Unique List of "Reactions"

Tim David

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Abstract

1 Introduction

The list below is a unique list provided so as to generate a protocol for deleting "reactions". "Reactions" are defined as distinct formulae forming the RHS of the relevant o.d.e. As a way of getting to a reduced system of NVC we have not altered the neuron model nor the ??

2 Synaptic Cleft and Astrocyte

THE LIST

Reaction	Description	
		Astrocyte and Synaptic Cleft.....
1	J_{K_k}	potassium (K^+) channel
2	$2J_{NaK_k}$	K^+ sodium (Na^+)-ATPase pump
3	J_{NKCC1_k}	Na+, K+ and Cl flux through the NKCC1 channel
4	J_{KCC1_k}	Cl and K+ flux through the KCC1 channel
5	$J_{KNEtoSC}$	flux of K+ into the SC based on the extracellular K+
6	J_{Na_k}	Na+ flux through the Na+ channel
7	J_{NBC_k}	Na+ and HCO3 flux through the NBC channel
8	$J_{NaNEtoSC}$,	flux of K+ into the SC based on the extracellular K+ = $J_{KNEtoSC}$
9	J_{IP3_k}	flux of Ca2+ through the IP3R channel
10	J_{pump_k}	flux of Ca2+ through the uptake pump
11	J_{ERleak_k}	flux of Ca2+ through the leak channel
12	$\frac{J_{TRPV_k}}{r_{buff}}$	flux of Ca2+ through TRPV4 channel
13	J_{CICR_k}	flux of Ca2+ through CICR into astrocytic cytosol
14	$r_h G$	rate of IP3 production in astrocyte due to glutamate receptors
15	$k_{deg} IP3_k$	Rate constant for IP3 degradation in astrocyte
16	$V_{eet} \max(Ca_k - c_{k_{min}}, 0)$	production of astrocytic epoxyeicosatrienoic acid (EET) concentration
17	$k_{eet} eet_k$	degredation of astrocytic epoxyeicosatrienoic acid (EET) concentration
18	J_{BK_k}	
19	J_{Cl_k}	
20	$\phi_n w_\infty$	

21	$-\phi_n w_k$	
22	$k_{on}K_{inh} - (Ca_k + K_{inh})h_k$	inactivation variable h_k of the astrocytic IP_3R channel
23	$-k_{on}(Ca_k + K_{inh})h_k$	inactivation variable h_k of the astrocytic IP_3R channel
24	$\frac{m_{inf}}{\tau_{TRPV4}}$	TRPV4 channel open probability
25	$\frac{-m_k}{\tau_{TRPV4}}$	TRPV4 channel open probability
26	$\frac{(AA_i - AA_k)}{\tau_{AA}}$	concentration of arachidonic acid in the astrocyte AA_k.
27	$\frac{AA_m AA_{max}}{(AA_m + (Ca_k - Ca_0))^2 \frac{dCa_k}{dt}}$	concentration of arachidonic acid in the astrocyte AA_k.
PVS.....		
28	$\frac{J_{BK_k}}{VR_{pk}}$	K^+ concentration in the perivascular space (PVS)
29	$\frac{J_{KIR_i}}{VR_{pi}}$	K^+ concentration in the PVS
30	$K_{decay_p}(K_p - K_{min_p})$	K^+ concentration in the PVS
31	$\frac{J_{TRPV_k}}{VR_{pk}}$	calcium (Ca^{2+}) concentration in the PVS
32	$\frac{J_{VOCC_i}}{VR_{pi}}$	Ca^{2+} concentration in the PVS
33	$-Ca_{decay_p}(Ca_p - Ca_{min_p})$	Ca^{2+} concentration in the PVS
34	$\frac{m_{\infty_k}}{t_{TRPV_k}}$	The open probability of the transient receptor potential vanniloid-related 4 (TRPV4) channel
35	$\frac{-m_k}{t_{TRPV_k}}$	The open probability of the TRPV4 channel
SMC		
36	$J_{IP_{3i}}$	Cytosolic Ca^{2+} in the smooth muscle cell (SMC)
37	$-J_{SR_{uptake_i}}$	Cytosolic Ca^{2+} in the SMC
38	$+J_{CICR_i}$	Cytosolic Ca^{2+} in the SMC
39	$-J_{extrusion_i}$	Cytosolic Ca^{2+} in the SMC
40	$J_{SR_{leak_i}}$	Cytosolic Ca^{2+} in the SMC
41	$-J_{VOCC_i}$	Cytosolic Ca^{2+} in the SMC
42	J_{Na/Ca_i}	Cytosolic Ca^{2+} in the SMC
43	$-0.1J_{stretch_i}$	Cytosolic Ca^{2+} in the SMC
44	$J^{SMC-EC}_{Ca^{2+}-coupling_i}$	Cytosolic Ca^{2+} in the SMC
45	$-\gamma_v J_{NaK_i}$	Membrane potential of the SMC
46	$-\gamma_v J_{Cl_i}$	Membrane potential of the SMC
47	$-\gamma_v J_{K_i}$	Membrane potential of the SMC
48	$-\gamma_v J_{KIR_i}$	Membrane potential of the SMC
49	$V^{SMC-EC}_{coupling_i}$	Membrane potential of the SMC
50	$\lambda_i\,(K_{act_i})$	Open state probability of Ca^{2+}-activated K^+ channels
51	$-\lambda_i w_i$	Open state probability of Ca^{2+}-activated K^+ channels
		fluxes for K^+ in SMC are 45, 47, 48 divided by γ_v
52	$-J_{degrad_i}$	inositol trisphosphate (IP_3) concentration in the SMC
53	$J^{SMC-EC}_{IP_3-coupling_i}$	IP_3 concentration in the SMC
54	$\frac{AA_k}{\tau_{AA}}$	Arachidonic acid in the SMC
55	$\frac{-AA_i}{\tau_{AA}}$	Arachidonic acid in the SMC
56	$\frac{1}{1+exp(\frac{(NO_i - NO_{rest})}{R_{NO}})}\frac{V_a AA_i}{K_a + AA_i}$	20-HETE in the SMC

57	$\frac{V_f AA_i}{K_f + AA_i}$	20-HETE in the SMC
58	$-\lambda_h H_i$	20-HETE in the SMC
EC		
59	$J_{IP_{3j}}$	Cytosolic Ca^{2+} concentration in the endothelial cell (EC)
60	$-J_{ER_{uptake_j}}$	Cytosolic Ca^{2+} concentration in the EC
61	J_{CICR_j}	Cytosolic Ca^{2+} concentration in the EC
62	$-J_{extrusion_j}$	Cytosolic Ca^{2+} concentration in the EC
63	$J_{ER_{leak_j}}$	Cytosolic Ca^{2+} concentration in the EC
64	J_{cation_j}	Cytosolic Ca^{2+} concentration in the EC
65	J_{0_j}	Cytosolic Ca^{2+} concentration in the EC
66	$-J_{stretch_j}$	Cytosolic Ca^{2+} concentration in the EC
67	$-\frac{1}{C_{m_j}}(I_{K_j} + I_{R_j})$	Membrane potential of the EC
68	$-V_{coupling_j}^{SMC-EC}$	Membrane potential of the EC
69	J_{PLC}	IP_3 concentration of the EC
70	$-J_{degrad_j}$	IP_3 concentration of the EC
71	$-J_{IP_3-coupling_j}^{SMC-EC}$	IP_3 concentration of the EC