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// -- Begin Antimony block converted from wolf2001.xml
// Created by libAntimony v2.9.1
model *wolf2001()

  // Compartments and Species:
  compartment c0, c1, c2;
  species $sul_ex in c0, $eth_ex in c0, $oxy_ex in c0, oxy in c2, $H2O in c2;
  species $Ac in c1, aps in c1, $PPi in c1, pap in c1, sul in c1, eth in c1;
  species $A2c in c1, hyd in c1, cys in c1, N2 in c1, $N1 in c1, aco in c1;
  species oah in c1, S1 in c2, $S2 in c2, $C1 in c2, $C2 in c2, $A2m in c2;
  species A3m in c2, $Ho in c1, $Hm in c2;

  // Assignment Rules:
  A2c := Ac - A3c;
  N1 := N - N2;
  S2 := S - S1;
  A2m := Am - A3m;

  // Reactions:
  v1: $sul_ex => sul; c0*k_v0/(1 + (cys/Kc)^n);
  v13: $eth_ex => eth; c0*k_v13;
  v2: sul + A3c => aps + $PPi; c1*k2*sul*A3c;
  v10: $oxy_ex => oxy; c0*k_v10;
  v14: oxy => $oxy_ex; c2*k14*oxy;
  v3: aps + A3c => pap + $A2c; c1*k3*aps*A3c;
  v4: pap + 3N2 => hyd + 3$N1; c1*k4*pap^N2;
  v5: hyd + oah => cys; c1*k5*hyd*oah;
  v6: cys => ; c1*k6*cys;
  v7: eth + 3$N1 => aco + 3N2; c1*k7*eth*N1;
  v15: aco => oah; c1*k15*aco;
  v17: hyd => ; c1*k17*hyd;
  v18: oah => ; c1*k18*oah;
  v8: $S2 + aco => S1; c2*k8*aco*S2;
  v9: S1 + 6$N1 => $S2 + 4N2; c2*k9*S1*N1;
  v11a: $C1 + $Hm + N2 => $C2 + $Ho + $N1; c2*k11*N2*oxy/((a*N2 + oxy)*(1 +
(hyd/Kh)^m));
  v11a2: $C2 + oxy => $C1 + 5H2O; c2*k11*N2*oxy/((a*N2 + oxy)*(1 + (hyd/Kh)^m));
  v16: $A2c + A3m => $A2m + A3c; c2*k16*A3m*A2c;
  v11b: $Ho + $A2m => $Hm + A3m; (c2*k11*N2*oxy/((a*N2 + oxy)*(1 +
(hyd/Kh)^m)))*A2m/(Ka + A2m);
  vLEAK: $Ho => $Hm; 0;
  v12: A3c => $A2c; c1*k12*A3c;

  // Species initializations:
  sul_ex = 0;
  eth_ex = 0;
  oxy_ex = 0;
  oxy = 7;
  oxy has substance_per_volume;
  H2O = 0;
  A3c = 1.5;
  A3c has substance_per_volume;
  aps = 0.5;
  aps has substance_per_volume;
  PPi = 0;
  pap = 0.4;
  pap has substance_per_volume;
  sul = 0.4;
  sul has substance_per_volume;
  eth = 4;
  eth has substance_per_volume;
  A2c has substance_per_volume;
  hyd = 0.5;
  hyd has substance_per_volume;
  cys = 0.3;
  cys has substance_per_volume;
  N2 = 2;
  N2 has substance_per_volume;
  N1 has substance_per_volume;
  aco = 0.3;
  aco has substance_per_volume;
  oah = 1.5;
  oah has substance_per_volume;
  S1 = 1.5;
  S1 has substance_per_volume;
  S2 has substance_per_volume;
  C1 = 0;
  C2 = 0;
  A2m has substance_per_volume;
  A3m = 1.5;
  A3m has substance_per_volume;
  Ho = 0;
  Hm = 0;

  // Compartment initializations:
  c0 = 1;
  c1 = 1;
  c2 = 1;

  // Variable initializations:
  Ac = 2;
  N = 2;
  S = 2;
  Am = 2;
  k_v0 = 1.6;
  Kc = 0.1;
  n = 4;
  k_v13 = 4;
  k2 = 0.2;
  k_v10 = 80;
  k14 = 10;
  k3 = 0.2;
  k4 = 0.2;
  k5 = 0.1;
  k6 = 0.12;
  k7 = 10;
  k15 = 5;
  k17 = 0.02;
  k18 = 1;
  k8 = 10;
  k9 = 10;
  k11 = 10;
  a = 0.1;
  Kh = 0.5;
  m = 4;
  k16 = 10;
  Ka = 1;
  k12 = 5;

  // Other declarations:
  const c0, c1, c2, Ac, N, S, Am, k_v0, Kc, n, k_v13, k2, k_v10, k14, k3;
  const k4, k5, k6, k7, k15, k17, k18, k8, k9, k11, a, Kh, m, k16, Ka, k12;

  // Unit definitions:
  unit substance_per_volume = mole / litre;
  unit substance = mole;

  // Display Names:
  c0 is "external";
  c1 is "cytosol";
  c2 is "mitochondria";
  sul_ex is "SO4_ex";
  eth_ex is "EtOH_ex";
  oxy_ex is "O2_ex";
  oxy is "O2";
  A3c is "ATP";
  aps is "APS";
  pap is "PAPS";
  sul is "SO4";
  eth is "EtOH";
  A2c is "ADP";
  hyd is "H2S";
  cys is "CYS";
  N2 is "NADH";
  N1 is "NAD";
  aco is "AcCoA";
  oah is "OAH";
  A2m is "ADP_mit";
  A3m is "ATP_mit";
  v11a is "vET1";
  v11a2 is "vET2";
  v11b is "vSYNT";
end
// -- End Antimony block

// -- Begin PhraSEDML block converted from main.xml
// Created by libphrasedml v1.0.5
// Models
model_m_1 = model "wolf2001" with m=1
model_m_2 = model "wolf2001" with m=2
model_m_4 = model "wolf2001" with m=4
model_m_8 = model "wolf2001" with m=8
model_m_16 = model "wolf2001" with m=16

// Simulations
sim_short = simulate uniform(0, 100, 5000)
sim_long  = simulate uniform(0, 200, 5000)

// Tasks
m1_short  = run sim_short on model_m_1
m2_short  = run sim_short on model_m_2
m4_short  = run sim_short on model_m_4
m8_short  = run sim_short on model_m_8
m16_short = run sim_short on model_m_16

m1_long  = run sim_long on model_m_1
m2_long  = run sim_long on model_m_2
m4_long  = run sim_long on model_m_4
m8_long  = run sim_long on model_m_8
m16_long = run sim_long on model_m_16

// Outputs
plot "Oxygen (short duration)" m1_short.time vs m1_short.oxy, m2_short.oxy,
m4_short.oxy, m8_short.oxy, m16_short.oxy
plot "Oxygen (long duration)" m1_long.time vs m1_long.oxy, m2_long.oxy, m4_long.oxy,
m8_long.oxy, m16_long.oxy

// -- End PhraSEDML block
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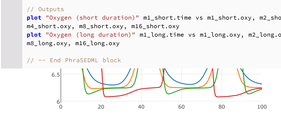

Oxygen (long duration)