Supplement: Validation

Glucose Transporter

Synthesis rate of glucose transporter in dependence of glucose. Experimental data taken from [[1](#_ENREF_1)]



Glucokinase

Synthesis rate of glucokinase in dependence of insulin and oxygen. Experimental data taken from [[2](#_ENREF_2)],[[3](#_ENREF_3)]



Glucose-6-pohosphatase

Synthesis rate of Glucose-6-pohosphatase mRNA in dependence of glucose and synthesis rate of Glucose-6-pohosphatase in dependence glucagon. Experimental data taken from [[4](#_ENREF_4), [5](#_ENREF_5)]. An translation efficiency of 30 % [[4](#_ENREF_4)] was taken into account (see factor of 0.3 in Table 1).



PFK1

Degradation rate of phosphofructokinase1 in dependence of insulin. Experimental data taken from [[6](#_ENREF_6)].



FBP1

Synthesis rate of fructose-1,6 phosphatase in dependence of glucagon. Experimental data taken from [[7](#_ENREF_7" \o "Elmaghrabi, 1991 #56)]. Since cAMP is generated by glucagon dependent activation of adenylate cyclase maximal cAMP levels were assumed at saturating glucagon levels of 10 nM.



PFK2/FBP2

Synthesis rate of the tandem enzyme phosphofructokinase 2 /frucotse2,6 phosphatase in dependence of oxygen and glucagon. Experimental data taken from [[8](#_ENREF_8), [9](#_ENREF_9)].



Pyruvate Kinase

Synthesis rate of the pyruvate kinase in dependence of oxygen. Relative synthesis rate of pyruvate kinase in the normal and diabetic case. Normal case was simulated by 1000 pM insulin and 20 pM glucagon, diabetes was simulated by 100 pM insulin and 300 pM glucagon (see [[10](#_ENREF_10)]). Black bars show simulation results, red bars depict the experimental values. Experimental data taken from [[11](#_ENREF_11), [12](#_ENREF_12)]



Pyruvate Carboxylase

Relative synthesis rate of pyruvate carboxylase in the normal and diabetic case. Normal case was simulated by 1000 pM insulin and 20 pM glucagon, diabetes was simulated by 100 pM insulin and 300 pM glucagon ([[10](#_ENREF_10)]. Black bars show simulation results, red bars depict the experimental values, error bar depicts variance in experimental values. Experimental data taken from [[13](#_ENREF_13)] .



Phosphoenolpyruvatec arboxykinase

Synthesis rate of the phosphoenolpyruvate carboxykinase in dependence of oxygen, insulin and glucaogon. The optimal fit for the oxygen dependency (red curve) gives a $k\_{2}=0.7$ . Instead $k\_{2}=2$ was used (black curve) to match observed pp-pc ratios. Experimental data taken from [[14](#_ENREF_14), [15](#_ENREF_15)]



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