**Table 3.** Parameters

|  |  |
| --- | --- |
| **Fixed parameters** |  |
| Volume fractions | Ve = 0.2, Vcap = 0.0055, Vg = 0.25, Vn = 0.45, , *r*en = Ve/Vn, *r*eg = Ve/Vg, *r*ce = Vcap/Ve, *r*cg = Vcap/Vg, *r*cn = Vcap/Vn |
| Surface-to-volume ratios | SmVn = 2.5 104, SmVg = 2.5 104 cm-1 |
| Physical constants | *R* = 8.31451 J mol-1 K-1, *F* = 9.64853 104 C mol-1, *RT*/*F* = 26.73 mV,  mV,  mM |
| Glucose exchange affinities | , , ,  mM |
| Lactate exchange affinities | , , ,  mM |
| Hexokinase-phosphofructokinase system | *K*I,ATP = 1 mM, *nH* = 4, *K*g = 0.05 mM |
| Oxygen exchange constants | mM, *Hb.OP* = 8.6 mM, *nh* = 2.73 |
| Electron transport chain | mM |
| Hodgkin-Huxley parameters | *Cm* = 10-3 mF cm-2, *gL* = 0.02, *g*Na = 40, *g*K = 18, *g*Ca = 0.02, *g*mAHP = 6.5 mS cm-2, *KD* = 30 10-3 mM,  s,  mM, *E*K = -80, *E*Ca = 120 mV, |
| Venous balloon | s, |
| Blood flow contribution to capillary glucose and oxygen | O2a = 8.35, GLCa = 4.75 mM |
| Na,K-ATPase and sodium leak | , ,  mS cm-2, ,  cm mM-1 s-1,  = 0.0687 mM s-1, *K*m,pump = 0.5 mM |
| Total creatine plus phosphocreatine concentration | *C* = 10 mM |
| Total nicotinamide adenine dinucleotide concentration | *N* = 0.212 mM |
| TCA cycle | mM |
| **Optimized parameters** |  |
| Lactate dehydrogenase | ,  mM-1 s-1 |
| NADH shuttles | , , , |
| Electron transport chain | , , ,  mM |
| Creatine kinase | ,  mM-1 s-1 |
| TCA cycle | ,  mM |
| **Constrained parameters** |  |
| Glucose exchange constants | , , ,  mM s-1 |
| Lactate exchange constants | , , ,  mM s-1 |
| Hexokinase-phosphofructokinase system | ,  s-1 |
| Lactate dehydrogenase | ,  mM-1 s-1 |
| Oxygen exchange constants | ,  s-1 |
| Electron transport chain | ,  mMs-1 |
| TCA cycle | , mMs-1 |
| Phosphoglycerate kinase | ,  mM-1 s-1 |
| Pyruvate kinase | ,  mM-1 s-1 |
| ATPases | ,  mMs-1 |
| Creatine kinase | ,  mM-1 s-1 |
| NADH shuttles | ,  mM s-1 |
| Blood flow contribution to capillary lactate | LACa = 0.506 mM |
|  |  |
|  |  |
| Glycogen and NE related parameters |  |
|  |  |
| *k*L1 | 0.05 mM/sec |
| *k*L2 | 0.1 sec-1 |
| *k*L3 | 0.002 mM/sec |
| *k\_*L1 | 0.07 mM/sec |
| *k\_*L2 | 0.1 sec-1 |
| *k\_*L3 | 0.002 mM/sec |
| *kmL1* | 7.7 mM |
| *kmL2* | 0.57 mM |
| *kmL3* | 0.01 mM |
| *km\_L1* | 1.3 mM |
| *km\_L2* | 1.4 mM |
| *km\_L3* | 0.0034 mM |
| ktL1 | 0.16 sec-1 |
| kDne | 3.0 x 10-4 mM |
| kgc1 | 1 x 10-6 sec-1 |
| kgc2 | 1 x 10-6 sec-1 |
| K\_gc1 | 1 x 10-2 sec-1 |
| K\_gc2 | 1 x 10-2 sec-1 |
|  | 2.5 sec |
| kg5 | 20 sec-1 |
| kg6 | 5 sec-1 |
| pt | 0.07 mM |
| s1 | 100 |
| s2 | 0.001 |
| K\_a | 1 sec-1 mM-1 |
| kgi | 10 mM |
| kg7 | 20 mM |
| kg8 | 5 mM |
| kmg7 | 0.015 |
| kmg8 | 0.00012 |
| kg2 | 0.5 mM |
| kt | 0.0025 mM |
| kg3 | 20 sec-1 |
| kg4 | 5 sec-1 |
| kmg3 | 0.004 mM |
| kmg4 | 0.0011 mM |
| kmaxd | 3.2 x 10-3 mM |
| kmind | 2.0 x 10-6 mM |
| Kd\_mg | 1 mM |
|  | 0.1, 1, 10 sec |
|  | 500 sec |
| cyclase coefficient 1 | 50 x 10-4 |
| cyclase coefficient 2 | 40 x 10-4 |
| cyclase coefficient 3 | 25 x 10-4 |
| cyclase coefficient 4 | 17 x 10-4 |
| Diffusion coefficient, NE | 0.077x10-5 cm2/s |
| Release site density | 2.1x106/mm3 |
| Gap, extracellular | 30 nm |