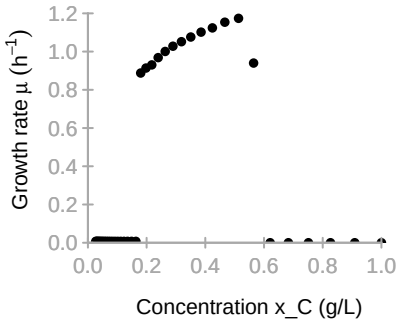
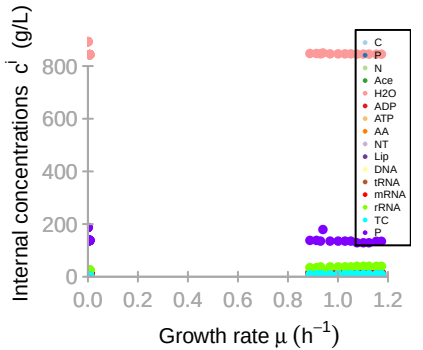
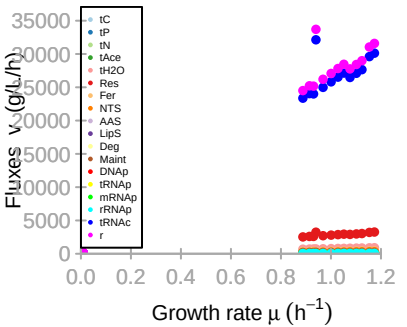
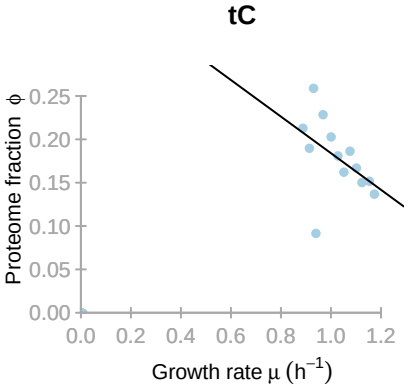
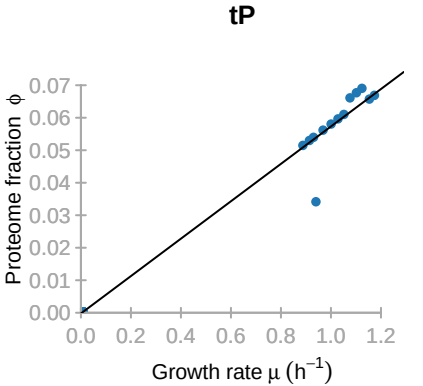
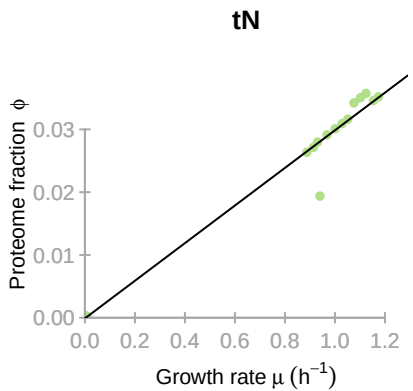

Growth rate μ (h^{-1})
Concentration x_C (g/L)

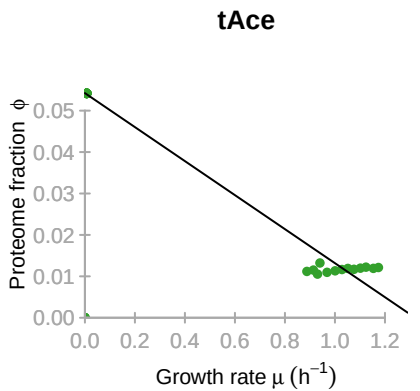

Internal concentrations c^i (g/L)
Growth rate μ (h^{-1})
C
P
N
Ace
H2O
ADP
ATP
AA
NT
Lip
DNA
tRNA
mRNA
rRNA
TC
P

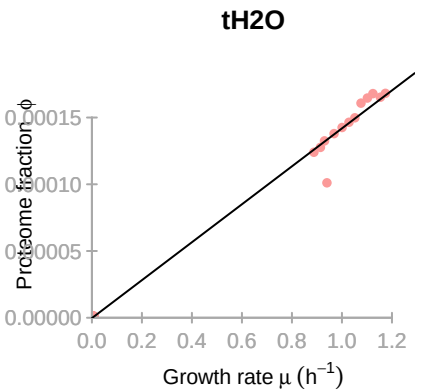

Fluxes v_i (g/L/h)
Growth rate μ (h^{-1})
tC
tP
tN
tAce
tH2O
Res
Fer
NTS
AAS
LipS
Deg
Maint
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
r

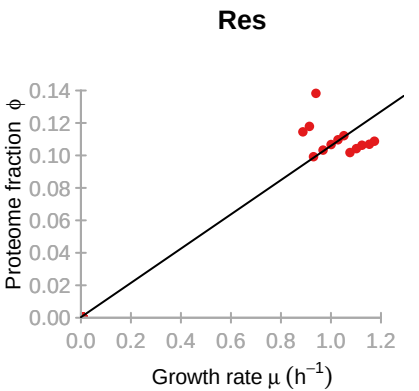

tC
Proteome fraction ϕ
Growth rate μ (h^{-1})

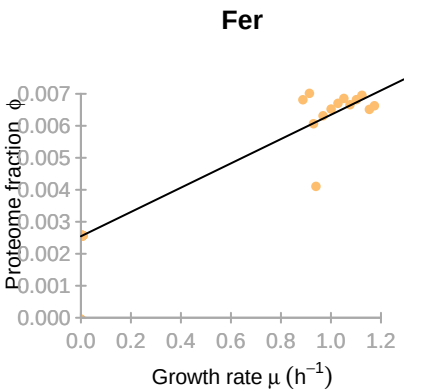

tP
Proteome fraction ϕ
Growth rate μ (h^{-1})

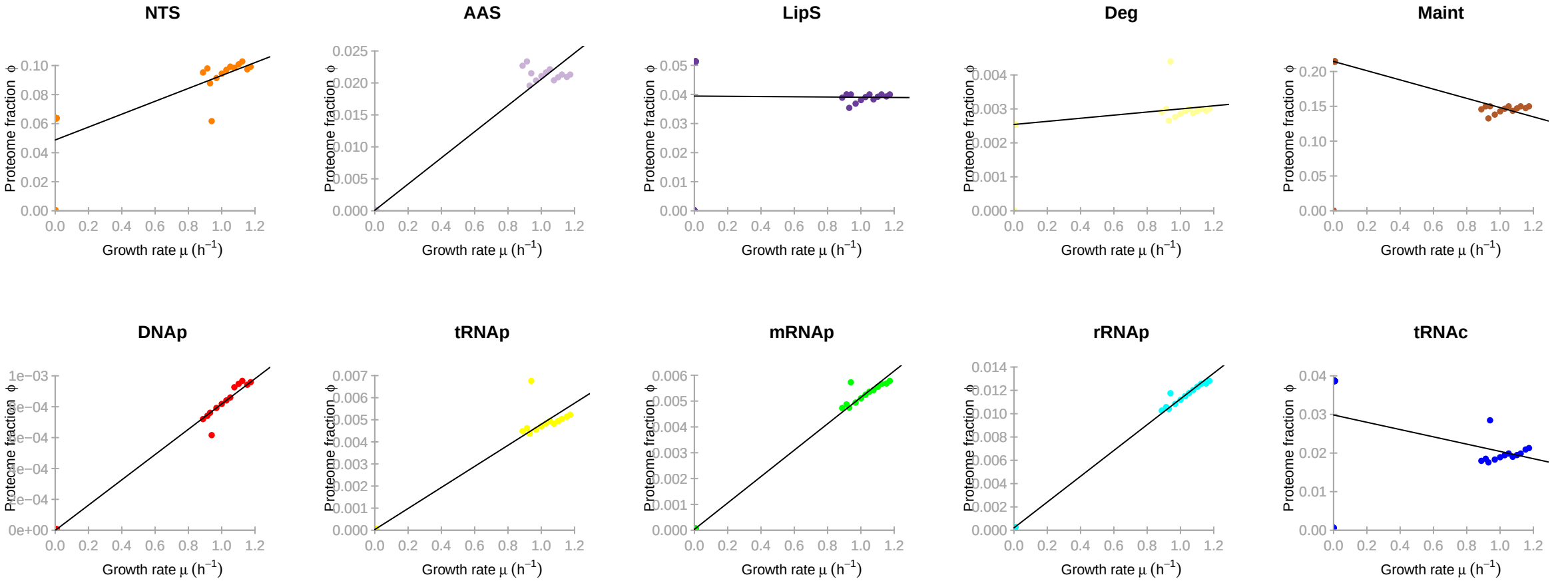

tN
Proteome fraction ϕ
Growth rate μ (h^{-1})

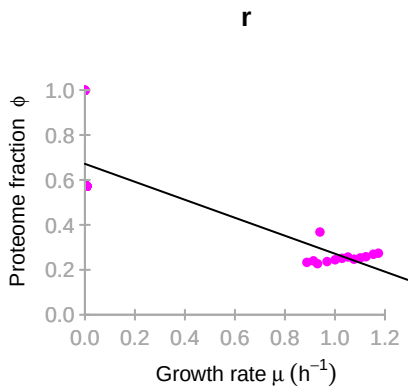

tAce
Proteome fraction ϕ
Growth rate μ (h^{-1})

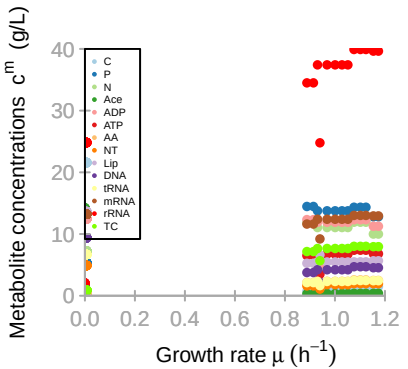

tH2O
Proteome fraction ϕ
Growth rate μ (h^{-1})

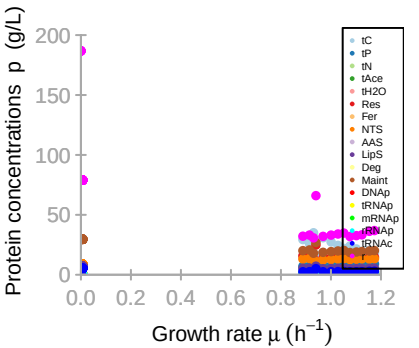

Res
Proteome fraction ϕ
Growth rate μ (h^{-1})

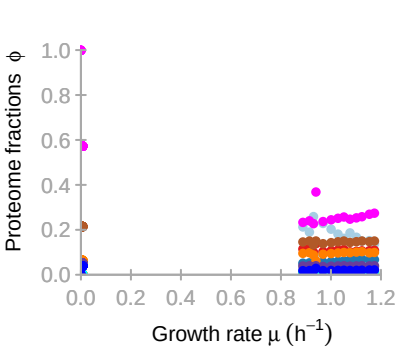

Fer
Proteome fraction ϕ
Growth rate μ (h^{-1})

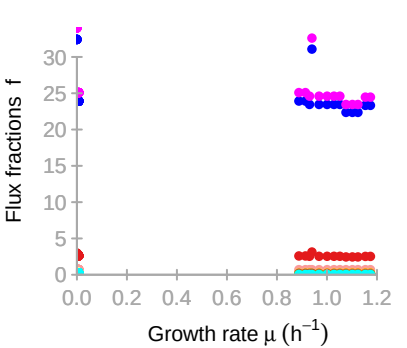

NTS
AAS
LipS
Deg
Maint
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
Proteome fraction ϕ
Growth rate μ (h−1)

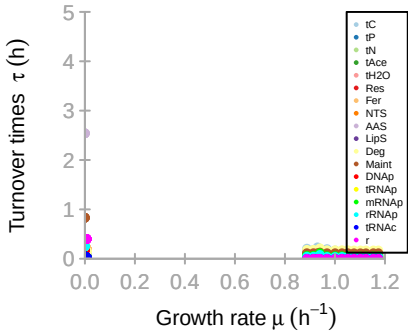

r
Proteome fraction ϕ
Growth rate μ (h−1)

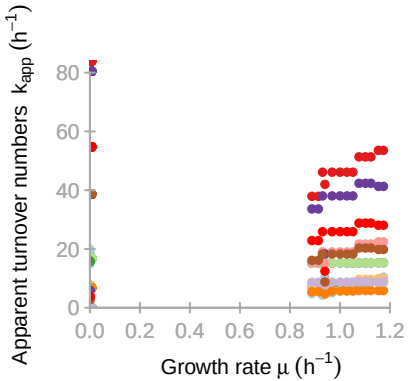

Metabolite concentrations cm (g/L)
C
P
N
Ace
ADP
ATP
AA
NT
Lip
DNA
tRNA
mRNA
rRNA
TC
Growth rate μ (h−1)

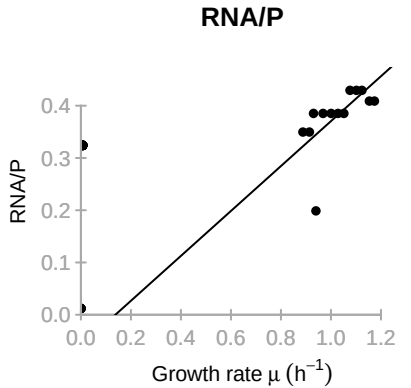

Protein concentrations p (g/L)
tC
tP
tN
tAce
tH2O
Res
Fer
NTS
AAS
LipS
Deg
Maint
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
Growth rate μ (h−1)

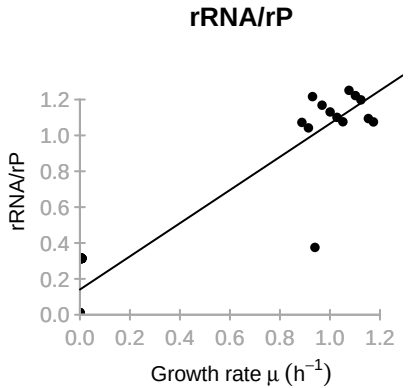

Proteome fractions ϕ
Growth rate μ (h−1)

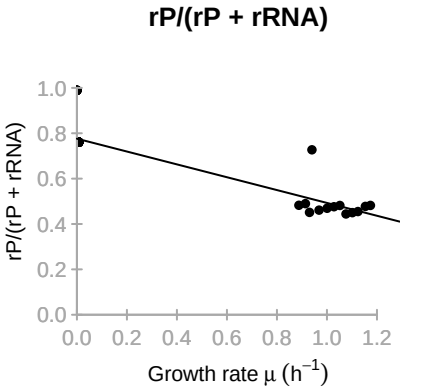

Flux fractions f
Growth rate μ (h−1)


Turnover times τ (h)
tC
tP
tN
tAce
tH2O
Res
Fer
NTS
AAS
LipS
Deg
Maint
DNAp
tRNAp
mRNAp
rRNAp
tRNAc
r
Growth rate μ (h−1)

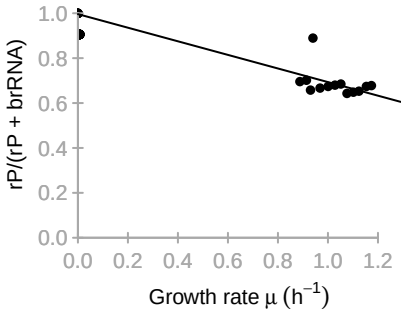

Apparent turnover numbers kapp (h−1)
Growth rate μ (h−1)

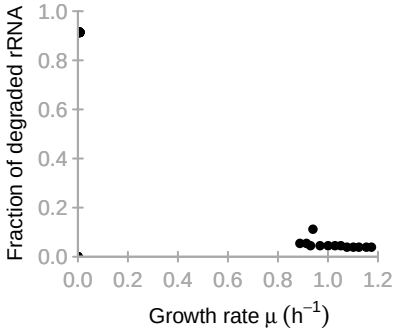

RNA/P
RNA/P
Growth rate μ (h−1)

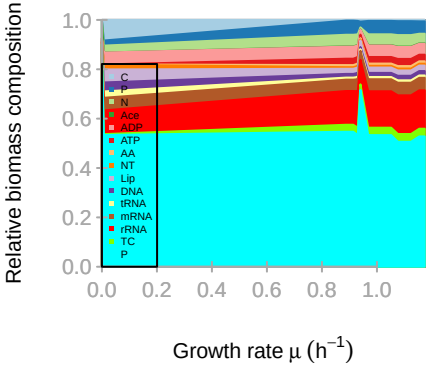

rRNA/rP
rRNA/rP
Growth rate μ (h−1)

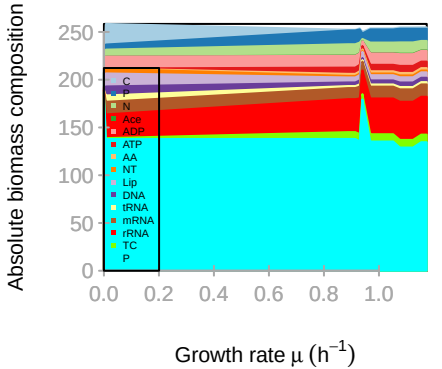

rP/(rP + rRNA)
rP/(rP + rRNA)
Growth rate μ (h−1)

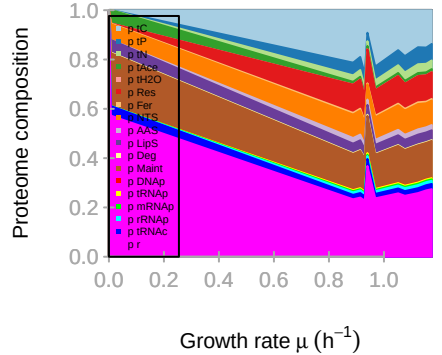
Protein mass fraction in ribosome

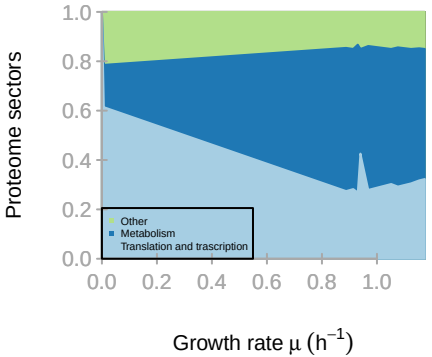












M

	tC	tP	tN	tAce	tH2O	Res	Fer	NTS	AAS	LipS	Deg	Maint	DNAp	tRNAp	mRNAp	rRNAp	tRNAc	r
C	1	0	0	0	0	−0.002	−0.02	−0.175	−0.76	−0.112	0	0	0	0	0	0	0	0
P	0	1	0	0	0	−0.124	−0.12	0.046	0	0.102	0	0	0	0	0	0	0.002	0.008
N	0	0	1	0	0	0	0	−0.079	−0.24	−0.004	0	0	0	0	0	0	0	0
Ace	0	0	0	−1	0	0.002	0.02	0	0	0	0	0	0	0	0	0	0	0
H2O	0	0	0	0	1	0.072	0.07	−0.054	0	−0.064	0	0	0	0	0	0	−0.001	−0.004
ADP	0	0	0	0	0	−0.874	0.91	0.657	0	0.774	0	1	0	0	0	0	0.013	0.053
ATP	0	0	0	0	0	0.926	−0.86	−0.692	0	−0.82	0	−1	0	0	0	0	−0.014	−0.057
AA	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	−0.005	0
NT	0	0	0	0	0	0	0	0.297	0	0	1	0	−1	−1	−1	−1	0	0
Lip	0	0	0	0	0	0	0	0	0	0.124	0	0	0	0	0	0	0	0
DNA	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
tRNA	0	0	0	0	0	0	0	0	0	0	−0.1	0	0	1	0	0	−0.98	0.934
mRNA	0	0	0	0	0	0	0	0	0	0	−0.1	0	0	0	1	0	0	0
rRNA	0	0	0	0	0	0	0	0	0	0	−0.8	0	0	0	0	1	0	0
TC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.985	−0.939
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.005

K

	tC	tP	tN	tAce	tH2O	Res	Fer	NTS	AAS	LipS	Deg	Maint	DNAp	tRNAp	mRNAp	rRNAp	tRNAc	r
x_C	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_P	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_N	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_Ace	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_H2O	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
C	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0
P	0	0	0	0	0	1	1	1	0	10	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Ace	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0
H2O	0	0	0	0	0	800	800	800	0	750	0	0	0	0	0	0	800	800
ADP	0	0	0	0	0	10	10	10	0	0	0	0	0	0	0	0	0	0
ATP	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	0	1	1
AA	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	1	0
NT	0	0	0	0	0	0	0	10	0	0	0	0	1	1	1	1	0	0
Lip	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0
DNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
tRNA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0
mRNA	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
rRNA	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0
TC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

KA

	tC	tP	tN	tAce	tH2O	Res	Fer	NTS	AAS	LipS	Deg	Maint	DNAp	RNAp	mRNAp	rRNAp	tRNAc	r
x_C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_Ace	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
x_H2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ace	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ADP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ATP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lip	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DNA	0	0	0	0	0	0	0	0	0	0	0	0	10	10	10	10	0	0
tRNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
mRNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
rRNA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
TC	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

kcat

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]	[,18]
kcatf	100	40	40	40	40000	1000	1000	100	100	40	10	10	200	136	96	136	60000	6000
kcatb	10	4	4	2	4000	100	100	10	10	4	0	0	0	0	0	0	0	0

Keq

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[1,]	10	10	10	200	10	800	80000	1.25	100	4	Inf	Inf	Inf	Inf	Inf	Inf	Inf	Inf

minimal phi constraint

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]	[,18]
[1,]	0	0	0	0	0	0	0	0	0	0.04	0.003	0.15	0	0	0	0	0	0

minimal f constraint

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]	[,8]	[,9]	[,10]	[,11]	[,12]	[,13]	[,14]	[,15]	[,16]	[,17]	[,18]
[1,]	0	0	0	0	0.7	0	0	0	0	0	0	0	0	0	0	0	0	0