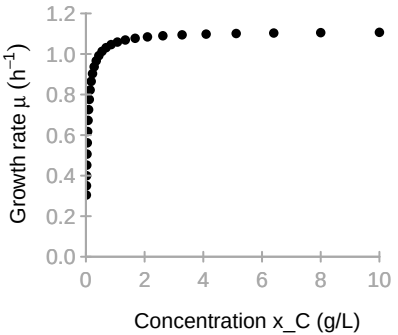
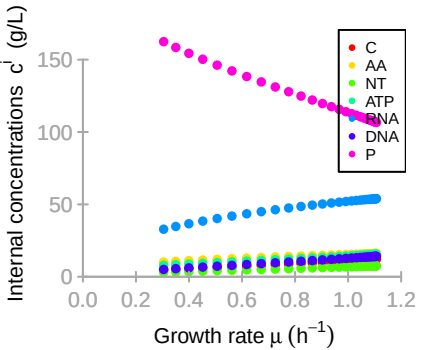
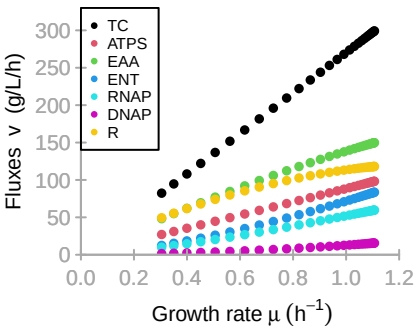
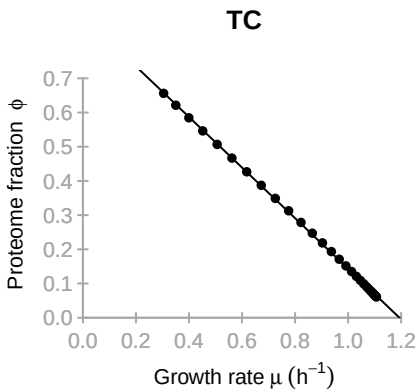
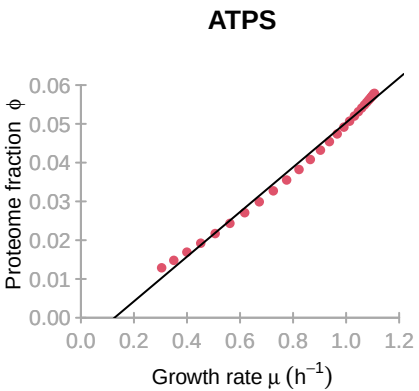
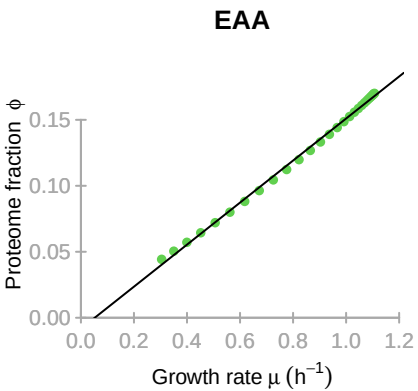

Growth rate μ (h$^{-1}$)
Concentration x_C (g/L)

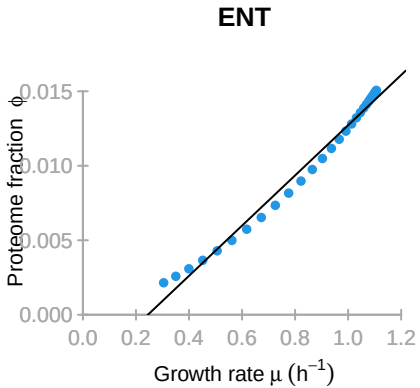

Internal concentrations $c^i$ (g/L)
Growth rate μ (h$^{-1}$)
C
AA
NT
ATP
RNA
DNA
P

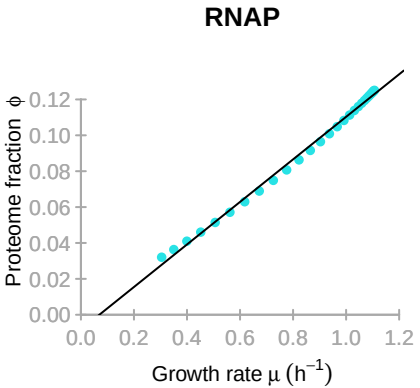

Fluxes v (g/L/h)
Growth rate μ (h$^{-1}$)
TC
ATPS
EAA
ENT
RNAP
DNAP
R

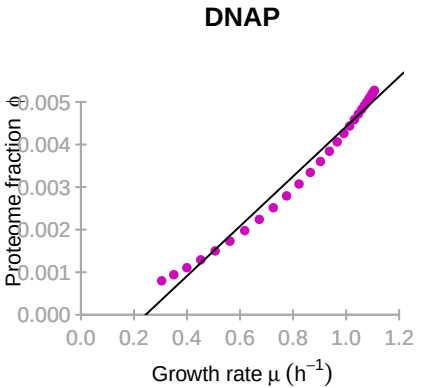

TC
Proteome fraction ϕ
Growth rate μ (h$^{-1}$)

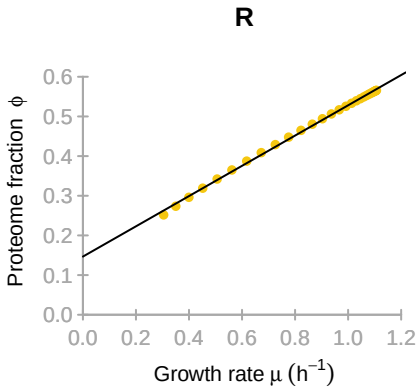

ATPS
Proteome fraction ϕ
Growth rate μ (h$^{-1}$)

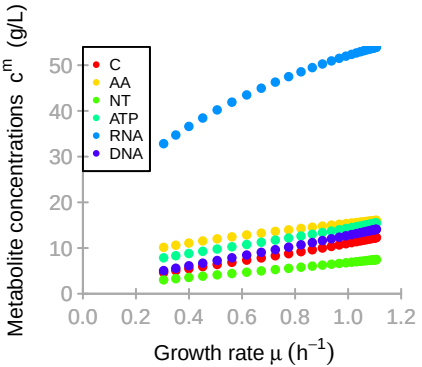

EAA
Proteome fraction ϕ
Growth rate μ (h$^{-1}$)

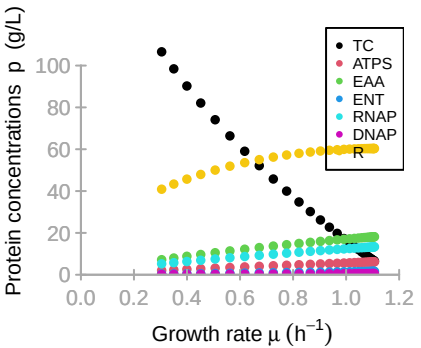

ENT
Proteome fraction ϕ
0.000
0.005
0.010
0.015
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

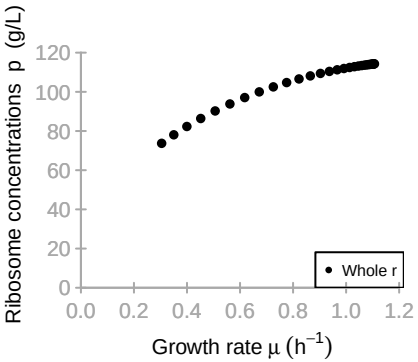

RNAP
Proteome fraction ϕ
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

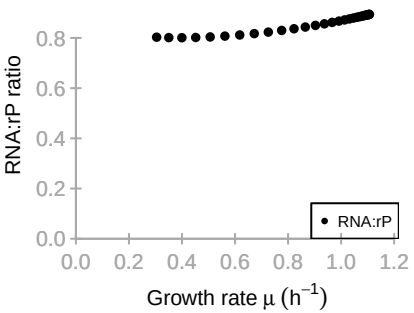

DNAP
Proteome fraction ϕ
0.000
0.001
0.002
0.003
0.004
0.005
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

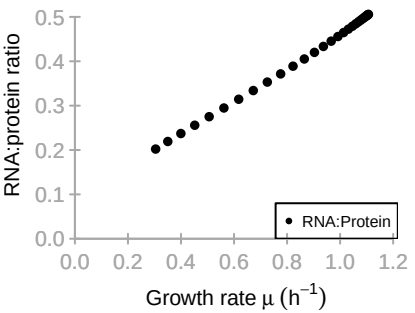

R
Proteome fraction ϕ
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

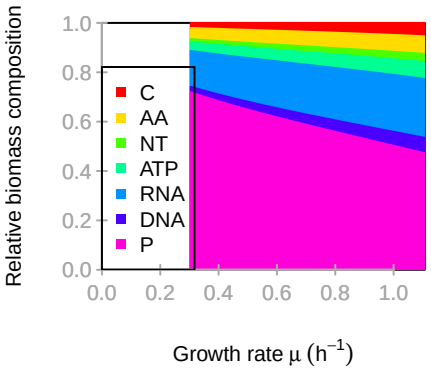

Metabolite concentrations cm (g/L)
C
AA
NT
ATP
RNA
DNA
0
10
20
30
40
50
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

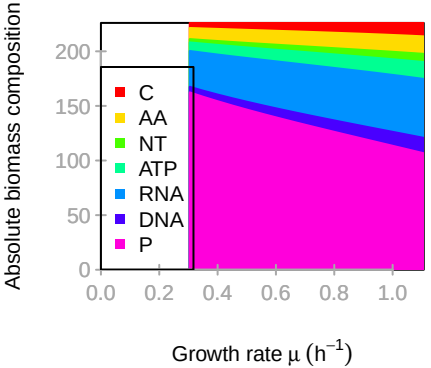

Protein concentrations p (g/L)
TC
ATPS
EAA
ENT
RNAP
DNAP
R
0
20
40
60
80
100
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

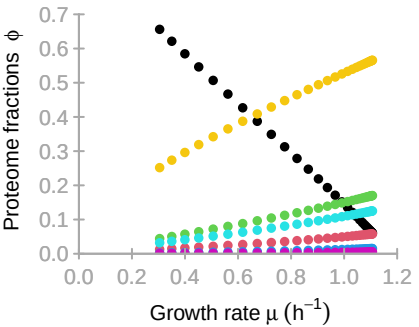

Ribosome concentrations p (g/L)
120
100
80
60
40
20
0
0.0 0.2 0.4 0.6 0.8 1.0 1.2
Growth rate μ (h−1)
Whole r

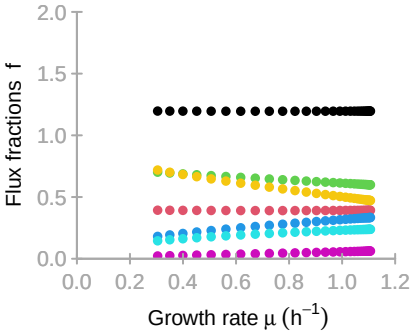

RNA:rP ratio
0.8
0.6
0.4
0.2
0.0
0.0 0.2 0.4 0.6 0.8 1.0 1.2
Growth rate μ (h−1)
RNA:rP

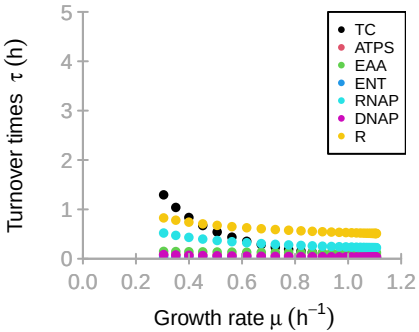

RNA:protein ratio
0.5
0.4
0.3
0.2
0.1
0.0
0.0 0.2 0.4 0.6 0.8 1.0 1.2
Growth rate μ (h−1)
RNA:Protein

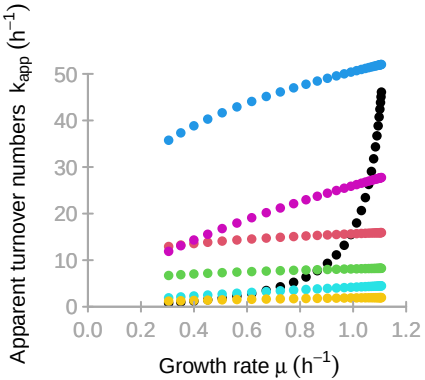

Relative biomass composition
1.0
0.8
0.6
0.4
0.2
0.0
0.0 0.2 0.4 0.6 0.8 1.0
Growth rate μ (h−1)
C
AA
NT
ATP
RNA
DNA
P


Absolute biomass composition
200
150
100
50
0
0.0 0.2 0.4 0.6 0.8 1.0
Growth rate μ (h−1)
C
AA
NT
ATP
RNA
DNA
P


Proteome fractions ϕ
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.0 0.2 0.4 0.6 0.8 1.0 1.2
Growth rate μ (h−1)


Flux fractions f
2.0
1.5
1.0
0.5
0.0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)


Turnover times τ (h)
5
4
3
2
1
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)
TC
ATPS
EAA
ENT
RNAP
DNAP
R


Apparent turnover numbers kapp (h−1)
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Growth rate μ (h−1)

# M

| | TC | ATPS | EAA | ENT | RNAP | DNAP | R |
|---|---|---|---|---|---|---|---|
| **C** | 1 | −1 | −1 | −0.45 | 0 | 0 | 0 |
| **AA** | 0 | 0 | 1 | −0.45 | 0 | 0 | −0.8 |
| **NT** | 0 | 0 | 0 | 1 | −1 | −1 | 0 |
| **ATP** | 0 | 0.5 | 0 | −0.1 | 0 | 0 | −0.2 |
| **RNA** | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **DNA** | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **P** | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

# K

| | TC | ATPS | EAA | ENT | RNAP | DNAP | R |
|---|---|---|---|---|---|---|---|
| **x_C** | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **x_W** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **C** | 5 | 2 | 2 | 2 | 0 | 0 | 0 |
| **AA** | 0 | 0 | 5 | 2 | 0 | 0 | 2 |
| **NT** | 0 | 0 | 0 | 5 | 2 | 2 | 0 |
| **ATP** | 0 | 5 | 0 | 2 | 0 | 0 | 2 |
| **RNA** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **DNA** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **P** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# KA

| | TC | ATPS | EAA | ENT | RNAP | DNAP | R |
|---|---|---|---|---|---|---|---|
| **x_C** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **x_W** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **C** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **AA** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **NT** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ATP** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **RNA** | 0 | 0 | 0 | 0 | 0 | 0 | 72 |
| **DNA** | 0 | 0 | 0 | 0 | 11 | 11 | 0 |
| **P** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# kcat

| | [,1] | [,2] | [,3] | [,4] | [,5] | [,6] | [,7] |
|---|---|---|---|---|---|---|---|
| **kcatf** | 50.7 | 18.5 | 9.6 | 76.8 | 10.1 | 62.6 | 5.8 |
| **kcatb** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Keq

| | [,1] | [,2] | [,3] | [,4] | [,5] | [,6] | [,7] |
|---|---|---|---|---|---|---|---|
| [1,] | Inf | Inf | Inf | Inf | Inf | Inf | Inf |