

Supplementary Material

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Table I-S: Metabolite relative concentrations in 3 day-old male thoraxes

	3 day-old males		
	<i>Control</i>	<i>Hypoxia</i>	<i>Recovery</i>
2-phosphoglycerate	0.3223± 0.0377	0.2071± 0.0365	0.1239± 0.0109
4-aminobutyrate	0.0369± 0.0038	0.0541± 0.0071	0.029± 0.002
Acetate	0.0915± 0.0154	0.3517± 0.0467	0.5797± 0.0434
Alanine	0.1733± 0.0155	0.4426± 0.0504	0.2573± 0.027
Arginine	0.1206± 0.0142	0.1821± 0.013	0.1023± 0.0139
Asparagine	0.0236± 0.0015	0.0336± 0.0073	0.018± 0.0023
β-Alanine	0.2623± 0.0294	0.3444± 0.0298	0.2966± 0.0187
Carnitine	0.0258± 0.0044	0.0309± 0.0043	0.0294± 0.0026
Choline	0.0222± 0.0032	0.0171± 0.0019	0.008± 0.0005
Cysteine	0.0199± 0.0024	0.035± 0.0045	0.0185± 0.0018
Glucose	0.2407± 0.0269	0.3635± 0.059	0.2488± 0.0207
Glutamate	0.1638± 0.0134	0.2118± 0.0157	0.0608± 0.0055
Glutamine	0.1396± 0.0102	0.1865± 0.0185	0.1053± 0.0102
Glycerate	0.0386± 0.0046	0.0442± 0.0075	0.0251± 0.0026
Glycine	0.0277± 0.0032	0.048± 0.0049	0.0274± 0.0017
Histidine	0.0562± 0.0078	0.0752± 0.014	0.0426± 0.0047
Homoserine	0.0928± 0.0053	0.1307± 0.0186	0.0517± 0.0031
Lactate	0.1123± 0.0091	0.2649± 0.0639	0.1286± 0.0113
Lysine	0.0199± 0.0024	0.0435± 0.0087	0.0203± 0.0021
O-Phosphocholine	0.1353± 0.0132	0.1443± 0.0153	0.0822± 0.008
Oxalacetate	0.1496± 0.0182	0.133± 0.0197	0.2185± 0.0051
Proline	0.1263± 0.0111	0.1276± 0.0115	0.1166± 0.0075
Pyruvate	0.0157± 0.0019	0.0242± 0.0021	0.0229± 0.0017
Sarcosine	0.0359± 0.0054	0.0452± 0.0037	0.0269± 0.0015
Serine	0.1383± 0.0194	0.118± 0.0145	0.0788± 0.0038
Taurine	0.1631± 0.0227	0.1292± 0.0119	0.0957± 0.0104
Threonine	0.0322± 0.004	0.05± 0.0104	0.0357± 0.0058

* Concentrations in this table are expressed in μmol/mg protein and are shown as mean ± SEM (n= 5 experiments).

Table II-S: Metabolite relative concentrations in 40 day-old male thoraxes

	40 day-old males		
	<i>Control</i>	<i>Hypoxia</i>	<i>Recovery</i>
2-phosphoglycerate	0.3436± 0.052	0.3034± 0.024	0.1378± 0.0102
4-aminobutyrate	0.0444± 0.0056	0.0635± 0.0066	0.0255± 0.002
Acetate	0.0816± 0.0197	0.3987± 0.0616	1.5526± 0.148
Alanine	0.1901± 0.0234	0.4098± 0.0371	0.2286± 0.0201
Arginine	0.1817± 0.0263	0.1925± 0.0117	0.0922± 0.0146
Asparagine	0.0304± 0.003	0.0355± 0.0033	0.0167± 0.0018
β-Alanine	0.3921± 0.0506	0.38± 0.0363	0.27± 0.0238
Carnitine	0.0302± 0.0048	0.0243± 0.0017	0.0226± 0.0024
Choline	0.0097± 0.0017	0.0111± 0.0011	0.0083± 0.0013
Cysteine	0.03± 0.0031	0.0408± 0.0092	0.0235± 0.0029
Glucose	0.3717± 0.0441	0.3445± 0.032	0.1731± 0.0259
Glutamate	0.1961± 0.0164	0.2499± 0.0132	0.063± 0.007
Glutamine	0.2551± 0.0318	0.1703± 0.0082	0.0758± 0.014
Glycerate	0.0434± 0.004	0.0546± 0.0044	0.0284± 0.003
Glycine	0.0362± 0.0043	0.0451± 0.0034	0.0292± 0.0029
Histidine	0.0573± 0.0063	0.075± 0.0095	0.0362± 0.0047
Homoserine	0.1086± 0.0084	0.1523± 0.009	0.0577± 0.004
Lactate	0.1107± 0.0063	0.4365± 0.0313	0.2183± 0.0078
Lysine	0.0296± 0.004	0.04± 0.0035	0.021± 0.0018
O-Phosphocholine	0.1542± 0.0211	0.162± 0.0167	0.074± 0.0067
Oxalacetate	0.1042± 0.0125	0.126± 0.0102	0.2861± 0.0197
Proline	0.1816± 0.018	0.1384± 0.0148	0.0844± 0.0127
Pyruvate	0.0301± 0.0062	0.0441± 0.0036	0.0386± 0.0196
Sarcosine	0.0425± 0.0054	0.0586± 0.0046	0.0247± 0.0016
Serine	0.1771± 0.0196	0.1566± 0.0163	0.0782± 0.0053
Taurine	0.1109± 0.0135	0.1589± 0.0191	0.1158± 0.0207
Threonine	0.0245± 0.0017	0.0964± 0.0136	0.0364± 0.0019

*: Concentrations in this table are expressed in $\mu\text{mol}/\text{mg}$ protein and are shown as mean \pm SEM (n= 5 experiments).

Table III-S: *p*-values for t-tests

	Control 40days/Control 3days	Hypoxia 40days/Hypoxia 3days	Recovery 40days/ Recovery 3days
	<i>p values (low confidence)</i>	<i>p values (low confidence)</i>	<i>p values (low confidence)</i>
2-phosphoglycerate	0.7488	0.0588	0.3842
4-aminobutyrate	0.3091	0.3598	0.2569
Acetate	0.7036	0.5604	0.0002*
Alanine	0.5676	0.6152	0.4208
Arginine	0.0754	0.5685	0.628
Asparagine	0.0857	0.8196	0.6776
β-Alanine	0.0578	0.4701	0.405
Carnitine	0.5181	0.1994	0.0937
Choline	0.0094	0.0322	0.8672
Cysteine	0.0335	0.589	0.1872
Glucose	0.0351	0.7848	0.0524
Glutamate	0.1678	0.1013	0.8123
Glutamine	0.0086	0.4487	0.1289
Glycerate	0.4647	0.2676	0.439
Glycine	0.1533	0.6397	0.6185
Histidine	0.919	0.9918	0.3702
Homoserine	0.1531	0.3267	0.2727
Lactate	0.8855	0.0425	0.0002*
Lysine	0.0748	0.7172	0.8263
O-Phosphocholine	0.4705	0.4591	0.4625
Oxalacetate	0.0744	0.7601	0.0106
Proline	0.0311	0.5817	0.061
Pyruvate	0.0594	0.0015*	0.4472
Sarcosine	0.4161	0.0553	0.3497
Serine	0.1977	0.1156	0.9225
Taurine	0.0837	0.2237	0.4125
Threonine	0.1212	0.0267	0.9201

*Indicates *p* values that are statistically significant after Bonferroni correction. ($p < 0.05$)

Bold indicates $p < 0.05$

Table IV-S: Scaling factors for metabolites included in the model

	[Std] _{solution} (μM)	[Std] _{Chenomix} (μM)	Mean Scaling factor
4-aminobutyrate	1000	866.5	1.13
Acetate	1000	762.4	1.27
Alanine	1000	514.7	1.98
Glucose	1000	467.1	2.14
Glutamate	1000	872.3	1.16
Glutamine	1000	955.0	1.08
Lactate	1000	735.1	1.34
Oxaloacetate	1000	276.4	3.42
Proline	1000	879.6	1.13
Pyruvate	1000	925.8	1.15

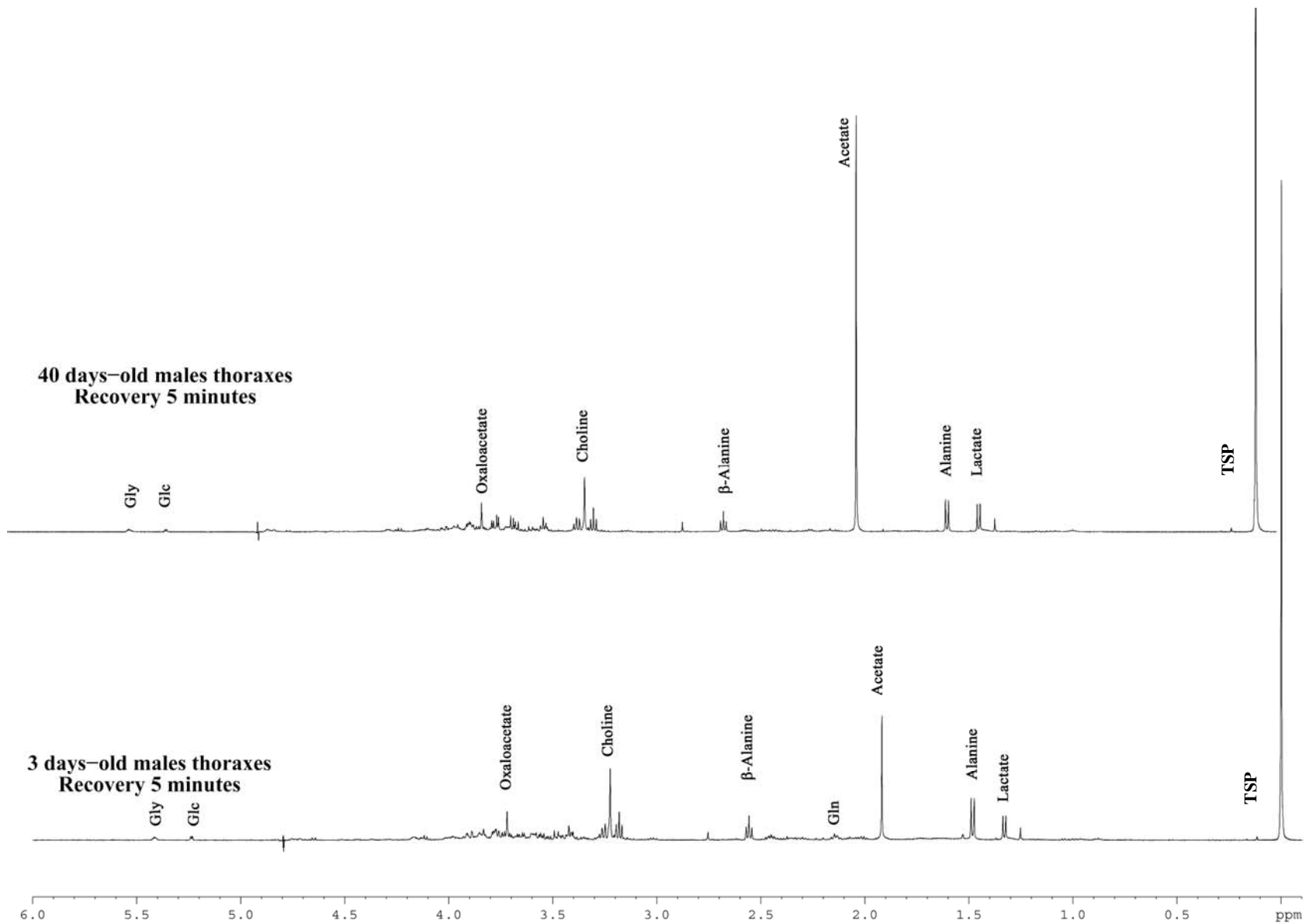


Figure 1-S: ¹H spectra of 40d-old and 3d-old male thoraxes after 5 minutes recovery. Gly: Glycogen, Glc: Glucose, Gln: Glutamine.

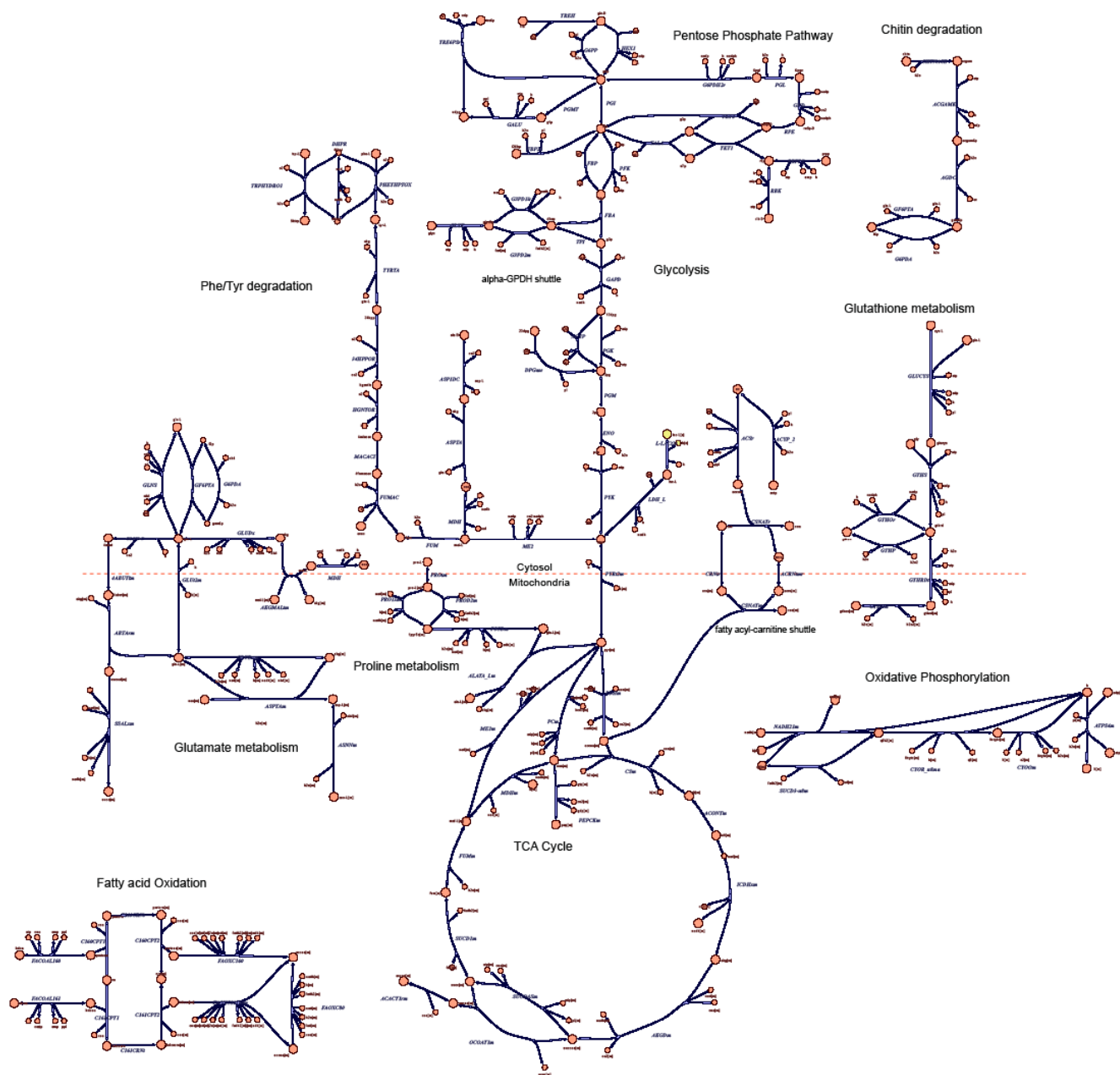


Figure 2-S: Complete map of the metabolic network model, including pathways unused by the simulation such as pentose phosphate pathway, fatty acid oxidation, chitin degradation, and phenylalanine/tyrosine degradation