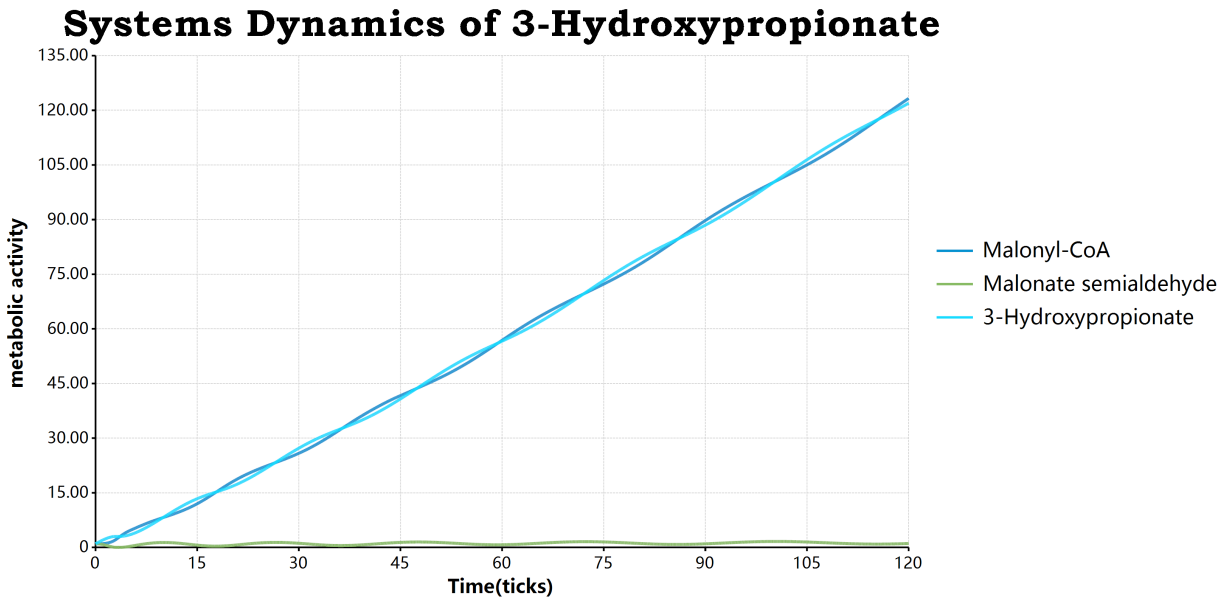
Metabolic Flux Report

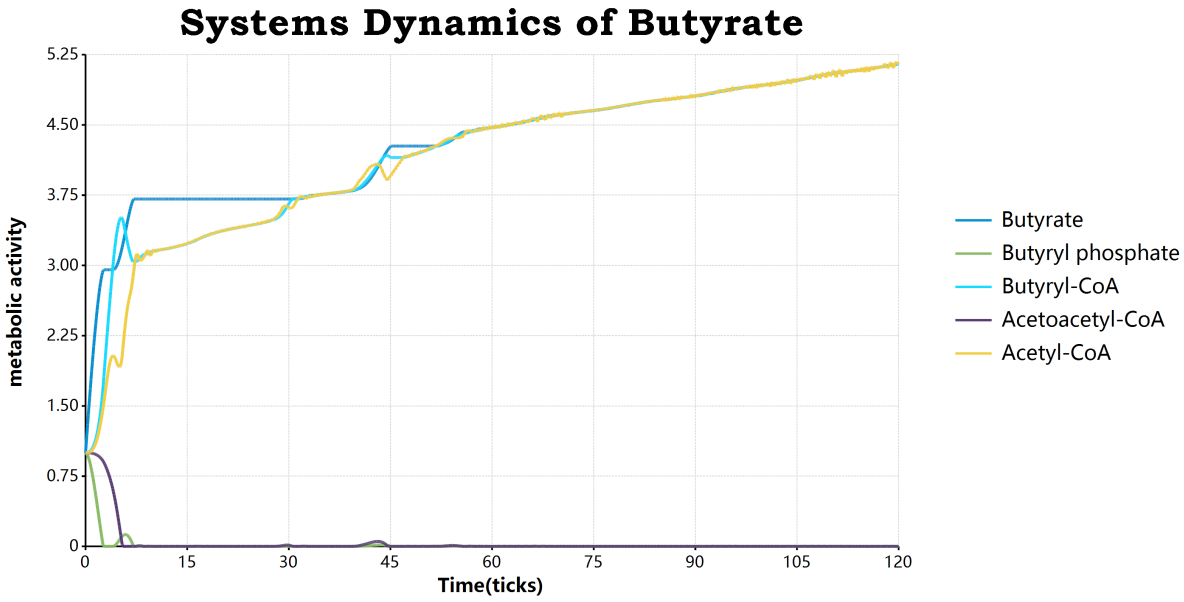
Metabolic flux refers to the amount of a metabolite processed by one or more catalytic steps per unit time, and it is typically normalized by cellular abundance (e.g., gram dry weight) (Stephanopoulos et al., 1998).

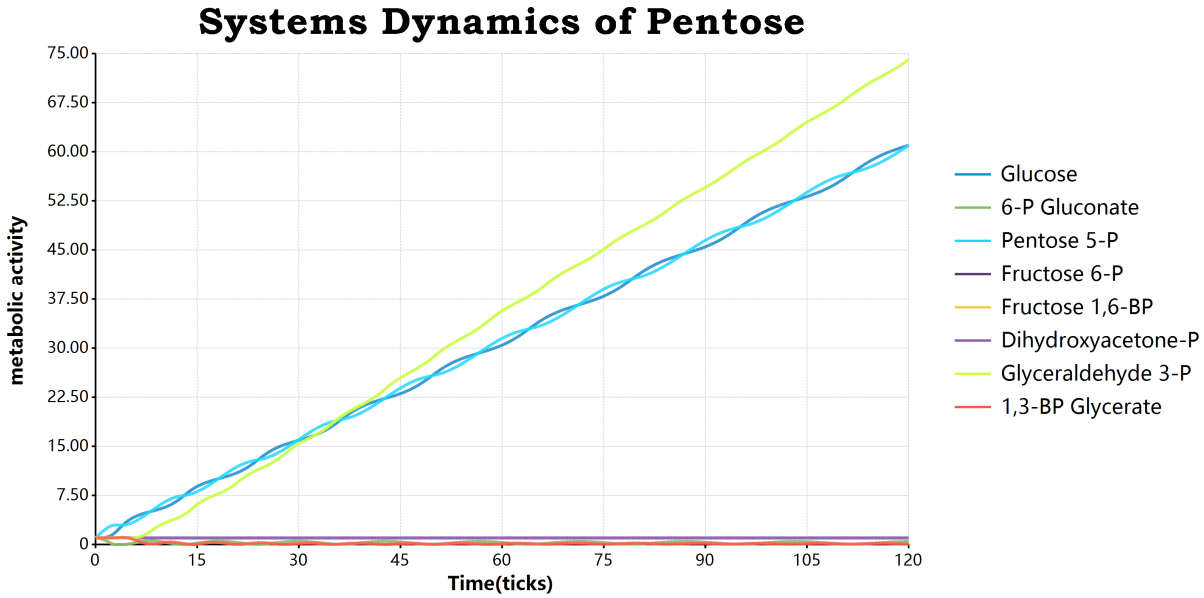
Graph View

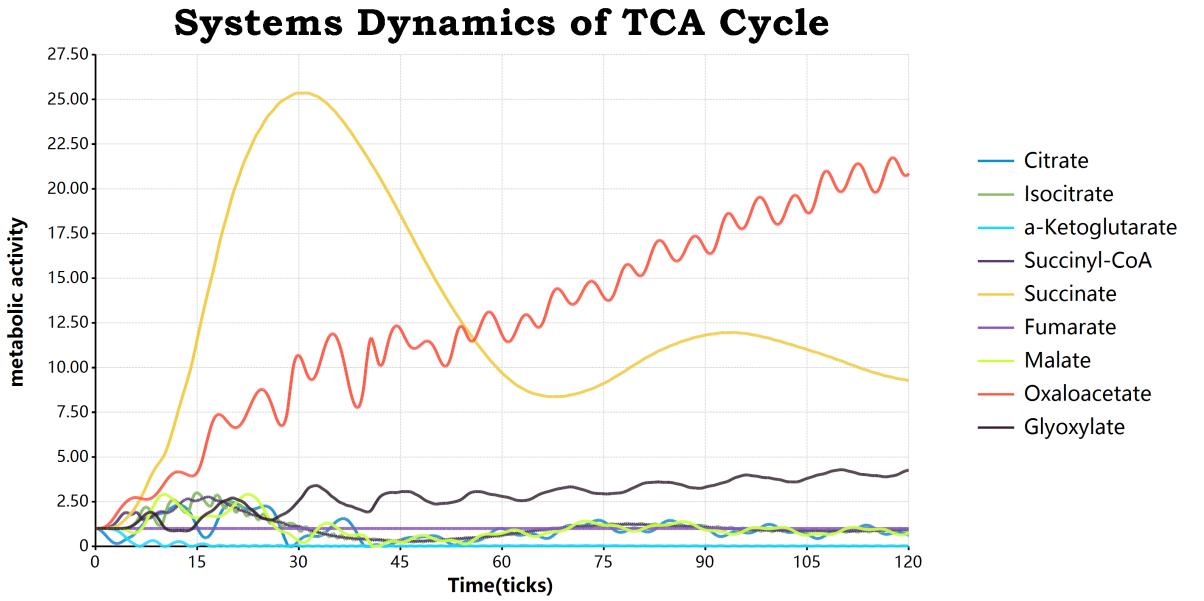
Pathway Dynamics

All metabolic changes take place in multiple reactions and follow a particular pathway called the metabolic pathway. The metabolic pathway includes a series of reactions. The metabolite flow, the rate, and direction at which metabolism takes place are called the dynamic state of body constituents.



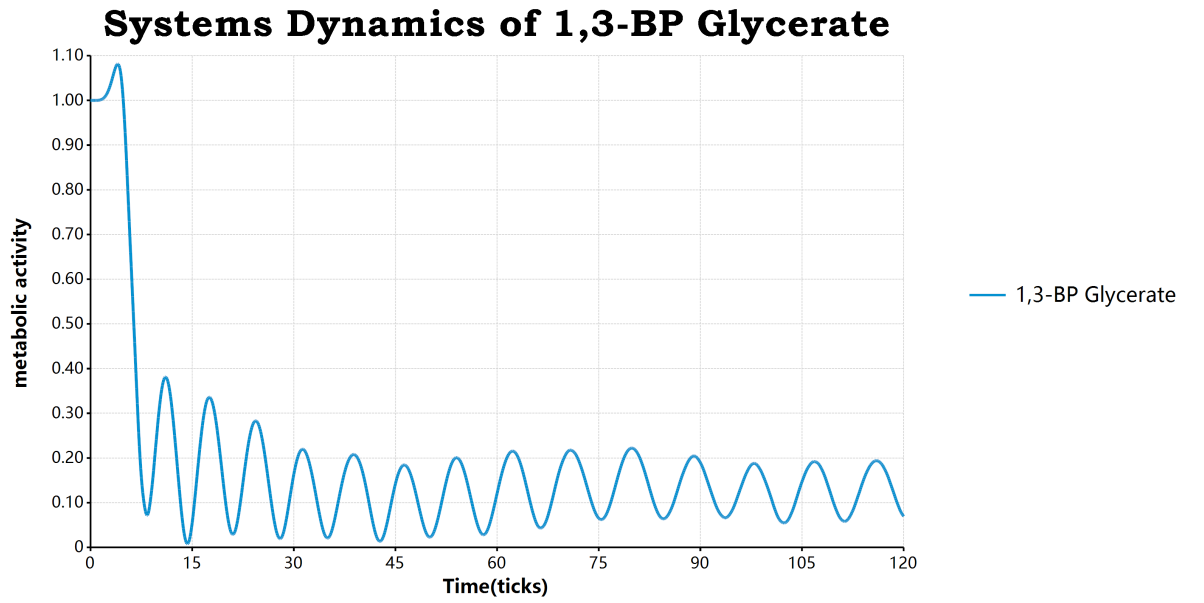


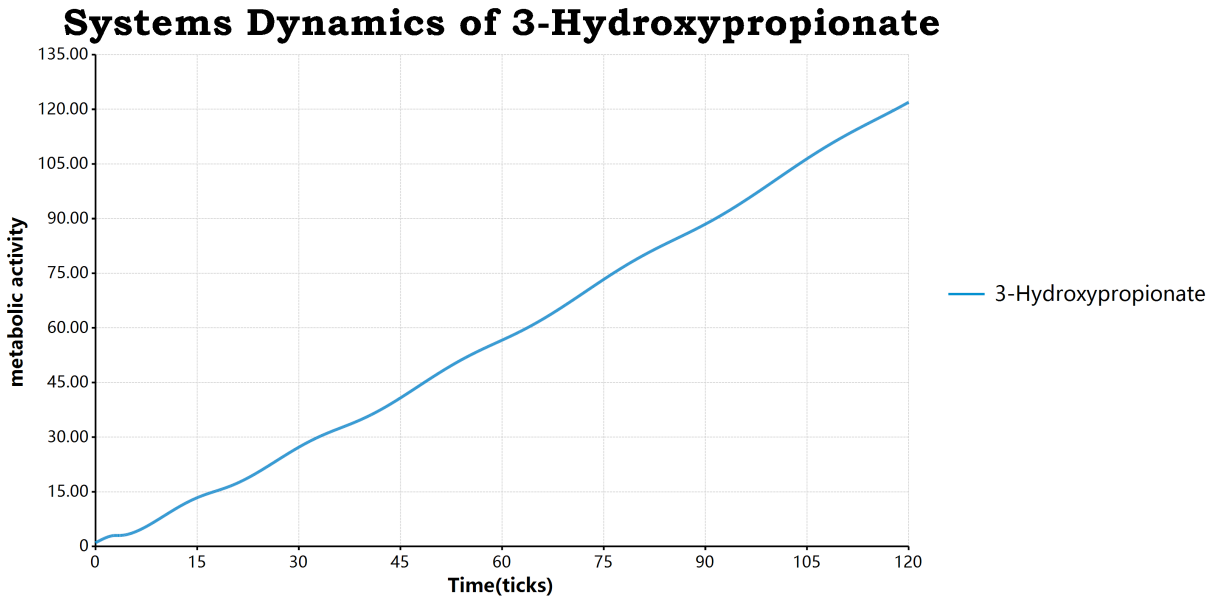

Systems Dynamics of Pentose
metabolic activity
75.00
67.50
60.00
52.50
45.00
37.50
30.00
22.50
15.00
7.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Glucose
6-P Gluconate
Pentose 5-P
Fructose 6-P
Fructose 1,6-BP
Dihydroxyacetone-P
Glyceraldehyde 3-P
1,3-BP Glycerate

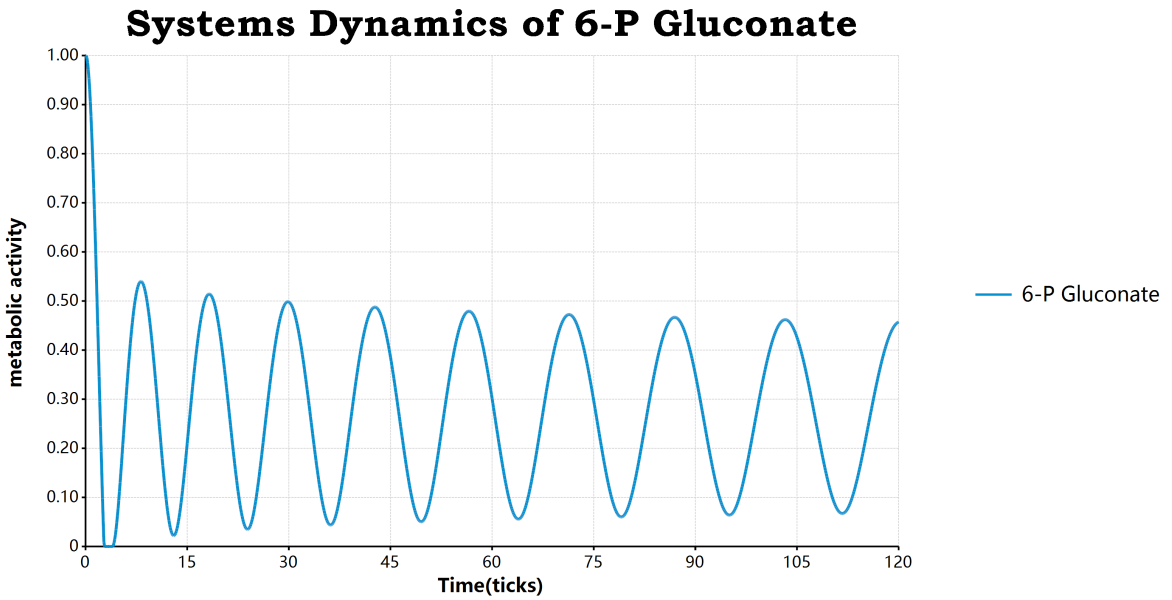

Systems Dynamics of TCA Cycle
metabolic activity
27.50
25.00
22.50
20.00
17.50
15.00
12.50
10.00
7.50
5.00
2.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Citrate
Isocitrate
a-Ketoglutarate
Succinyl-CoA
Succinate
Fumarate
Malate
Oxaloacetate
Glyoxylate

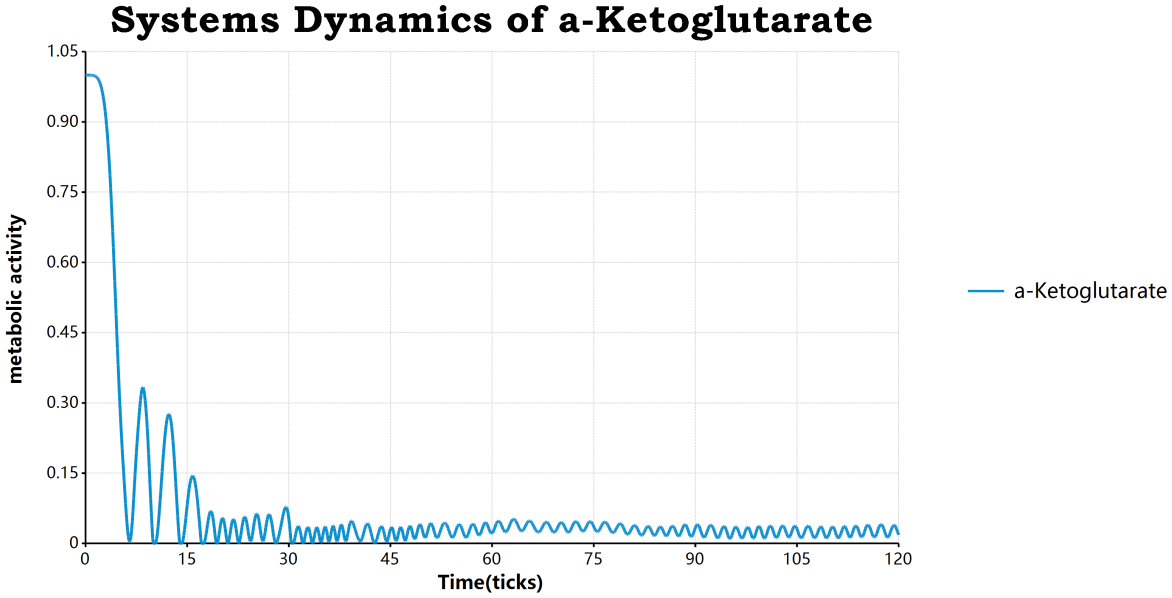
Fluxomics Dynamics

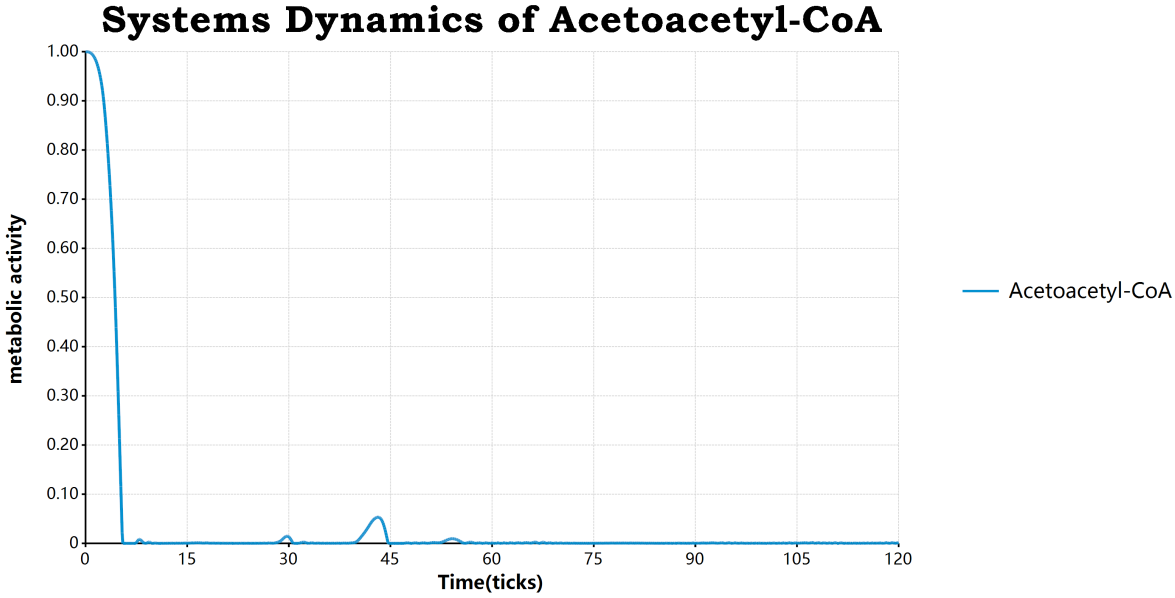
Metabolic flux analysis (MFA) is an increasingly important tool to study metabolism quantitatively. Unlike the concentrations of metabolites, the fluxes, which are the rates at which intracellular metabolites interconvert, are not directly measurable. MFA uses stable isotope labeled tracers to reveal information related to the fluxes. The conceptual idea of MFA is that in tracer experiments the isotope labeling patterns of intracellular metabolites are determined by the fluxes, therefore by measuring the labeling patterns we can infer the fluxes in the network.

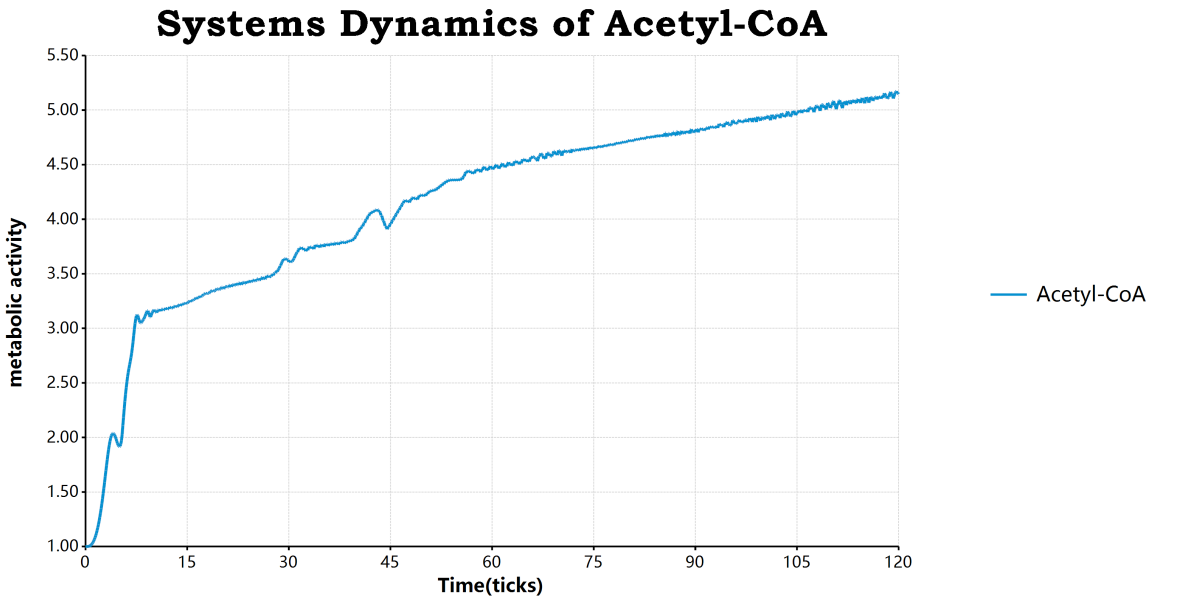


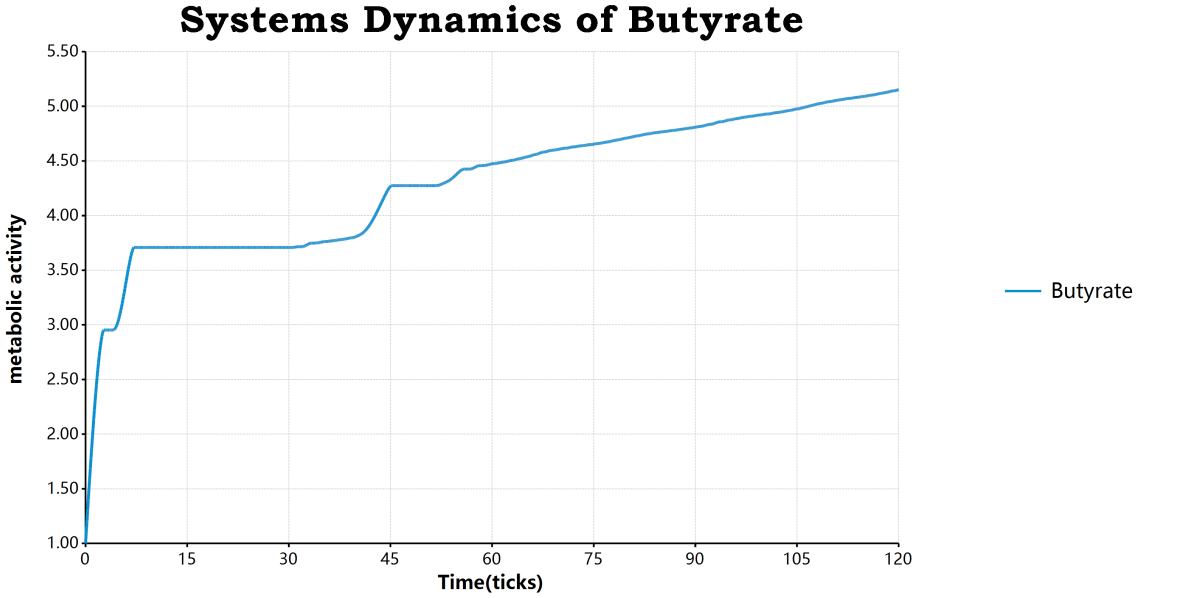


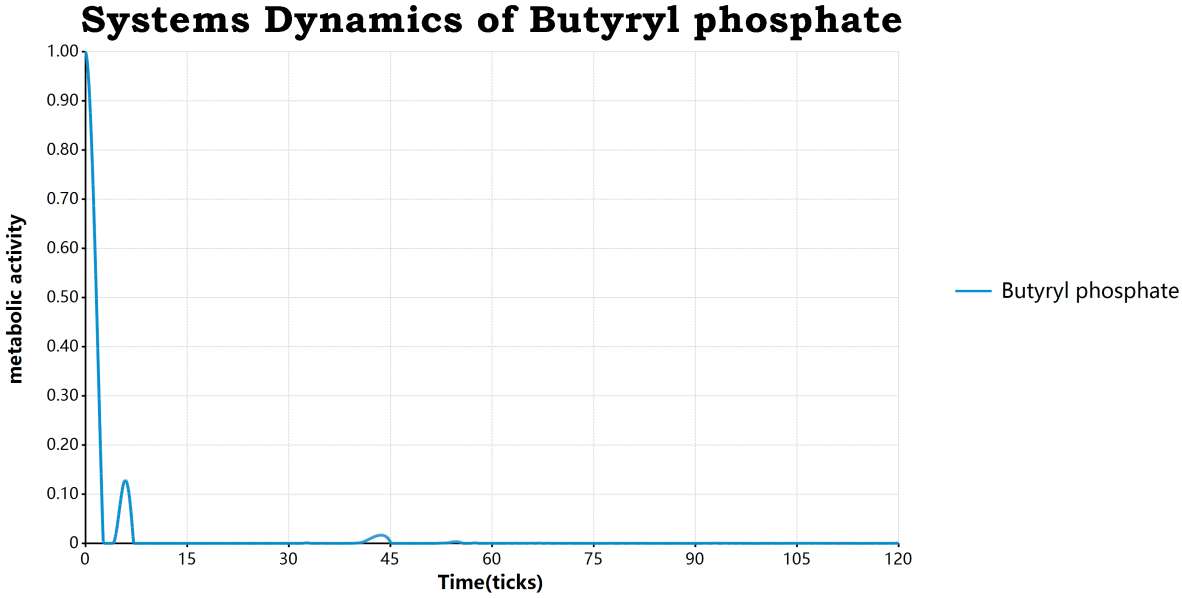

Systems Dynamics of 6-P Gluconate
metabolic activity
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0
0
15
30
45
60
75
90
105
120
Time(ticks)
6-P Gluconate

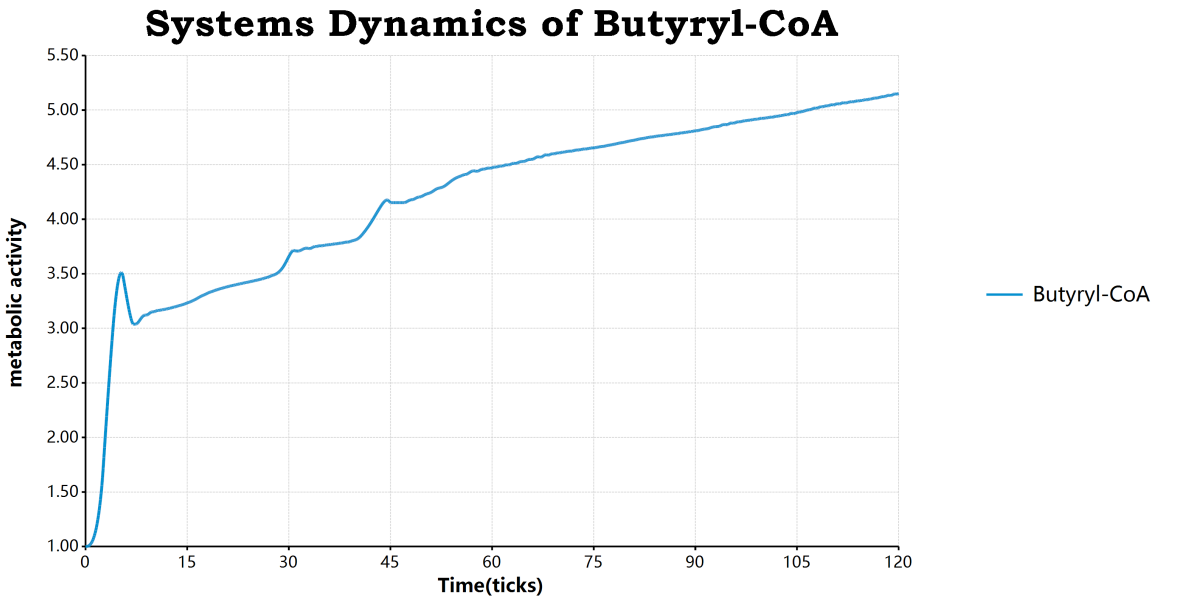

Systems Dynamics of a-Ketoglutarate
metabolic activity
1.05
0.90
0.75
0.60
0.45
0.30
0.15
0
0
15
30
45
60
75
90
105
120
Time(ticks)
a-Ketoglutarate

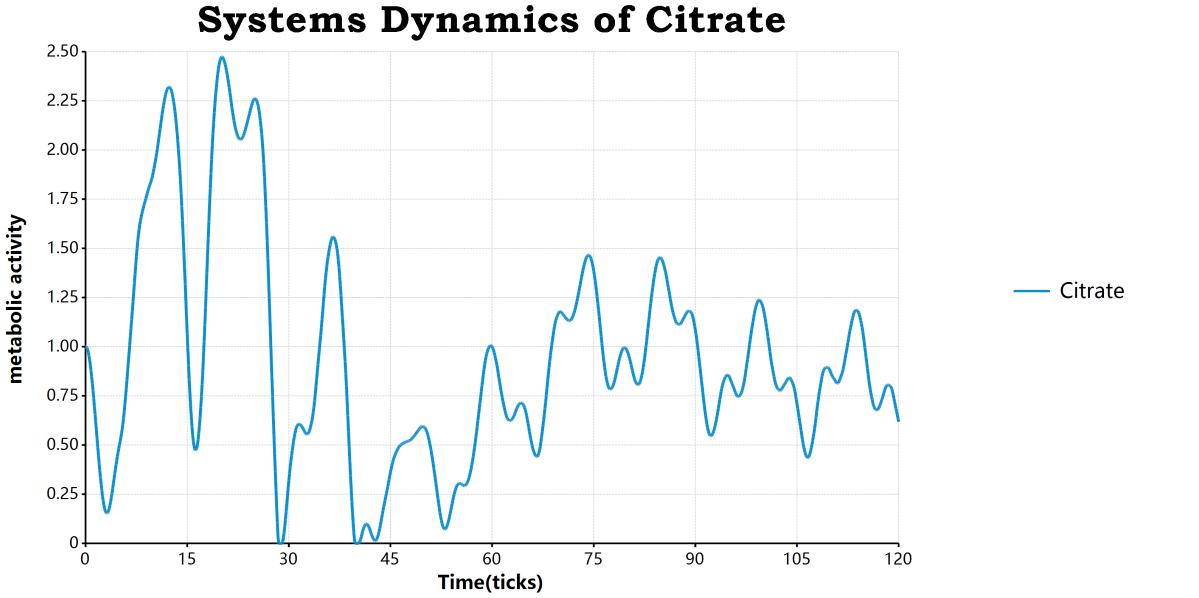

Systems Dynamics of Acetoacetyl-CoA
metabolic activity
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Acetoacetyl-CoA

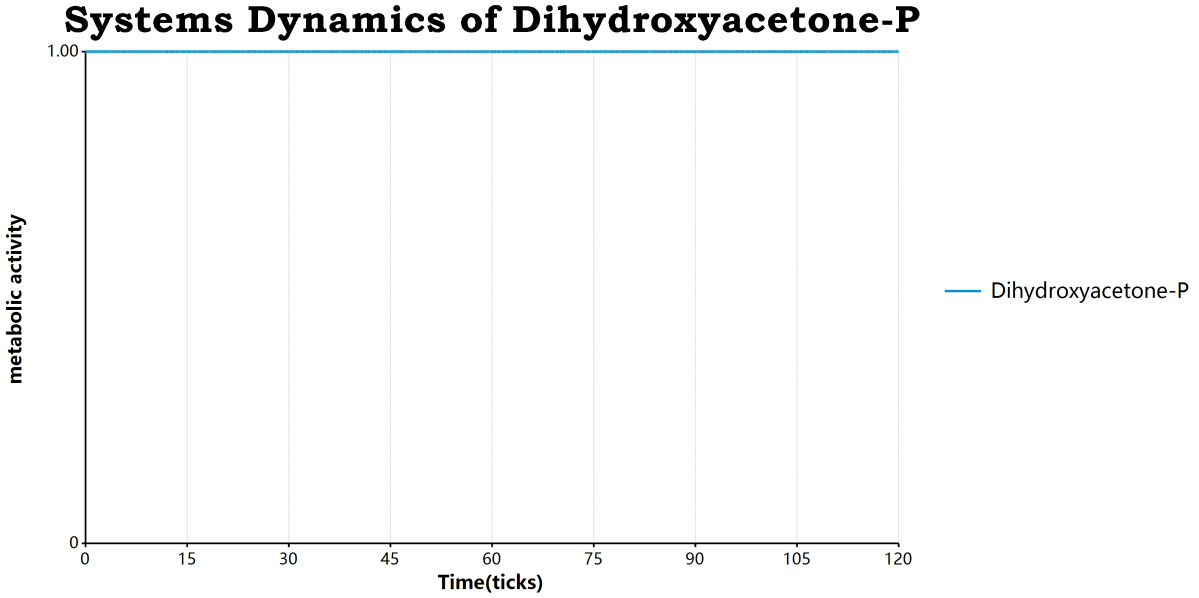

Systems Dynamics of Acetyl-CoA
metabolic activity
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0
15
30
45
60
75
90
105
120
Time(ticks)
Acetyl-CoA

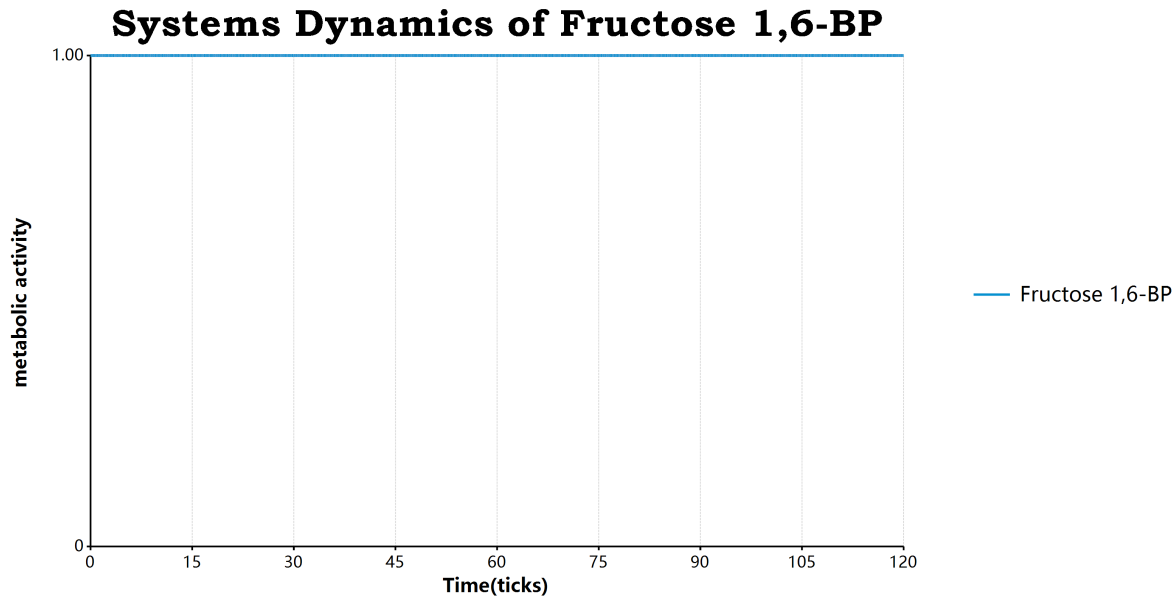

Systems Dynamics of Butyrate
metabolic activity
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0
15
30
45
60
75
90
105
120
Time(ticks)
Butyrate

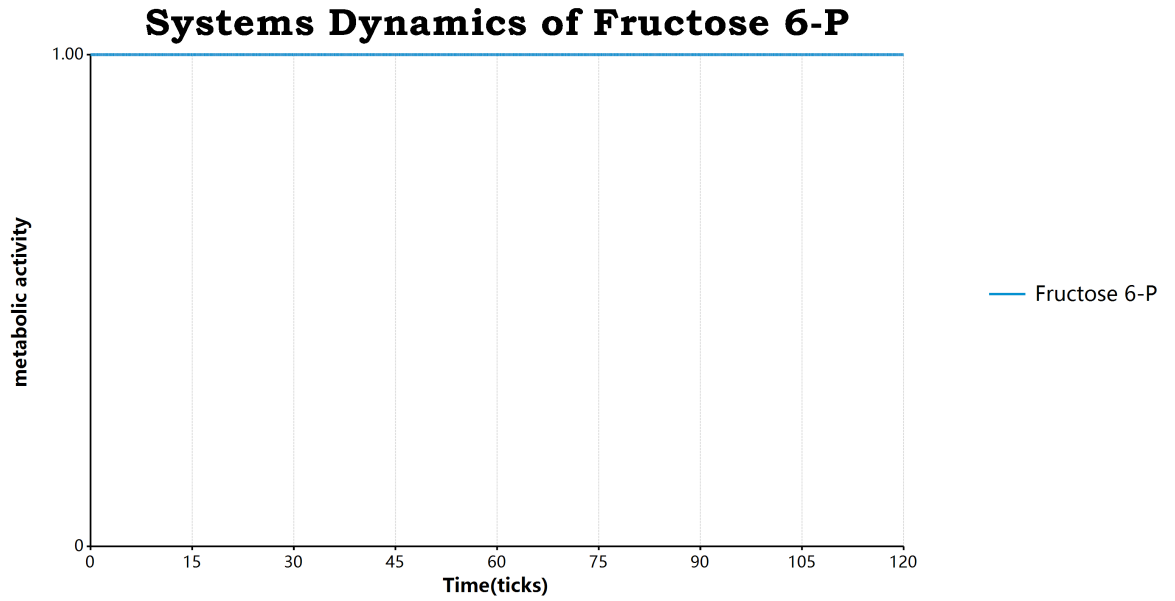

Systems Dynamics of Butyryl phosphate
metabolic activity
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Butyryl phosphate

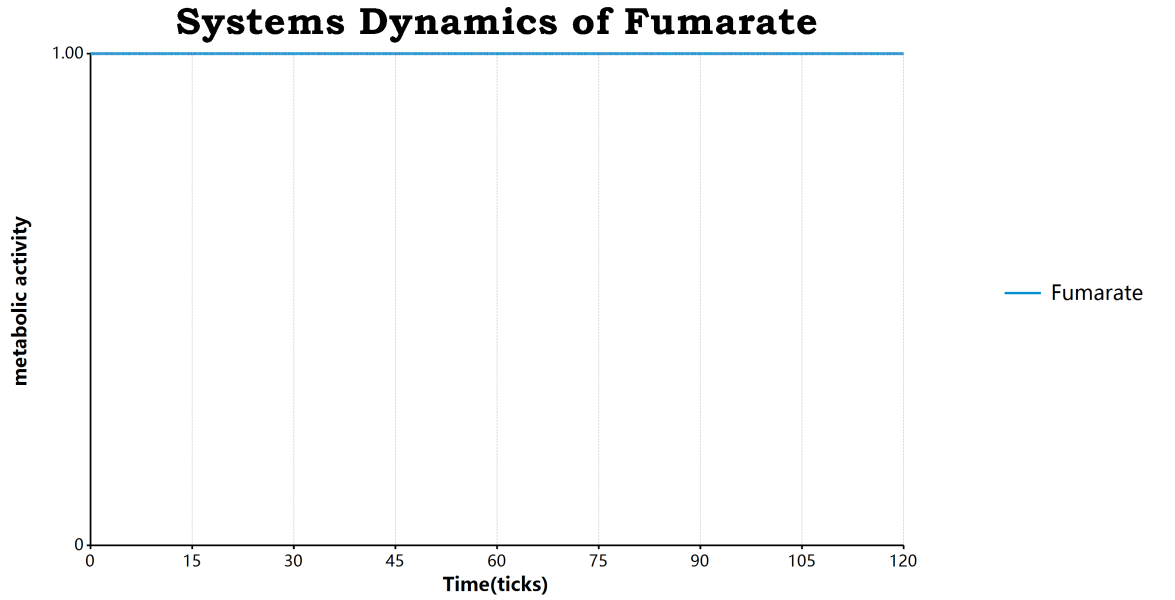

Systems Dynamics of Butyryl-CoA
metabolic activity
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0
15
30
45
60
75
90
105
120
Time(ticks)
Butyryl-CoA

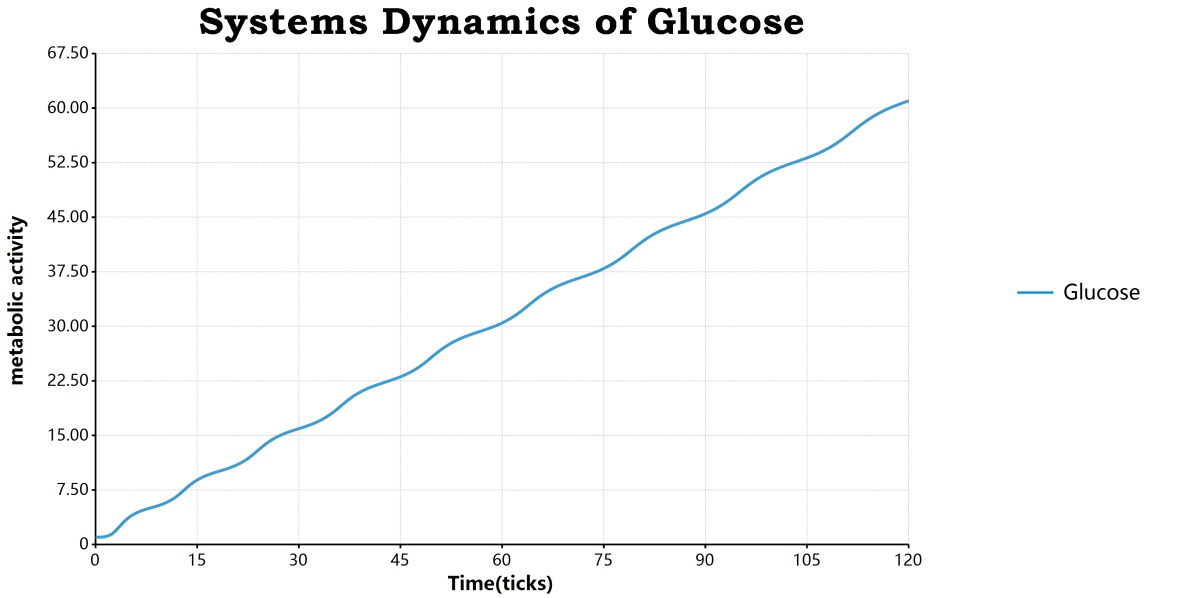

Systems Dynamics of Citrate
metabolic activity
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Citrate

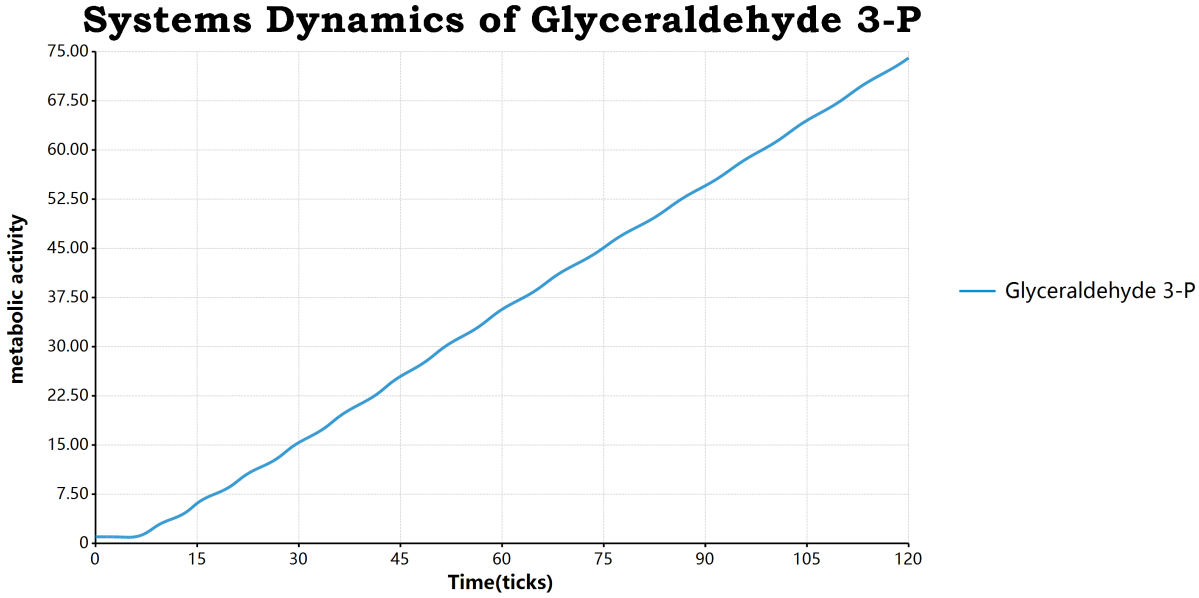

Systems Dynamics of Dihydroxyacetone-P
metabolic activity
1.00
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Dihydroxyacetone-P

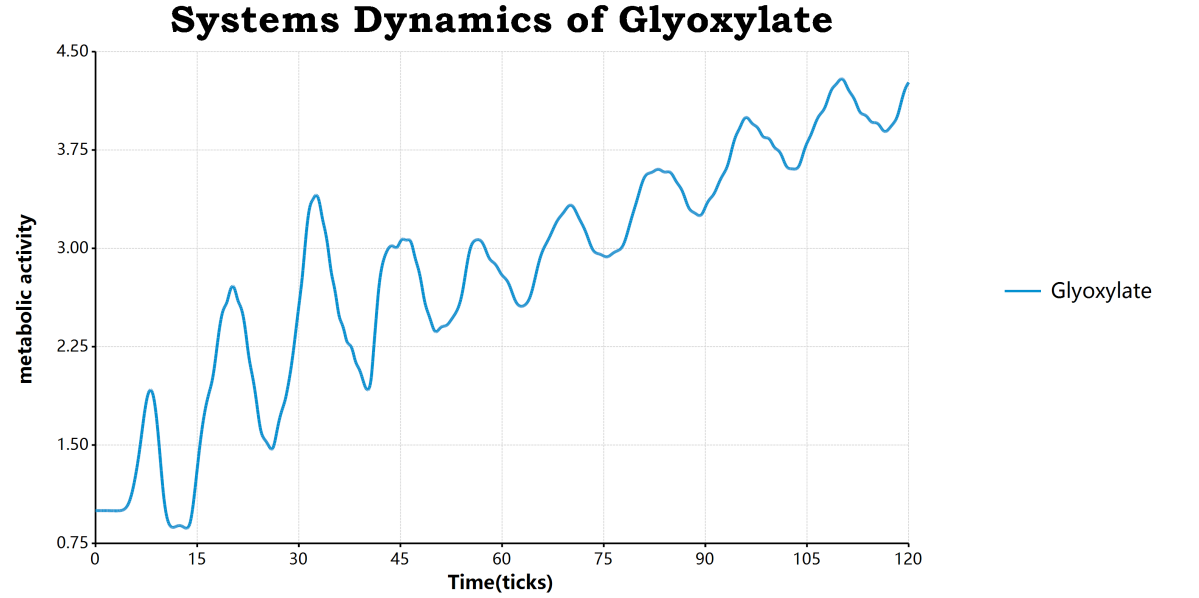

Systems Dynamics of Fructose 1,6-BP
1.00
0
metabolic activity
0
15
30
45
60
75
90
105
120
Time(ticks)
Fructose 1,6-BP

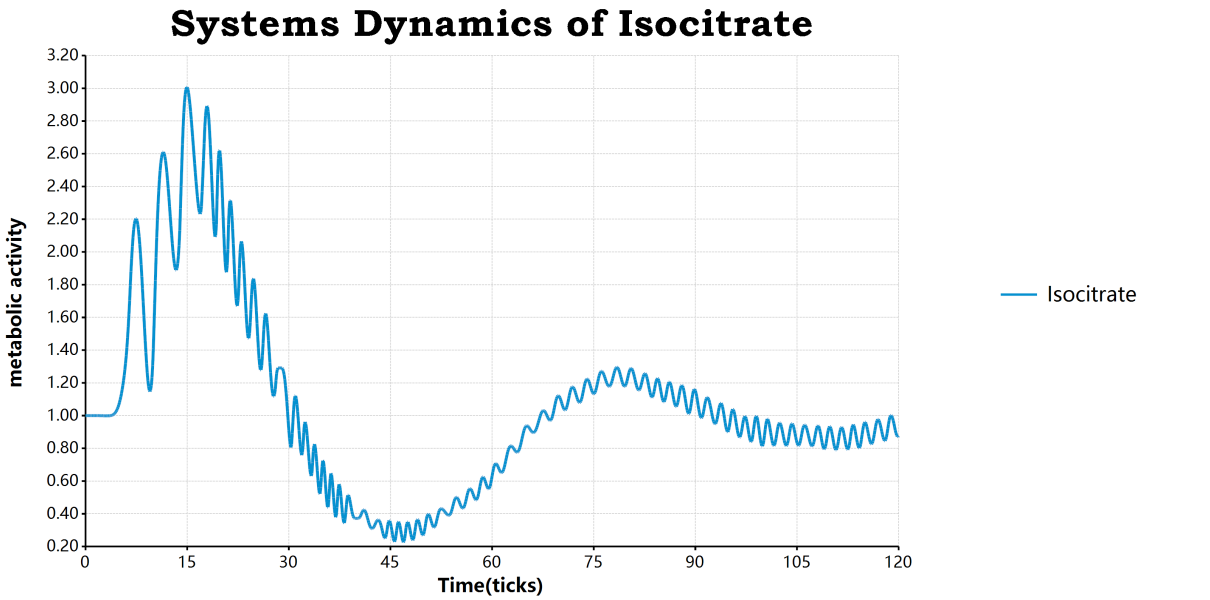

Systems Dynamics of Fructose 6-P
1.00
0
metabolic activity
0
15
30
45
60
75
90
105
120
Time(ticks)
Fructose 6-P

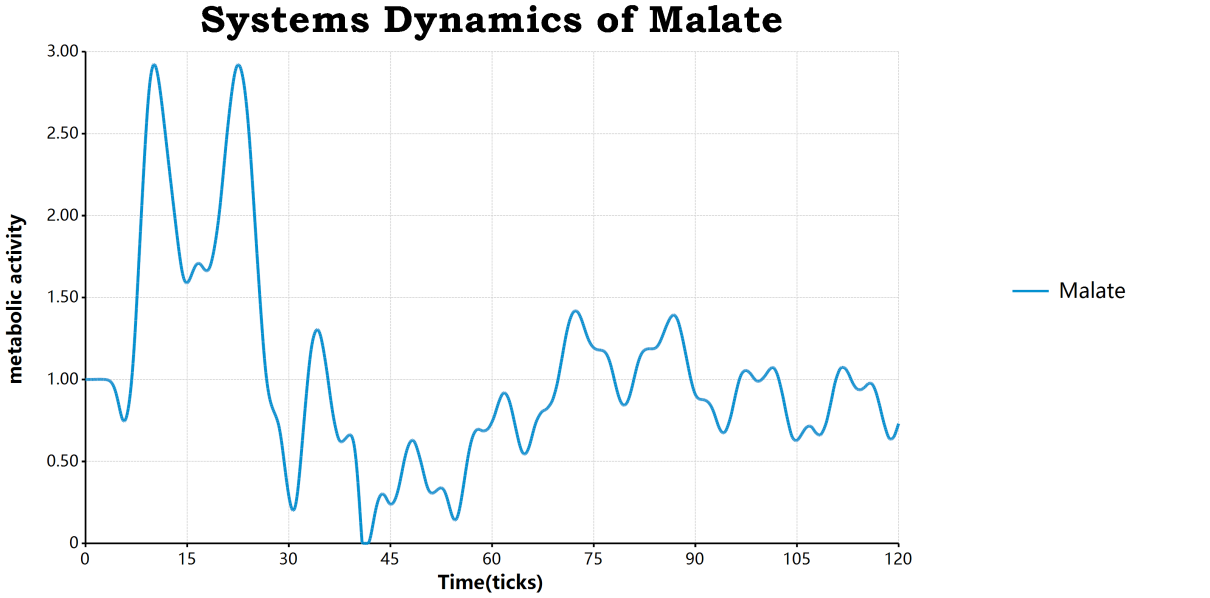

Systems Dynamics of Fumarate
1.00
0
metabolic activity
0
15
30
45
60
75
90
105
120
Time(ticks)
Fumarate

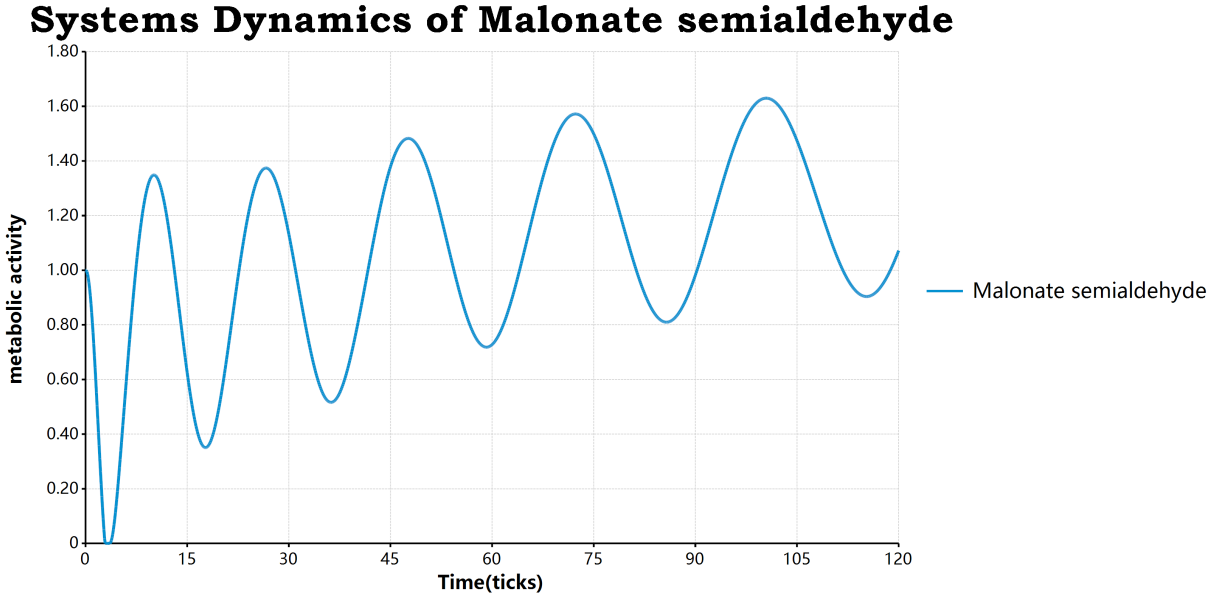

Systems Dynamics of Glucose
metabolic activity
67.50
60.00
52.50
45.00
37.50
30.00
22.50
15.00
7.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Glucose

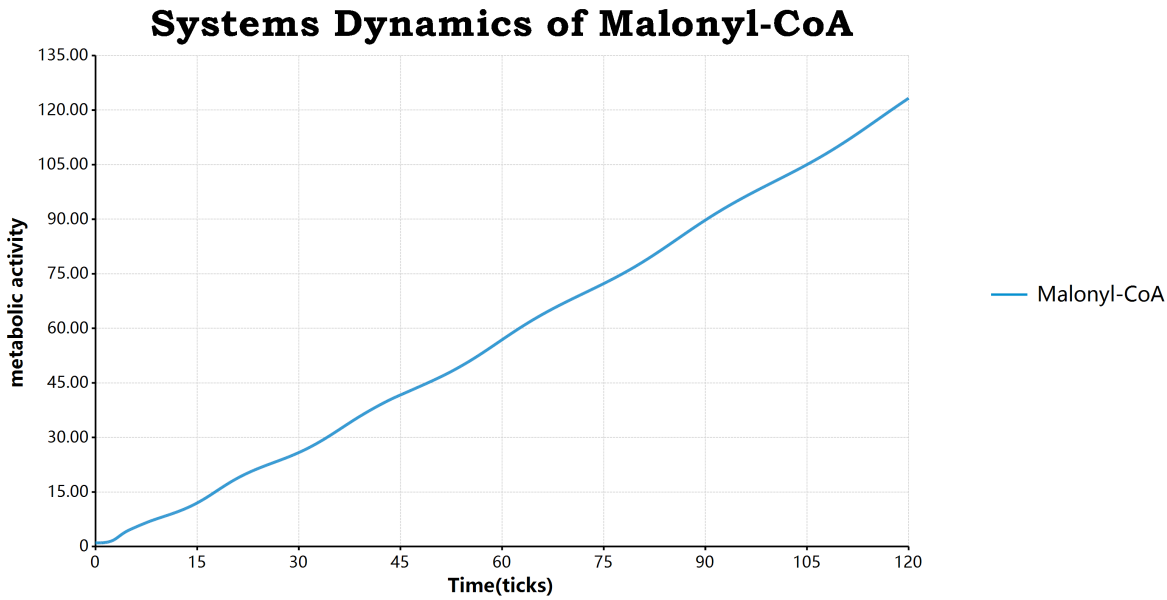

Systems Dynamics of Glyceraldehyde 3-P
metabolic activity
75.00
67.50
60.00
52.50
45.00
37.50
30.00
22.50
15.00
7.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Glyceraldehyde 3-P

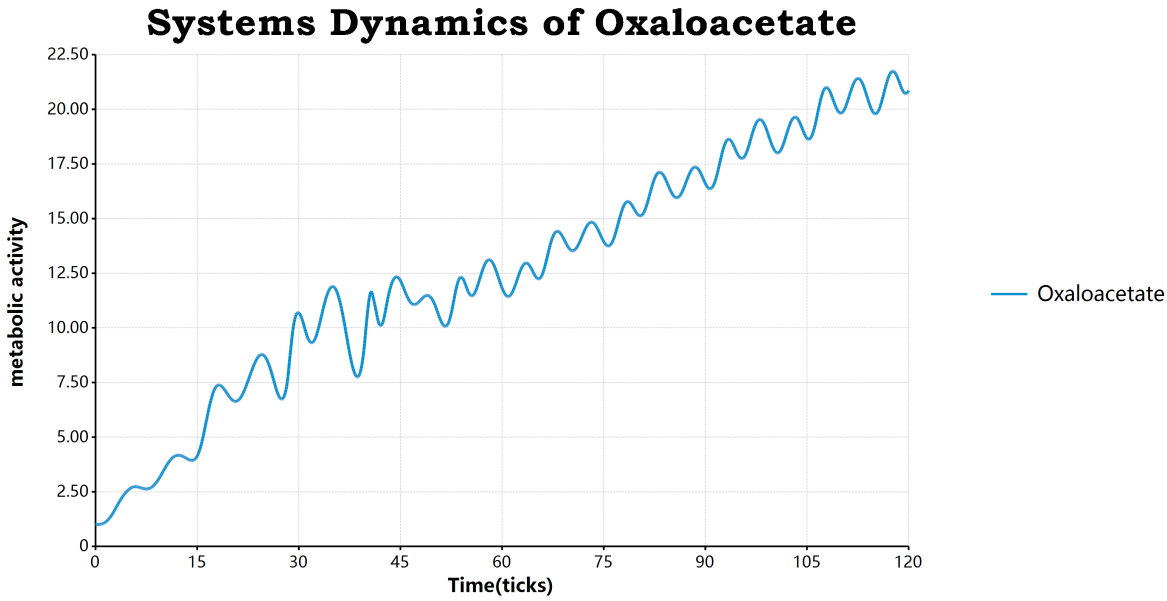

Systems Dynamics of Glyoxylate
metabolic activity
4.50
3.75
3.00
2.25
1.50
0.75
0
15
30
45
60
75
90
105
120
Time(ticks)
Glyoxylate

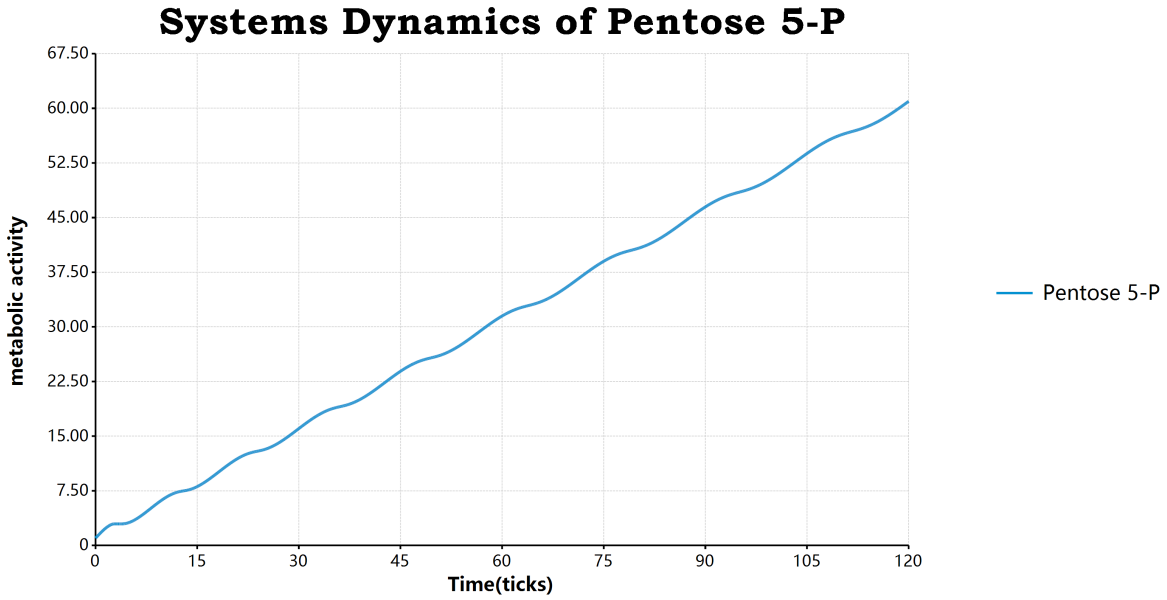

Systems Dynamics of Isocitrate
metabolic activity
3.20
3.00
2.80
2.60
2.40
2.20
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0
15
30
45
60
75
90
105
120
Time(ticks)
Isocitrate

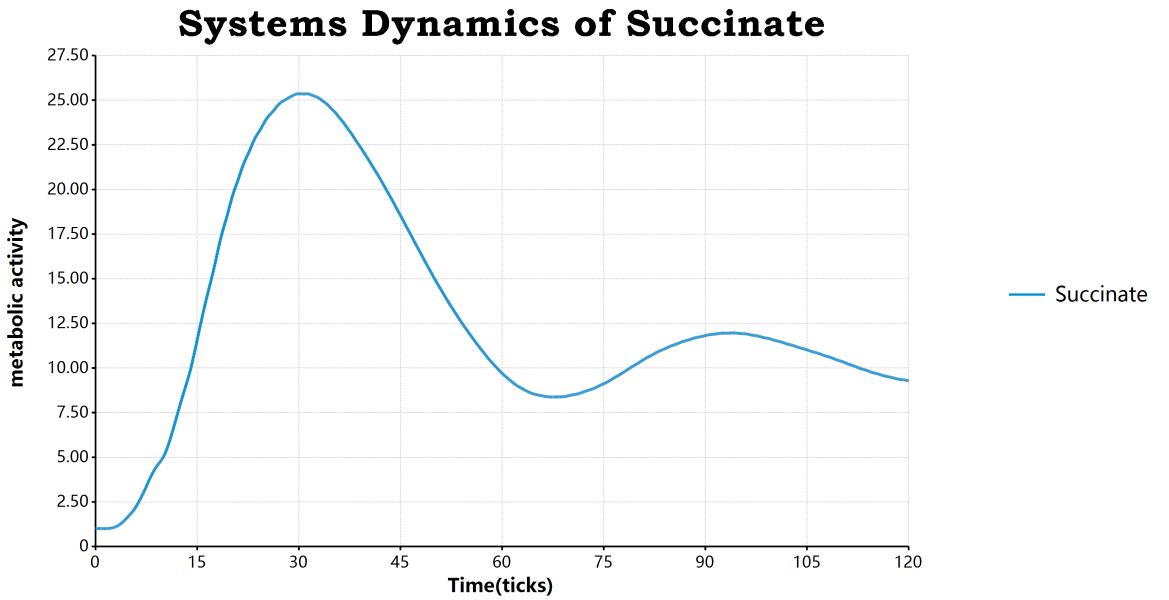

Systems Dynamics of Malate
metabolic activity
3.00
2.50
2.00
1.50
1.00
0.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Malate

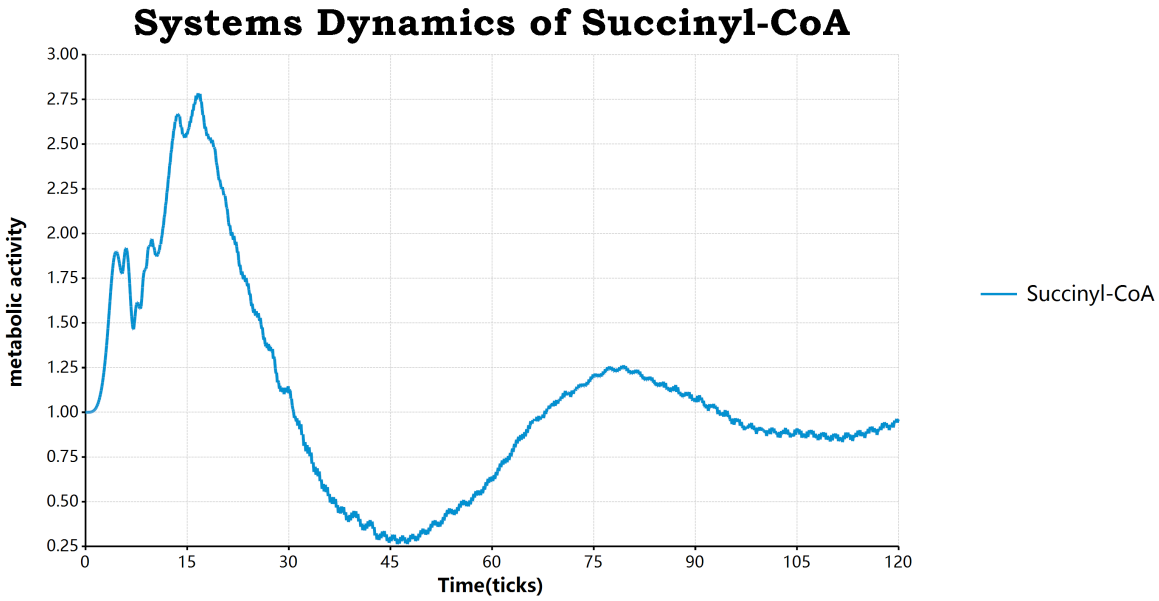

Systems Dynamics of Malonate semialdehyde
metabolic activity
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Malonate semialdehyde


Systems Dynamics of Malonyl-CoA
metabolic activity
135.00
120.00
105.00
90.00
75.00
60.00
45.00
30.00
15.00
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Malonyl-CoA


Systems Dynamics of Oxaloacetate
metabolic activity
22.50
20.00
17.50
15.00
12.50
10.00
7.50
5.00
2.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Oxaloacetate


Systems Dynamics of Pentose 5-P
metabolic activity
67.50
60.00
52.50
45.00
37.50
30.00
22.50
15.00
7.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Pentose 5-P


Systems Dynamics of Succinate
metabolic activity
27.50
25.00
22.50
20.00
17.50
15.00
12.50
10.00
7.50
5.00
2.50
0
0
15
30
45
60
75
90
105
120
Time(ticks)
Succinate


Systems Dynamics of Succinyl-CoA
metabolic activity
3.00
2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0
15
30
45
60
75
90
105
120
Time(ticks)
Succinyl-CoA