMI	-0.23	0.214
H2O2	ln_state_u	age sex BMI	-0.19	0.293
H2O2	ln_Q_mal_box	age sex BMI	-0.16	0.447
H2O2	ln_Q_mal_oct	age sex BMI	-0.03	0.876
H2O2	ln_Q_b_oxid	age sex BMI	-0.16	0.439
H2O2	ln_Q_state_three_CI_box	age sex BMI	-0.03	0.900
H2O2	ln_Q_state_three_CI_CII_box	age sex BMI	-0.09	0.665
H2O2	ln_Q_cyt_C_box	age sex BMI	-0.10	0.637

H2O2	ln_Q_state_u_box	age sex BMI	-0.02	0.920
H2O2	ln_Q_mal_glycolysis	age sex BMI	-0.22	0.319
H2O2	ln_Q_mal_pyr	age sex BMI	-0.03	0.898
H2O2	ln_Q_state_three_CI_pyr	age sex BMI	-0.02	0.911
H2O2	ln_Q_state_three_CI_pyr_glut	age sex BMI	-0.02	0.911
H2O2	ln_Q_state_three_Ci_CII_pyr	age sex BMI	-0.22	0.271
H2O2	ln_Q_cyt_c_pyr	age sex BMI	-0.22	0.265
H2O2	ln_Q_state_u_pyr	age sex BMI	-0.12	0.550
H2O2	ln_Q_mal_TCA	age sex BMI	-0.17	0.442
H2O2	ln_Q_mal_glut	age sex BMI	-0.02	0.916
H2O2	ln_Q_state_three_CI	age sex BMI	-0.16	0.415
H2O2	ln_Q_state_three_CI_CII	age sex BMI	-0.20	0.315
H2O2	ln_Q_cyt_c_TCA	age sex BMI	-0.21	0.303
H2O2	ln_Q_state_u	age sex BMI	-0.15	0.467
H2O2	ln_mal_box_mito	age sex BMI	0.21	0.451
H2O2	ln_mal_oct_mito	age sex BMI	-0.03	0.907
H2O2	ln_box_mito	age sex BMI	0.12	0.591
H2O2	ln_oligo_box_mito	age sex BMI	0.03	0.910

H2O2	ln_max_box_mito	age sex BMI	-0.04	0.862
H2O2	ln_mal_TCA_mito	age sex BMI	0.47	0.041
H2O2	ln_mal_glut_mito	age sex BMI	0.33	0.146
H2O2	ln_CI_mito	age sex BMI	0.51	0.010
H2O2	ln_CI_CII_mito	age sex BMI	0.16	0.457
H2O2	ln_cyt_c_TCA_mito	age sex BMI	0.03	0.876
H2O2	ln_max_TCA_mito	age sex BMI	0.17	0.414
H2O2	ln_CSA	age sex BMI	0.04	0.856
H2O2	ln_M_Value	age sex BMI	-0.26	0.262
H2O2	ln_Insulin	age sex BMI	0.28	0.180
H2O2	ln_FFA	age sex BMI	0.17	0.418
H2O2	ln_AdipoIR	age sex BMI	0.34	0.126
H2O2	ln_bEGP	age sex BMI	-0.27	0.266
H2O2	ln_EGP_suppr	age sex BMI	-0.09	0.719
H2O2	ln_HIS	age sex BMI	-0.37	0.133
H2O2	ln_CAT	age sex BMI	-0.18	0.425
H2O2	ln_TBARS	age sex BMI	-0.26	0.255
H2O2	ln_V_ATP5A	age sex BMI	-0.54	0.018

H2O2	ln_III_UQCRC2	age sex BMI	-0.54	0.014
H2O2	ln_II_SDHB	age sex BMI	-0.48	0.030
H2O2	ln_I_NDUFB8	age sex BMI	-0.32	0.167
H2O2	ln_IV_COX_IV	age sex BMI	-0.37	0.109
H2O2	ln_OPA1	age sex BMI	-0.10	0.679
H2O2	ln_MFN1	age sex BMI	-0.05	0.838
H2O2	ln_MFN2	age sex BMI	0.08	0.742
H2O2	ln_Fis	age sex BMI	0.19	0.475
H2O2	ln_MFF	age sex BMI	-0.12	0.620
H2O2	ln_PARKIN	age sex BMI	-0.09	0.715
H2O2	ln_pPARKIN	age sex BMI	0.44	0.055
H2O2	ln_pPARKIN_PARKIN	age sex BMI	0.53	0.016
H2O2	ln_DRP1	age sex BMI	0.30	0.222
H2O2	ln_pDRP1	age sex BMI	0.12	0.621
H2O2	ln_pDRP1_DRP1	age sex BMI	-0.27	0.283
H2O2	ln_PINK1	age sex BMI	-0.15	0.520
H2O2	ln_pPINK	age sex BMI	-0.02	0.923
H2O2	ln_pPINK_PINK	age sex BMI	0.08	0.732

H2O2	ln_NF_kB	age sex BMI	0.03	0.894
H2O2	ln_IRE1	age sex BMI	-0.09	0.694
H2O2	ln_PERK	age sex BMI	-0.60	0.005
H2O2	ln_BiP	age sex BMI	0.50	0.029
H2O2	ln_ATF4	age sex BMI	0.06	0.812
H2O2	ln_eIF2	age sex BMI	0.03	0.900
H2O2	ln_phospho_eIF2	age sex BMI	0.07	0.758
H2O2	ln_Liver_MG_H1	age sex BMI	-0.49	0.092
H2O2	ln_Liver_CML	age sex BMI	0.56	0.047
H2O2	ln_Liver_FL	age sex BMI	-0.56	0.048
H2O2	ln_Liver_3NT	age sex BMI	0.14	0.646
H2O2	ln_Liver_Argyrimidine	age sex BMI	0.18	0.561
H2O2	ln_Plasma_MG_H1	age sex BMI	0.21	0.495
H2O2	ln_Plasma_CEL	age sex BMI	0.12	0.696
H2O2	ln_Plasm_G_H1	age sex BMI	0.42	0.180
H2O2	ln_Plasm_CML	age sex BMI	0.13	0.675
H2O2	ln_Plasma_FL	age sex BMI	0.60	0.032
H2O2	ln_Plasma_3NT	age sex BMI	-0.32	0.291

H2O2	In_Plasa_Argyprimidine	age sex BMI	0.18	0.549
H2O2	NAFLD_Score	age sex BMI	0.05	0.794
H2O2	Lobular_inflammation	age sex BMI	-0.02	0.909
H2O2	Portal_inflammation	age sex BMI	-0.31	0.086
H2O2	Ballooning	age sex BMI	-0.01	0.967
H2O2	Fibrosis	age sex BMI	0.04	0.843
H2O2	FPG	age sex BMI	0.02	0.906
H2O2	HbA1c	age sex BMI	0.20	0.296
H2O2	Liver_CEL	age sex BMI	-0.44	0.135
H2O2	Liver_G_H1	age sex BMI	0.19	0.533
H2O2	HCL	age sex BMI	0.12	0.512
In_Liver_MG_H1	In_HCL	age sex BMI	-0.20	0.511
In_Liver_MG_H1	In_mal_box	age sex BMI	0.24	0.458
In_Liver_MG_H1	In_mal_oct	age sex BMI	0.14	0.666
In_Liver_MG_H1	In_b_oxid	age sex BMI	0.26	0.414
In_Liver_MG_H1	In_state_three_CI_box	age sex BMI	0.32	0.316
In_Liver_MG_H1	In_state_three_CI_CII_box	age sex BMI	0.44	0.157
In_Liver_MG_H1	In_cyt_C_box	age sex BMI	0.50	0.095

ln_Liver_MG_H1	ln_state_u_box	age sex BMI	0.36	0.244
ln_Liver_MG_H1	ln_mal_glycolysis	age sex BMI	-0.18	0.578
ln_Liver_MG_H1	ln_mal_pyr	age sex BMI	-0.17	0.589
ln_Liver_MG_H1	ln_state_three_CI_pyr	age sex BMI	0.23	0.458
ln_Liver_MG_H1	ln_state_three_CI_pyr_glut	age sex BMI	0.13	0.682
ln_Liver_MG_H1	ln_state_three_Ci_CII_pyr	age sex BMI	0.45	0.127
ln_Liver_MG_H1	ln_cyt_c_pyr	age sex BMI	0.43	0.146
ln_Liver_MG_H1	ln_state_u_pyr	age sex BMI	0.18	0.546
ln_Liver_MG_H1	ln_mal_TCA	age sex BMI	0.15	0.643
ln_Liver_MG_H1	ln_mal_glut	age sex BMI	-0.07	0.830
ln_Liver_MG_H1	ln_state_three_CI	age sex BMI	0.02	0.954
ln_Liver_MG_H1	ln_state_three_CI_CII	age sex BMI	0.44	0.156
ln_Liver_MG_H1	ln_cyt_c_TCA	age sex BMI	0.31	0.320
ln_Liver_MG_H1	ln_state_u	age sex BMI	0.25	0.432
ln_Liver_MG_H1	ln_Q_mal_box	age sex BMI	0.20	0.565
ln_Liver_MG_H1	ln_Q_mal_oct	age sex BMI	0.11	0.752
ln_Liver_MG_H1	ln_Q_b_oxid	age sex BMI	0.32	0.332
ln_Liver_MG_H1	ln_Q_state_three_CI_box	age sex BMI	0.32	0.342

ln_Liver_MG_H1	ln_Q_state_three_CI_CII_box	age sex BMI	0.48	0.134
ln_Liver_MG_H1	ln_Q_cyt_C_box	age sex BMI	0.44	0.179
ln_Liver_MG_H1	ln_Q_state_u_box	age sex BMI	0.31	0.350
ln_Liver_MG_H1	ln_Q_mal_glycolysis	age sex BMI	-0.26	0.432
ln_Liver_MG_H1	ln_Q_mal_pyr	age sex BMI	-0.40	0.222
ln_Liver_MG_H1	ln_Q_state_three_CI_pyr	age sex BMI	0.12	0.721
ln_Liver_MG_H1	ln_Q_state_three_CI_pyr_glut	age sex BMI	0.12	0.721
ln_Liver_MG_H1	ln_Q_state_three_Ci_CII_pyr	age sex BMI	0.34	0.280
ln_Liver_MG_H1	ln_Q_cyt_c_pyr	age sex BMI	0.36	0.247
ln_Liver_MG_H1	ln_Q_state_u_pyr	age sex BMI	0.13	0.681
ln_Liver_MG_H1	ln_Q_mal_TCA	age sex BMI	0.10	0.770
ln_Liver_MG_H1	ln_Q_mal_glut	age sex BMI	-0.10	0.753
ln_Liver_MG_H1	ln_Q_state_three_CI	age sex BMI	-0.10	0.751
ln_Liver_MG_H1	ln_Q_state_three_CI_CII	age sex BMI	0.19	0.580
ln_Liver_MG_H1	ln_Q_cyt_c_TCA	age sex BMI	0.10	0.777
ln_Liver_MG_H1	ln_Q_state_u	age sex BMI	0.00	0.995
ln_Liver_MG_H1	ln_mal_box_mito	age sex BMI	-0.42	0.476
ln_Liver_MG_H1	ln_mal_oct_mito	age sex BMI	0.24	0.570

ln_Liver_MG_H1	ln_box_mito	age sex BMI	0.48	0.232
ln_Liver_MG_H1	ln_oligo_box_mito	age sex BMI	0.28	0.508
ln_Liver_MG_H1	ln_max_box_mito	age sex BMI	0.36	0.386
ln_Liver_MG_H1	ln_mal_TCA_mito	age sex BMI	0.11	0.821
ln_Liver_MG_H1	ln_mal_glut_mito	age sex BMI	0.64	0.118
ln_Liver_MG_H1	ln_CI_mito	age sex BMI	-0.11	0.819
ln_Liver_MG_H1	ln_CI_CII_mito	age sex BMI	-0.31	0.502
ln_Liver_MG_H1	ln_cyt_c_TCA_mito	age sex BMI	-0.19	0.676
ln_Liver_MG_H1	ln_max_TCA_mito	age sex BMI	-0.57	0.185
ln_Liver_MG_H1	ln_CSA	age sex BMI	0.11	0.700
ln_Liver_MG_H1	ln_M_Value	age sex BMI	0.33	0.379
ln_Liver_MG_H1	ln_Insulin	age sex BMI	-0.29	0.369
ln_Liver_MG_H1	ln_FFA	age sex BMI	0.22	0.490
ln_Liver_MG_H1	ln_AdipoIR	age sex BMI	-0.27	0.442
ln_Liver_MG_H1	ln_bEGP	age sex BMI	0.07	0.861
ln_Liver_MG_H1	ln_EGP_suppr	age sex BMI	0.60	0.114
ln_Liver_MG_H1	ln_HIS	age sex BMI	0.44	0.270
ln_Liver_MG_H1	ln_CAT	age sex BMI	0.38	0.352

ln_Liver_MG_H1	ln_TBARS	age sex BMI	0.44	0.281
ln_Liver_MG_H1	ln_V_ATP5A	age sex BMI	0.00	0.996
ln_Liver_MG_H1	ln_III_UQCRC2	age sex BMI	0.08	0.833
ln_Liver_MG_H1	ln_II_SDHB	age sex BMI	0.30	0.437
ln_Liver_MG_H1	ln_I_NDUFB8	age sex BMI	-0.35	0.354
ln_Liver_MG_H1	ln_IV_COX_IV	age sex BMI	0.27	0.485
ln_Liver_MG_H1	ln_OPA1	age sex BMI	-0.06	0.882
ln_Liver_MG_H1	ln_MFN1	age sex BMI	0.22	0.606
ln_Liver_MG_H1	ln_MFN2	age sex BMI	-0.28	0.458
ln_Liver_MG_H1	ln_Fis	age sex BMI	-0.32	0.403
ln_Liver_MG_H1	ln_MFF	age sex BMI	-0.48	0.188
ln_Liver_MG_H1	ln_PARKIN	age sex BMI	-0.26	0.537
ln_Liver_MG_H1	ln_pPARKIN	age sex BMI	-0.61	0.081
ln_Liver_MG_H1	ln_pPARKIN_PARKIN	age sex BMI	-0.45	0.229
ln_Liver_MG_H1	ln_DRP1	age sex BMI	-0.41	0.311
ln_Liver_MG_H1	ln_pDRP1	age sex BMI	-0.41	0.268
ln_Liver_MG_H1	ln_pDRP1_DRP1	age sex BMI	-0.34	0.413
ln_Liver_MG_H1	ln_PINK1	age sex BMI	0.65	0.058

ln_Liver_MG_H1	ln_pPINK	age sex BMI	0.09	0.819
ln_Liver_MG_H1	ln_pPINK_PINK	age sex BMI	-0.51	0.164
ln_Liver_MG_H1	ln_NF_kB	age sex BMI	-0.40	0.287
ln_Liver_MG_H1	ln_IRE1	age sex BMI	-0.67	0.048
ln_Liver_MG_H1	ln_PERK	age sex BMI	0.24	0.536
ln_Liver_MG_H1	ln_BiP	age sex BMI	-0.49	0.219
ln_Liver_MG_H1	ln_ATF4	age sex BMI	-0.45	0.227
ln_Liver_MG_H1	ln_eIF2	age sex BMI	0.49	0.178
ln_Liver_MG_H1	ln_phospho_eIF2	age sex BMI	0.42	0.266
ln_Liver_MG_H1	ln_Liver_CML	age sex BMI	-0.15	0.586
ln_Liver_MG_H1	ln_Liver_FL	age sex BMI	-0.25	0.370
ln_Liver_MG_H1	ln_Liver_3NT	age sex BMI	0.17	0.548
ln_Liver_MG_H1	ln_Liver_Argyprimidine	age sex BMI	-0.03	0.916
ln_Liver_MG_H1	ln_Plasma_MG_H1	age sex BMI	0.12	0.701
ln_Liver_MG_H1	ln_Plasma_CEL	age sex BMI	-0.28	0.362
ln_Liver_MG_H1	ln_Plasm_G_H1	age sex BMI	0.33	0.295
ln_Liver_MG_H1	ln_Plasm_CML	age sex BMI	-0.17	0.585
ln_Liver_MG_H1	ln_Plasma_FL	age sex BMI	-0.25	0.407

ln_Liver_MG_H1	ln_Plasma_3NT	age sex BMI	-0.04	0.896
ln_Liver_MG_H1	ln_Plasa_Argyprimidine	age sex BMI	-0.32	0.284
ln_Liver_MG_H1	NAFLD_Score	age sex BMI	-0.16	0.589
ln_Liver_MG_H1	Lobular_inflammation	age sex BMI	0.38	0.185
ln_Liver_MG_H1	Portal_inflammation	age sex BMI	-0.10	0.726
ln_Liver_MG_H1	Ballooning	age sex BMI	0.04	0.905
ln_Liver_MG_H1	Fibrosis	age sex BMI	-0.07	0.807
ln_Liver_MG_H1	FPG	age sex BMI	0.22	0.443
ln_Liver_MG_H1	HbA1c	age sex BMI	-0.25	0.363
ln_Liver_MG_H1	H2O2	age sex BMI	-0.49	0.092
ln_Liver_MG_H1	Liver_CEL	age sex BMI	-0.27	0.334
ln_Liver_MG_H1	Liver_G_H1	age sex BMI	-0.18	0.530
ln_Liver_MG_H1	HCL	age sex BMI	-0.02	0.941
ln_Plasma_MG_H1	ln_HCL	age sex BMI	0.10	0.774
ln_Plasma_MG_H1	ln_mal_box	age sex BMI	-0.26	0.423
ln_Plasma_MG_H1	ln_mal_oct	age sex BMI	-0.09	0.783
ln_Plasma_MG_H1	ln_b_oxid	age sex BMI	-0.36	0.244
ln_Plasma_MG_H1	ln_state_three_CI_box	age sex BMI	-0.35	0.262

ln_Plasma_MG_H1	ln_state_three_CI_CII_box	age sex BMI	-0.22	0.495
ln_Plasma_MG_H1	ln_cyt_C_box	age sex BMI	-0.29	0.356
ln_Plasma_MG_H1	ln_state_u_box	age sex BMI	-0.23	0.476
ln_Plasma_MG_H1	ln_mal_glycolysis	age sex BMI	-0.18	0.585
ln_Plasma_MG_H1	ln_mal_pyr	age sex BMI	0.05	0.874
ln_Plasma_MG_H1	ln_state_three_CI_pyr	age sex BMI	-0.11	0.713
ln_Plasma_MG_H1	ln_state_three_CI_pyr_glut	age sex BMI	-0.13	0.674
ln_Plasma_MG_H1	ln_state_three_Ci_CII_pyr	age sex BMI	-0.08	0.803
ln_Plasma_MG_H1	ln_cyt_c_pyr	age sex BMI	-0.16	0.596
ln_Plasma_MG_H1	ln_state_u_pyr	age sex BMI	-0.17	0.571
ln_Plasma_MG_H1	ln_mal_TCA	age sex BMI	0.04	0.906
ln_Plasma_MG_H1	ln_mal_glut	age sex BMI	-0.31	0.301
ln_Plasma_MG_H1	ln_state_three_CI	age sex BMI	-0.28	0.354
ln_Plasma_MG_H1	ln_state_three_CI_CII	age sex BMI	-0.22	0.494
ln_Plasma_MG_H1	ln_cyt_c_TCA	age sex BMI	-0.17	0.606
ln_Plasma_MG_H1	ln_state_u	age sex BMI	-0.28	0.384
ln_Plasma_MG_H1	ln_Q_mal_box	age sex BMI	-0.18	0.604
ln_Plasma_MG_H1	ln_Q_mal_oct	age sex BMI	-0.14	0.688

ln_Plasma_MG_H1	ln_Q_b_oxid	age sex BMI	-0.39	0.231
ln_Plasma_MG_H1	ln_Q_state_three_CI_box	age sex BMI	-0.38	0.253
ln_Plasma_MG_H1	ln_Q_state_three_CI_CII_box	age sex BMI	-0.37	0.264
ln_Plasma_MG_H1	ln_Q_cyt_C_box	age sex BMI	-0.43	0.183
ln_Plasma_MG_H1	ln_Q_state_u_box	age sex BMI	-0.27	0.417
ln_Plasma_MG_H1	ln_Q_mal_glycolysis	age sex BMI	-0.10	0.759
ln_Plasma_MG_H1	ln_Q_mal_pyr	age sex BMI	0.07	0.849
ln_Plasma_MG_H1	ln_Q_state_three_CI_pyr	age sex BMI	-0.05	0.875
ln_Plasma_MG_H1	ln_Q_state_three_CI_pyr_glut	age sex BMI	-0.05	0.875
ln_Plasma_MG_H1	ln_Q_state_three_Ci_CII_pyr	age sex BMI	-0.26	0.406
ln_Plasma_MG_H1	ln_Q_cyt_c_pyr	age sex BMI	-0.31	0.335
ln_Plasma_MG_H1	ln_Q_state_u_pyr	age sex BMI	-0.26	0.417
ln_Plasma_MG_H1	ln_Q_mal_TCA	age sex BMI	0.04	0.898
ln_Plasma_MG_H1	ln_Q_mal_glut	age sex BMI	-0.40	0.203
ln_Plasma_MG_H1	ln_Q_state_three_CI	age sex BMI	-0.33	0.296
ln_Plasma_MG_H1	ln_Q_state_three_CI_CII	age sex BMI	-0.35	0.284
ln_Plasma_MG_H1	ln_Q_cyt_c_TCA	age sex BMI	-0.31	0.350
ln_Plasma_MG_H1	ln_Q_state_u	age sex BMI	-0.42	0.204

ln_Plasma_MG_H1	ln_mal_box_mito	age sex BMI	0.73	0.096
ln_Plasma_MG_H1	ln_mal_oct_mito	age sex BMI	-0.46	0.210
ln_Plasma_MG_H1	ln_box_mito	age sex BMI	-0.38	0.276
ln_Plasma_MG_H1	ln_oligo_box_mito	age sex BMI	-0.49	0.153
ln_Plasma_MG_H1	ln_max_box_mito	age sex BMI	-0.26	0.464
ln_Plasma_MG_H1	ln_mal_TCA_mito	age sex BMI	0.28	0.467
ln_Plasma_MG_H1	ln_mal_glut_mito	age sex BMI	0.06	0.885
ln_Plasma_MG_H1	ln_CI_mito	age sex BMI	0.01	0.986
ln_Plasma_MG_H1	ln_CI_CII_mito	age sex BMI	-0.04	0.913
ln_Plasma_MG_H1	ln_cyt_c_TCA_mito	age sex BMI	-0.16	0.690
ln_Plasma_MG_H1	ln_max_TCA_mito	age sex BMI	0.09	0.813
ln_Plasma_MG_H1	ln_amplex_red	age sex BMI	0.17	0.608
ln_Plasma_MG_H1	ln_CSA_mg_Prot	age sex BMI	0.25	0.386
ln_Plasma_MG_H1	ln_M_Value	age sex BMI	-0.11	0.742
ln_Plasma_MG_H1	ln_Insulin	age sex BMI	0.11	0.713
ln_Plasma_MG_H1	ln_FFA	age sex BMI	0.12	0.676
ln_Plasma_MG_H1	ln_AdipoIR	age sex BMI	-0.36	0.250
ln_Plasma_MG_H1	ln_bEGP	age sex BMI	0.34	0.343

ln_Plasma_MG_H1	ln_EGP_suppr	age sex BMI	-0.24	0.529
ln_Plasma_MG_H1	ln_HIS	age sex BMI	-0.49	0.148
ln_Plasma_MG_H1	ln_CAT	age sex BMI	-0.11	0.786
ln_Plasma_MG_H1	ln_TBARS	age sex BMI	0.32	0.446
ln_Plasma_MG_H1	ln_V_ATP5A	age sex BMI	-0.58	0.171
ln_Plasma_MG_H1	ln_III_UQCRC2	age sex BMI	-0.36	0.381
ln_Plasma_MG_H1	ln_II_SDHB	age sex BMI	-0.07	0.868
ln_Plasma_MG_H1	ln_I_NDUFB8	age sex BMI	0.01	0.987
ln_Plasma_MG_H1	ln_IV_COX_IV	age sex BMI	-0.02	0.954
ln_Plasma_MG_H1	ln_OPA1	age sex BMI	0.44	0.279
ln_Plasma_MG_H1	ln_MFN1	age sex BMI	-0.38	0.401
ln_Plasma_MG_H1	ln_MFN2	age sex BMI	-0.03	0.938
ln_Plasma_MG_H1	ln_Fis	age sex BMI	0.08	0.853
ln_Plasma_MG_H1	ln_MFF	age sex BMI	-0.49	0.222
ln_Plasma_MG_H1	ln_PARKIN	age sex BMI	-0.53	0.216
ln_Plasma_MG_H1	ln_pPARKIN	age sex BMI	0.26	0.533
ln_Plasma_MG_H1	ln_pPARKIN_PARKIN	age sex BMI	0.51	0.193
ln_Plasma_MG_H1	ln_DRP1	age sex BMI	0.32	0.438

ln_Plasma_MG_H1	ln_pDRP1	age sex BMI	-0.25	0.555
ln_Plasma_MG_H1	ln_pDRP1_DRP1	age sex BMI	-0.46	0.250
ln_Plasma_MG_H1	ln_PINK1	age sex BMI	0.12	0.771
ln_Plasma_MG_H1	ln_pPINK	age sex BMI	0.12	0.780
ln_Plasma_MG_H1	ln_pPINK_PINK	age sex BMI	-0.10	0.820
ln_Plasma_MG_H1	ln_NF_kB	age sex BMI	0.23	0.590
ln_Plasma_MG_H1	ln_IRE1	age sex BMI	-0.40	0.327
ln_Plasma_MG_H1	ln_PERK	age sex BMI	-0.61	0.110
ln_Plasma_MG_H1	ln_BiP	age sex BMI	0.42	0.345
ln_Plasma_MG_H1	ln_ATF4	age sex BMI	0.01	0.989
ln_Plasma_MG_H1	ln_eIF2	age sex BMI	0.06	0.883
ln_Plasma_MG_H1	ln_phospho_eIF2	age sex BMI	0.46	0.249
ln_Plasma_MG_H1	ln_Liver_MG_H1	age sex BMI	0.12	0.701
ln_Plasma_MG_H1	ln_Liver_CML	age sex BMI	-0.02	0.959
ln_Plasma_MG_H1	ln_Liver_FL	age sex BMI	-0.34	0.262
ln_Plasma_MG_H1	ln_Liver_3NT	age sex BMI	0.20	0.503
ln_Plasma_MG_H1	ln_Liver_Argyprimidine	age sex BMI	-0.71	0.007
ln_Plasma_MG_H1	ln_Plasma_CEL	age sex BMI	0.42	0.102

ln_Plasma_MG_H1	ln_Plasm_G_H1	age sex BMI	0.18	0.530
ln_Plasma_MG_H1	ln_Plasm_CML	age sex BMI	-0.20	0.456
ln_Plasma_MG_H1	ln_Plasma_FL	age sex BMI	0.24	0.375
ln_Plasma_MG_H1	ln_Plasma_3NT	age sex BMI	-0.10	0.714
ln_Plasma_MG_H1	ln_Plasa_Argyprimidine	age sex BMI	-0.15	0.570
ln_Plasma_MG_H1	NAFLD_Score	age sex BMI	0.15	0.613
ln_Plasma_MG_H1	Lobular_inflammation	age sex BMI	0.29	0.332
ln_Plasma_MG_H1	Portal_inflammation	age sex BMI	-0.28	0.350
ln_Plasma_MG_H1	Ballooning	age sex BMI	-0.24	0.422
ln_Plasma_MG_H1	Fibrosis	age sex BMI	0.22	0.467
ln_Plasma_MG_H1	FPG	age sex BMI	0.61	0.019
ln_Plasma_MG_H1	HbA1c	age sex BMI	0.04	0.898
ln_Plasma_MG_H1	H2O2	age sex BMI	0.21	0.495
ln_Plasma_MG_H1	Liver_CEL	age sex BMI	-0.13	0.667
ln_Plasma_MG_H1	Liver_G_H1	age sex BMI	-0.26	0.399
ln_Plasma_MG_H1	HCL	age sex BMI	0.22	0.449

Analysis adjusted for age, sex and BMI. Not-normally distributed data were loge-transformed

(ln). Q denotes normalized respiration rate to citrate synthase activity. Mito denotes respiration rate in isolated mitochondria. Q_state_u_box – β -oxidation linked maximal uncoupled hepatic mitochondrial respiration per citrate synthase activity, Q_state_u_pyr –

glycolysis-linked maximal uncoupled hepatic mitochondrial respiration per citrate synthase activity, Q_state_u– tricarboxylic acid cycle-linked maximal uncoupled hepatic mitochondrial respiration per citrate synthase activity, H2O2 – hepatic H2O2 emission, CSA – hepatic citrate synthase activity, HCL – hepatic lipid content, NAFLD – non-alcoholic fatty liver disease, FPG – fasting blood glucose, hsCRP – high-sensitive C-reactive protein, GOT – serum glutamate oxalacetate transaminase, GPT – serum glutamate pyruvate transaminase, GGT – serum gamma-glutamyl transferase, AP – alkaline phosphatase, EGP – endogenous glucose production, AdipoIR – adipose tissue insulin resistance index, HIS– hepatic insulin sensitivity index, TCA-cycle – tricarboxylic acid cycle, box – β -oxidation, mal – malate, glu – glutamate, adp – adenosine triphosphate, succ – succinate, pyr – pyruvate, oct – octanoylcarnitine, cyt c – cytochrome C, fccp - carbonylcyanide p-trifluoromethoxyphenylhydrazone, MG-H1 - methylglyoxal-derived hydroimidazolone isomer 1, G-H1 – glyoxal-derived hydroimidazolone isomer 1, FL - fructosyl-lysine or fructosamine, CEL - carboxyethyl-lysine, CML - carboxymethyl-lysine, 3NT - 3-nitro-tyrosine, CAT – catalase activity, TBARS – thiobarbituric acid reactive species, MFN – mitofusin, OPA1 - optic atrophy protein 1, DRP1 - dynamin related protein 1, FIS1 – mitochondrial fission 1 protein, MFF – mitochondrial fission factor, PINK1 - PTEN-induced kinase 1, PARKIN - ubiquitin E3 ligase parkin, ATF4 - activating transcription factor 4, PERK - protein kinase RNA-like endoplasmic reticulum kinase, IRE1 - inositol-requiring enzyme, eIF2 - eukaryotic initiation factor 2, NDUFB8 - NADH:ubiquinone oxidoreductase subunit B8, SDHB - succinate dehydrogenase complex iron sulfur subunit B, UQCRC2 - ubiquinol-cytochrome C reductase core protein 2, COXIV - cytochrome c oxidase subunit IV, ATP5A - ATP synthase F1 subunit alpha.

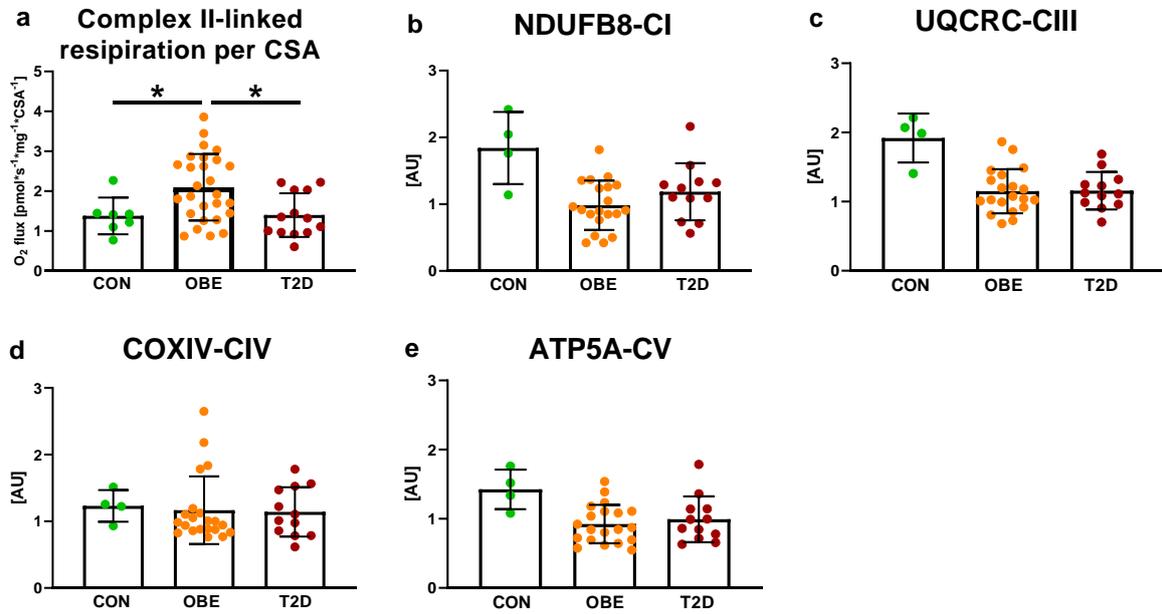
Suppl. Table 5. Participants' characteristics of healthy humans (CON) and in people with NASH and without (F0) and with (F1+) fibrosis.

Parameter	CON	F0	F1+
N (females)	12 (7)	18 (13)	27 (22)
Age (years)	41±3	41±12	43±9
BMI (kg/m ²)	25±2	54±9 [#]	50±7 [#]
T2D (n) (%)	0 (0)	7 (39)	8 (30)
HbA1c (%)	5.1±1.3	5.6±1.5	6.1±1.6 [#]
hsCRP (mg/dl)	0.3±0.2	1.4±1.8 [#]	1.1±1.0 [#]
GOT (U/l)	29±25	27±9	36±21
GPT (U/l)	30±41	41±16	50±34
GGT (U/l)	48±86	42±23	34±24
AP (U/l)	67±45	79±19	79±16
HIS (dl*min*kg BW/mg/μU)	6.7±2.5	4.4±2.6	3.8±2.2
M-value (mg/kg BW/min)	8.4±3.0	2.0±1.2 [#]	2.2±0.8 [#]
AdipoIR (AU)	5357±2441	20219±13336 [#]	17056±8024 [#]

Mean±SD. *p<0.05 vs F0. #<0.05 vs CON from one-way ANCOVA. AdipoIR – adipose tissue insulin resistance index (fasting free fatty acids*fasting insulin), HIS– hepatic insulin sensitivity index (100/(fasting endogenous glucose production*fasting insulin)), CON – lean

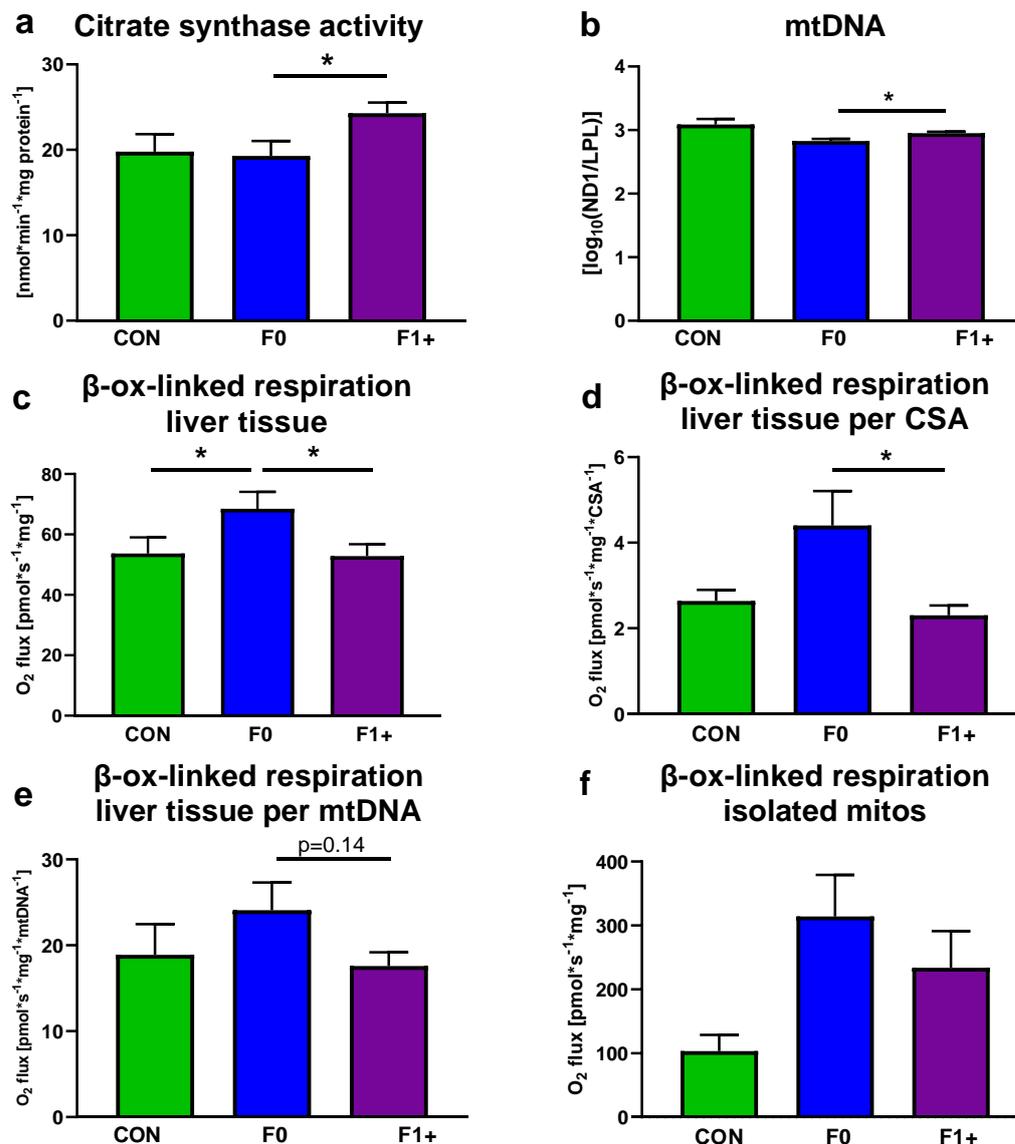
healthy humans, hsCRP – high-sensitive C-reactive protein, GOT – serum glutamate oxalacetate transaminase, GPT – serum glutamate pyruvate transaminase, GGT – serum gamma-glutamyl transferase, AP – alkaline phosphatase, T2D – type 2 diabetes, F0 - NASH patients with fibrosis score 0 from liver histology, F1+ - NASH patients with fibrosis score >0 from liver histology,

Suppl. Fig. 1. Hepatic complex II linked mitochondrial respiration per citrate synthase activity (CSA) (a) and mitochondrial electron transport chain complexes I, III, IV and V (b-e) in healthy humans (CON), NASH patients without (OBE) and with type 2 diabetes (T2D).



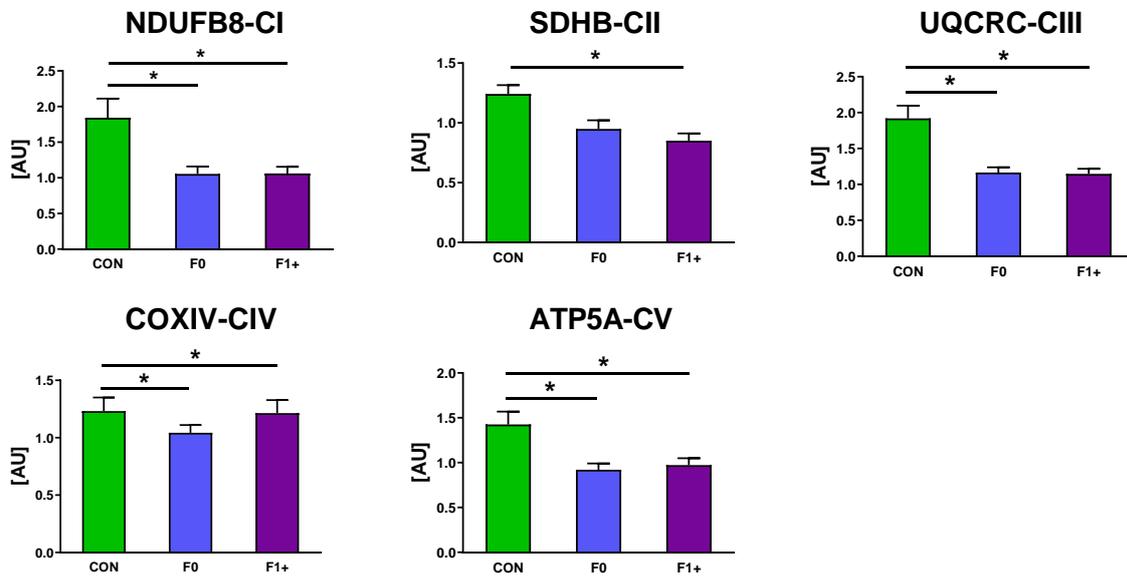
Mean \pm SD. * $p < 0.05$ from one-way ANCOVA. NDUFB8 - NADH:ubiquinone oxidoreductase subunit B8, UQCRC2 - ubiquinol-cytochrome C reductase core protein 2, COXIV - cytochrome c oxidase subunit IV, ATP5A - ATP synthase F1 subunit alpha.

Suppl. Fig. 2. Mitochondrial respiration in NASH and fibrosis. Hepatic citrate synthase activity (a), mitochondrial DNA (mtDNA) copy number (b), maximum uncoupled mitochondrial β -oxidation (β OX) linked respiration rates per liver tissue (c), per mitochondrial content from citrate synthase activity (d), per mitochondrial content from mtDNA (e) and in isolated mitochondria (f) in healthy humans (CON) and in NASH patients with (F1+) and without fibrosis (F0).



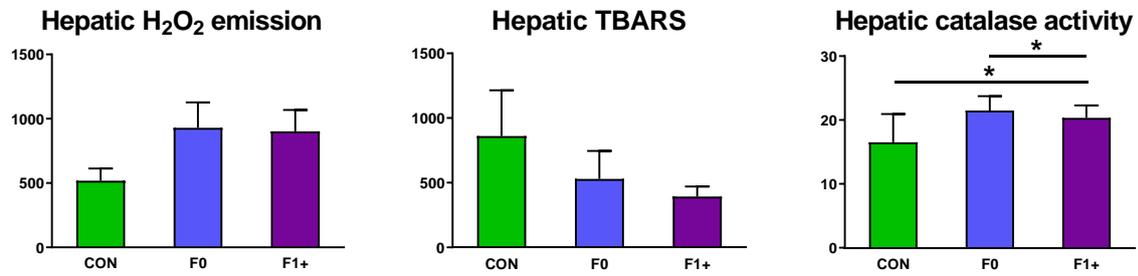
Mean \pm SEM, *p<0.05 from one-way ANCOVA. CSA – citrate synthase activity

Suppl. Fig 3. Content of mitochondrial electron transport chain complexes in healthy humans (CON) and in people with NASH and without (F0) or with (F1+) fibrosis. .



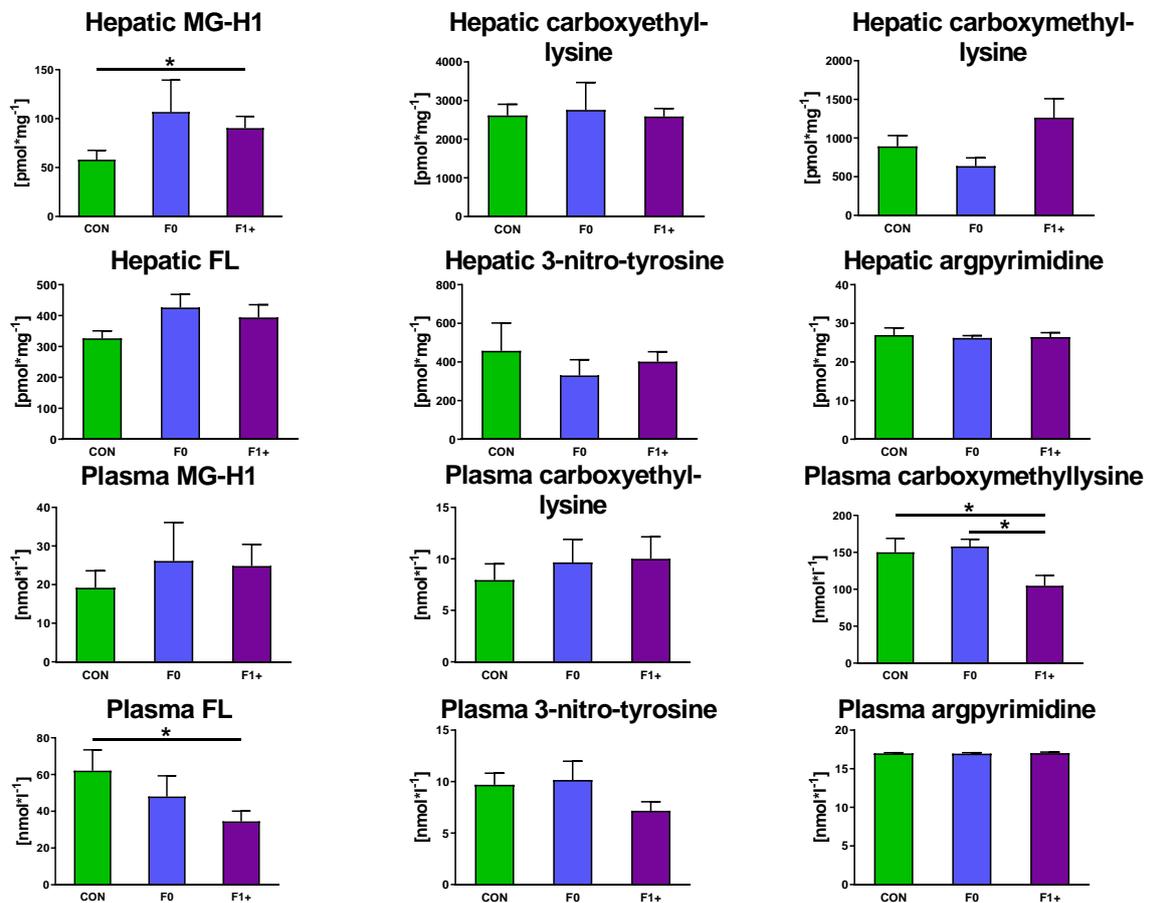
Mean \pm SEM. * p <0.05 from one-way ANCOVA. F0 – NASH patients without hepatic fibrosis, F1+ – NASH patients with hepatic fibrosis \geq 1. NDUFB8 - NADH:ubiquinone oxidoreductase subunit B8, SDHB - succinate dehydrogenase complex iron sulfur subunit B, UQCRC2 - ubiquinol-cytochrome C reductase core protein 2, COXIV - cytochrome c oxidase subunit IV, ATP5A - ATP synthase F1 subunit alpha.

Suppl. Fig. 4. Hepatic oxidative stress (H_2O_2 emission, lipid peroxidation (thiobarbituric acid reactive species, TBARS)), and antioxidative capacity (catalase activity), in healthy humans (CON) and in people with NASH and without (F0) and with fibrosis (F1+).



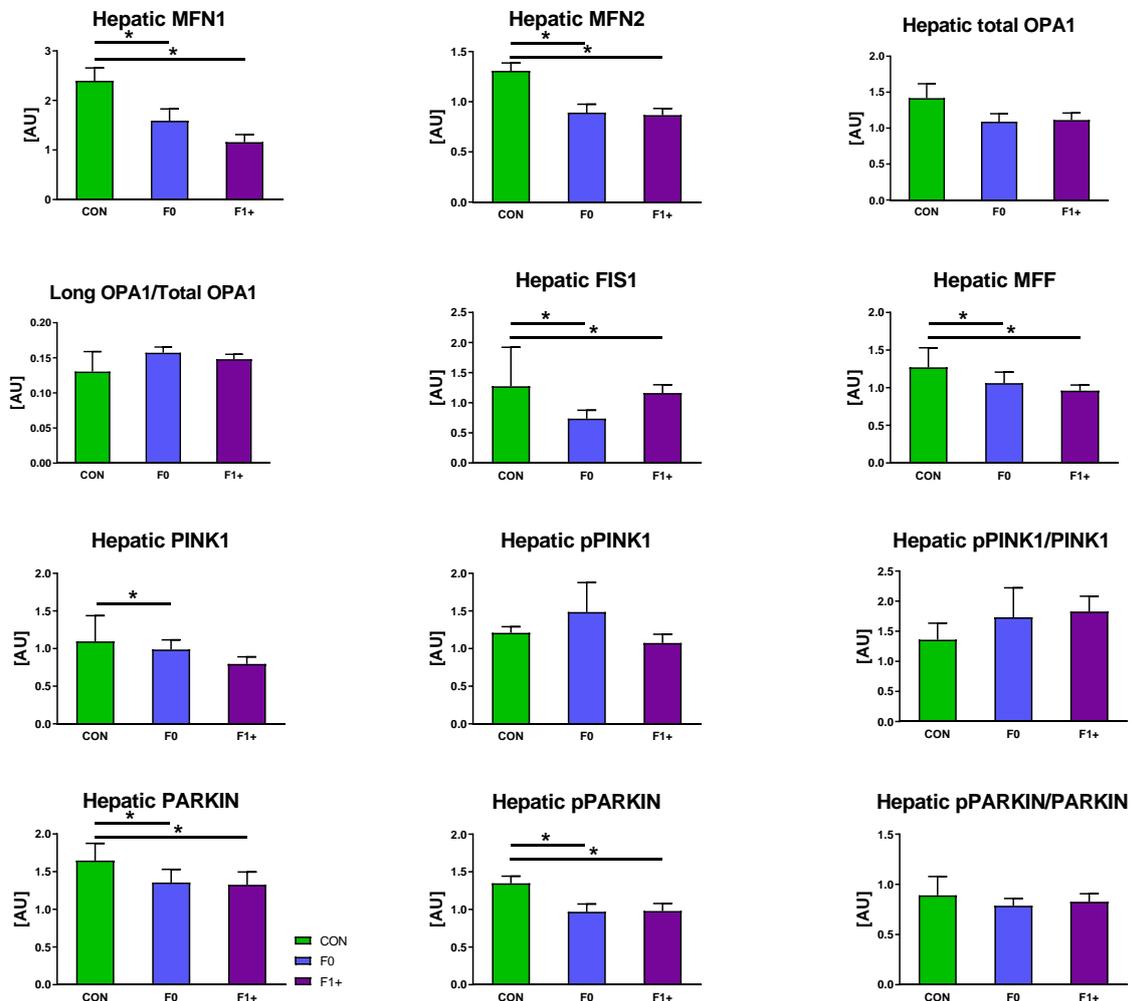
Mean \pm SEM. * $p < 0.05$ from one-way ANCOVA. F0 – NASH patients without hepatic fibrosis, F1+ – NASH patients with hepatic fibrosis score ≥ 1

Suppl. Fig. 5. Hepatic and plasma advanced glycation endproducts in healthy humans (CON) and in people with NASH and without (F0) or with fibrosis (F1+).



Mean±SEM. * $p < 0.05$ from one-way ANCOVA. F0 – NASH patients without hepatic fibrosis, F1+ – NASH patients with hepatic fibrosis score ≥ 1 . FL - fructosyl-lysine or fructosamine, MG-H1 - methylglyoxal-derived hydroimidazolone isomer 1

Suppl. Fig. 6 Hepatic mitochondrial fusion, fission and mitophagy markers in healthy humans (CON) and in people with NASH and without (F0) or with fibrosis (F1+).



Mean \pm SEM. * $p < 0.05$ from one-way ANCOVA. F0 – NASH patients without hepatic fibrosis, F1+ – NASH patients with hepatic fibrosis score ≥ 1 . MFN – mitofusin, OPA1 - optic atrophy protein 1, DRP1 - dynamin related protein 1, FIS1 – mitochondrial fission 1 protein, MFF – mitochondrial fission factor, PINK1 - PTEN-induced kinase 1, PARKIN - ubiquitin E3 ligase parkin