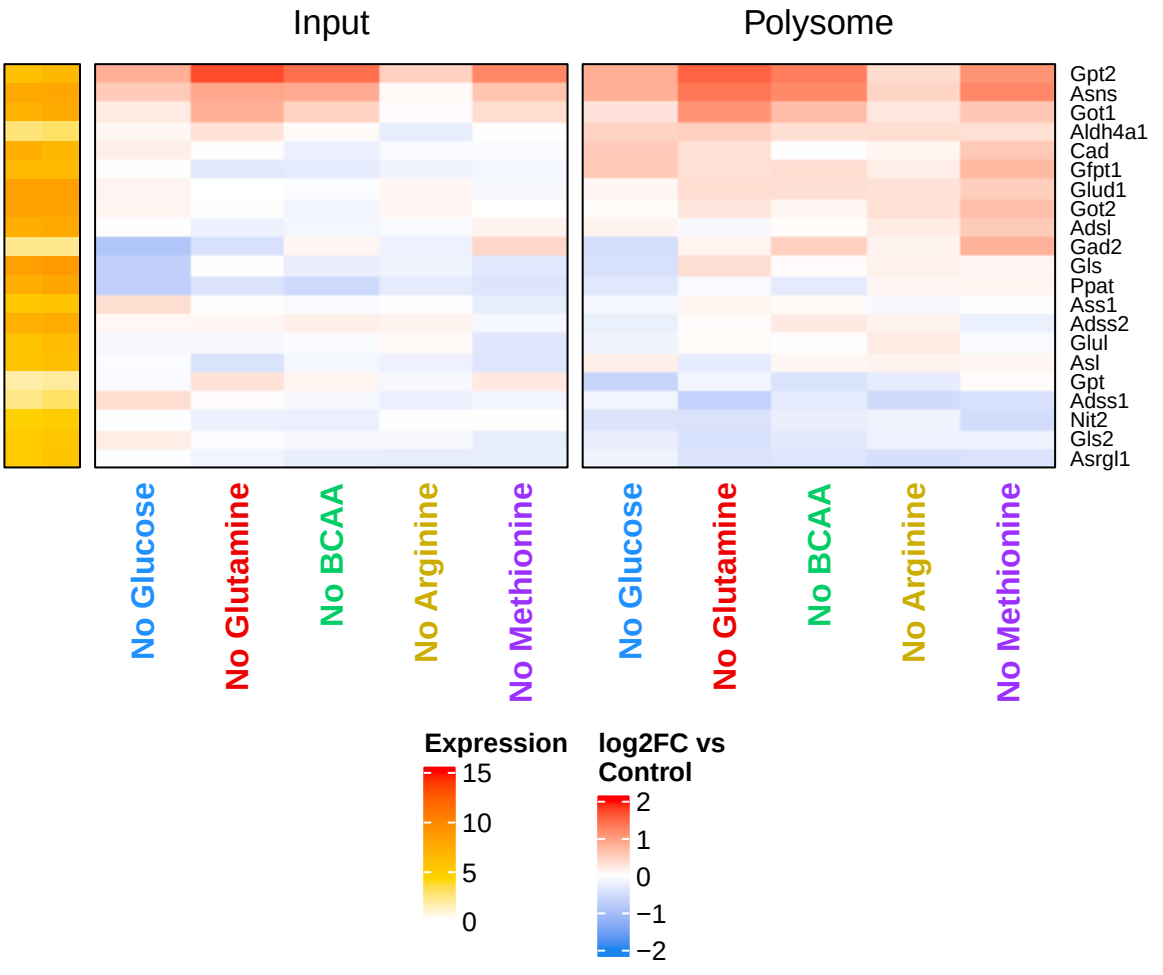
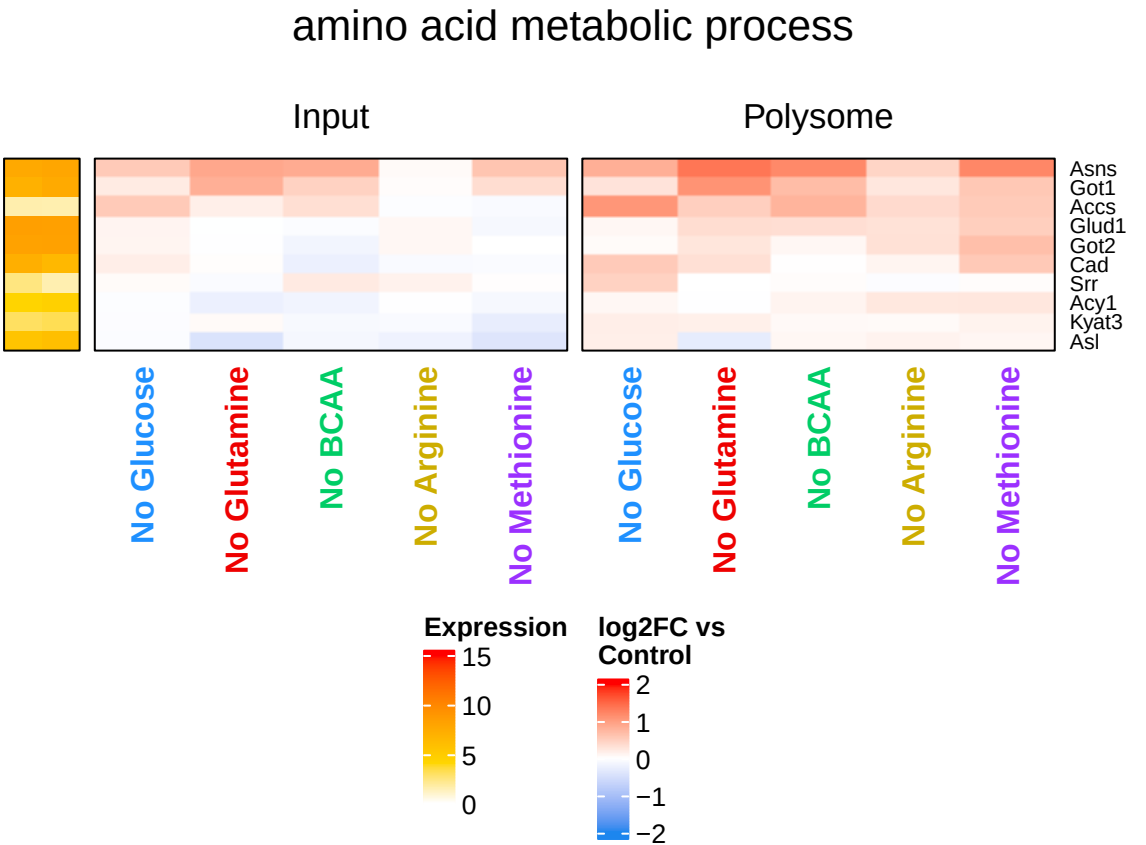
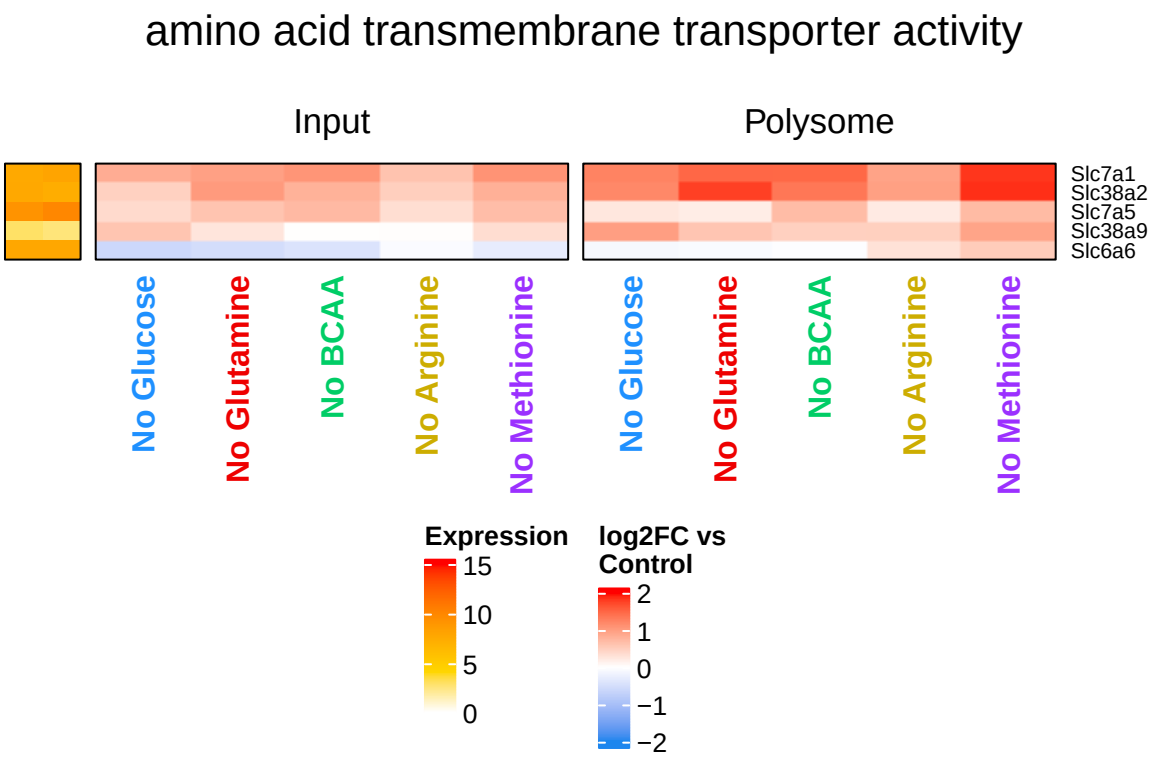
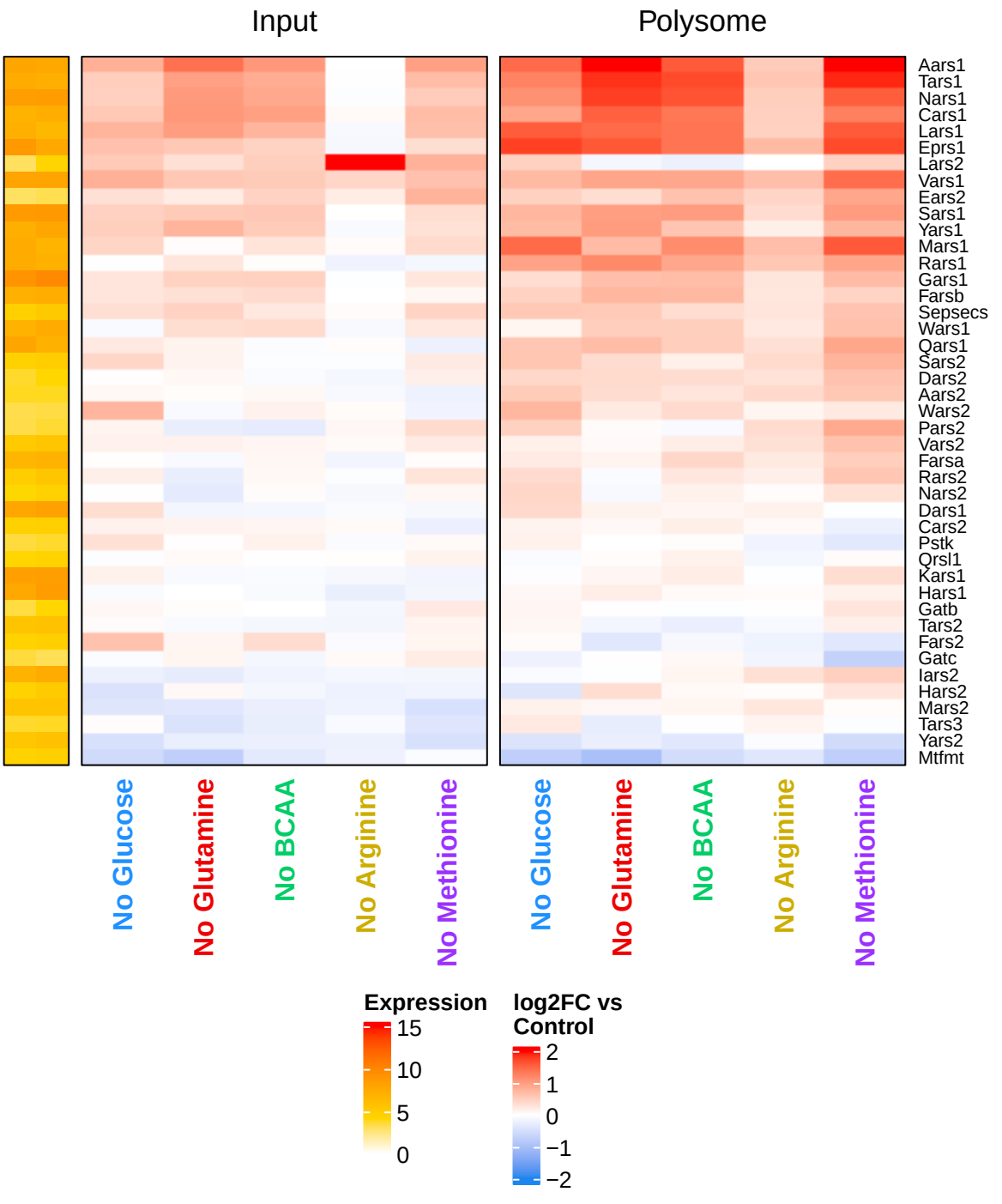
# Alanine, aspartate and glutamate metabolism

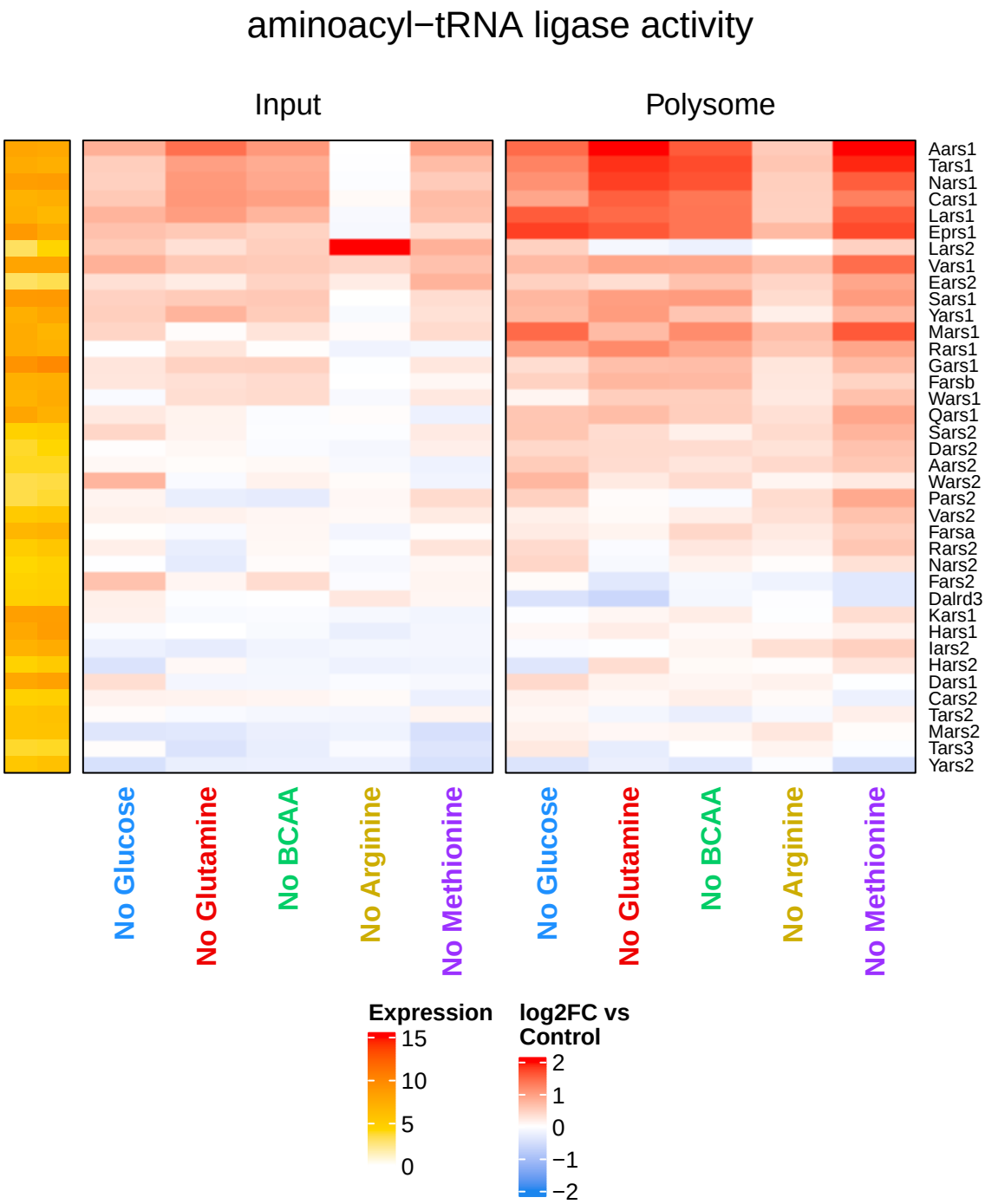



amino acid metabolic process
Input
Polysome
Asns
Got1
Accs
Glud1
Got2
Cad
Srr
Acy1
Kyat3
Asl
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

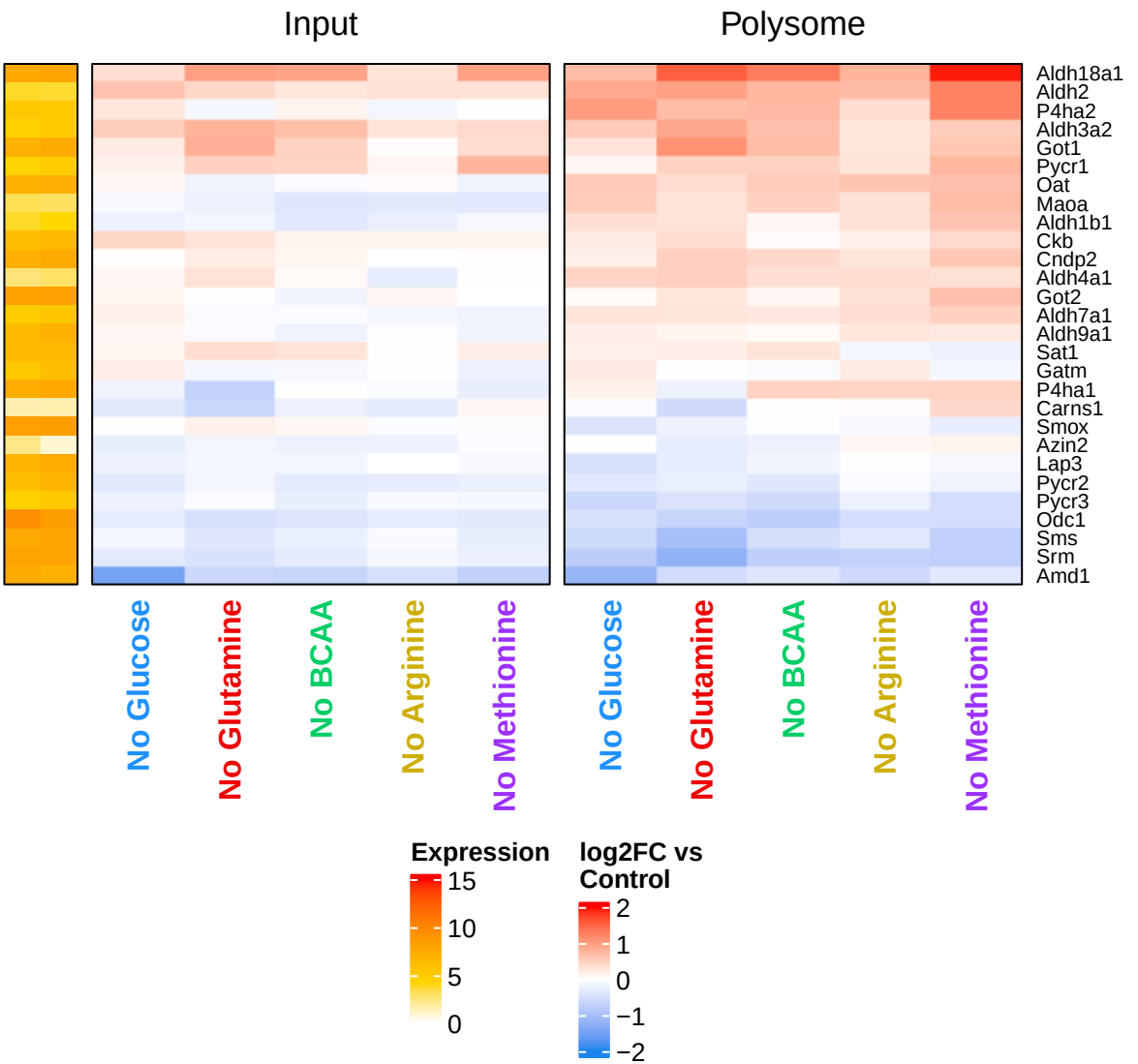

amino acid transmembrane transporter activity
Input
Polysome
Slc7a1
Slc38a2
Slc7a5
Slc38a9
Slc6a6
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

# Aminoacyl−tRNA biosynthesis

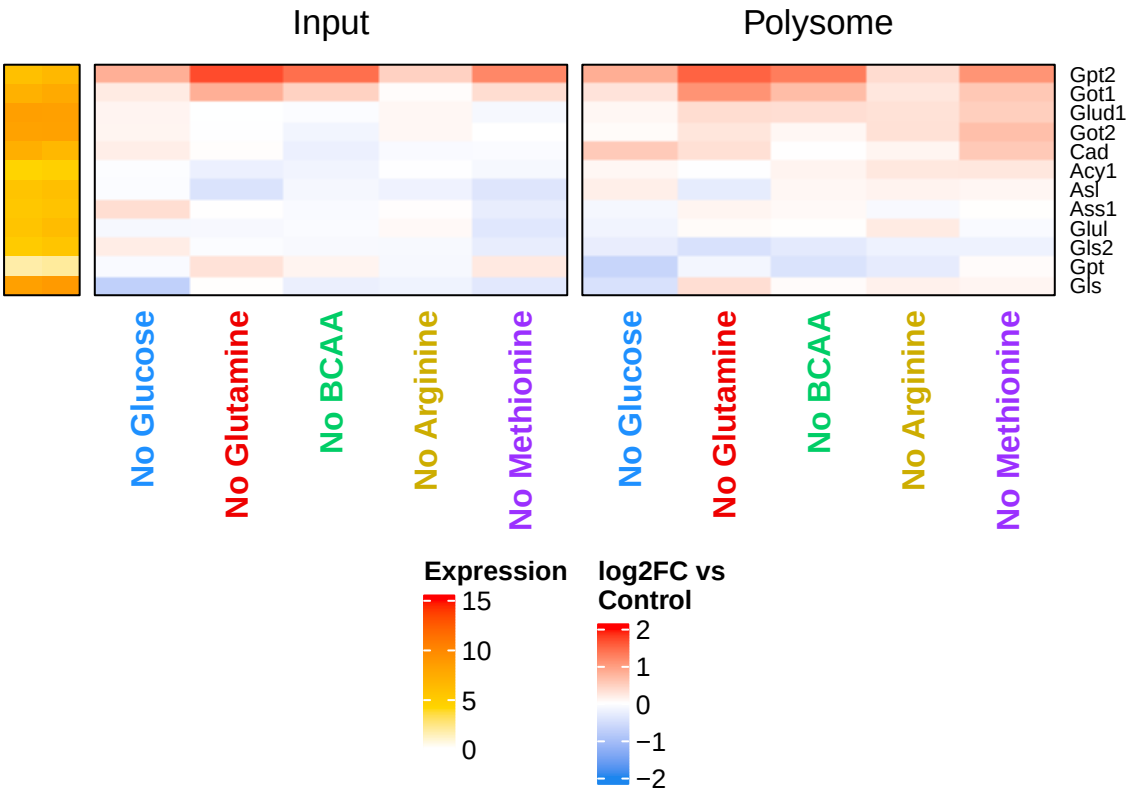



aminoacyl−tRNA ligase activity
Input
Polysome
Aars1
Tars1
Nars1
Cars1
Lars1
Eprs1
Lars2
Vars1
Ears2
Sars1
Yars1
Mars1
Rars1
Gars1
Farsb
Wars1
Qars1
Sars2
Dars2
Aars2
Wars2
Pars2
Vars2
Farsa
Rars2
Nars2
Fars2
Dalrd3
Kars1
Hars1
Iars2
Hars2
Dars1
Cars2
Tars2
Mars2
Tars3
Yars2
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

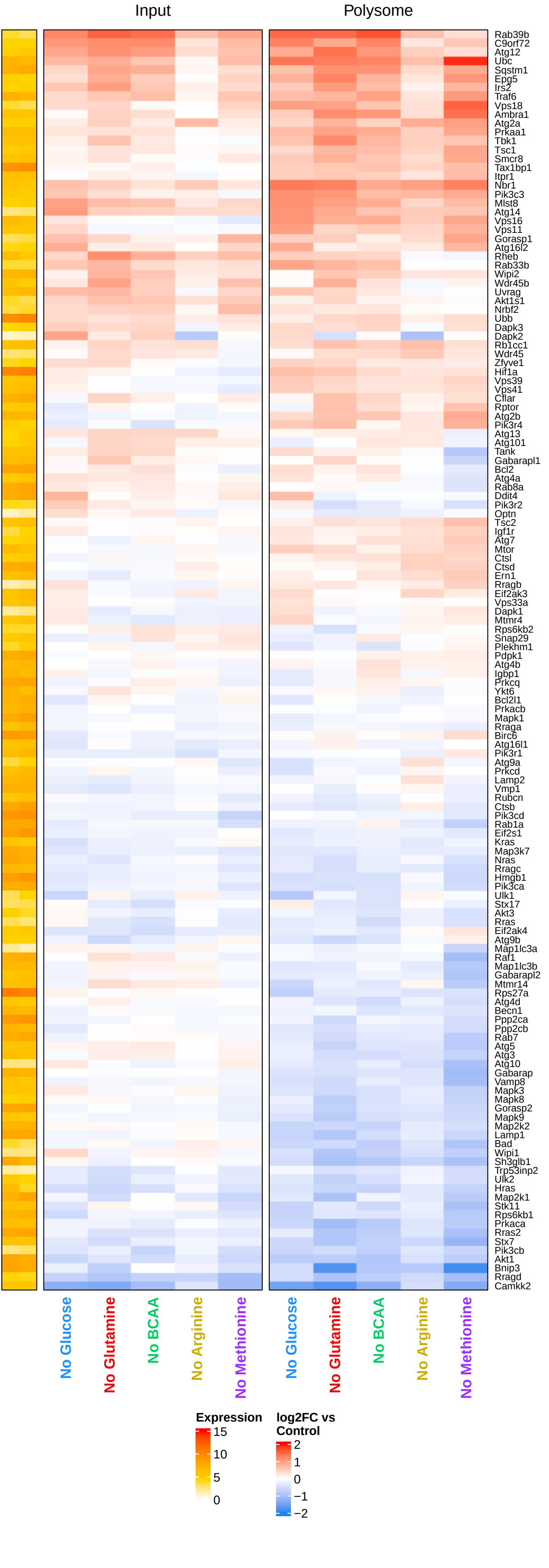
# Arginine and proline metabolism



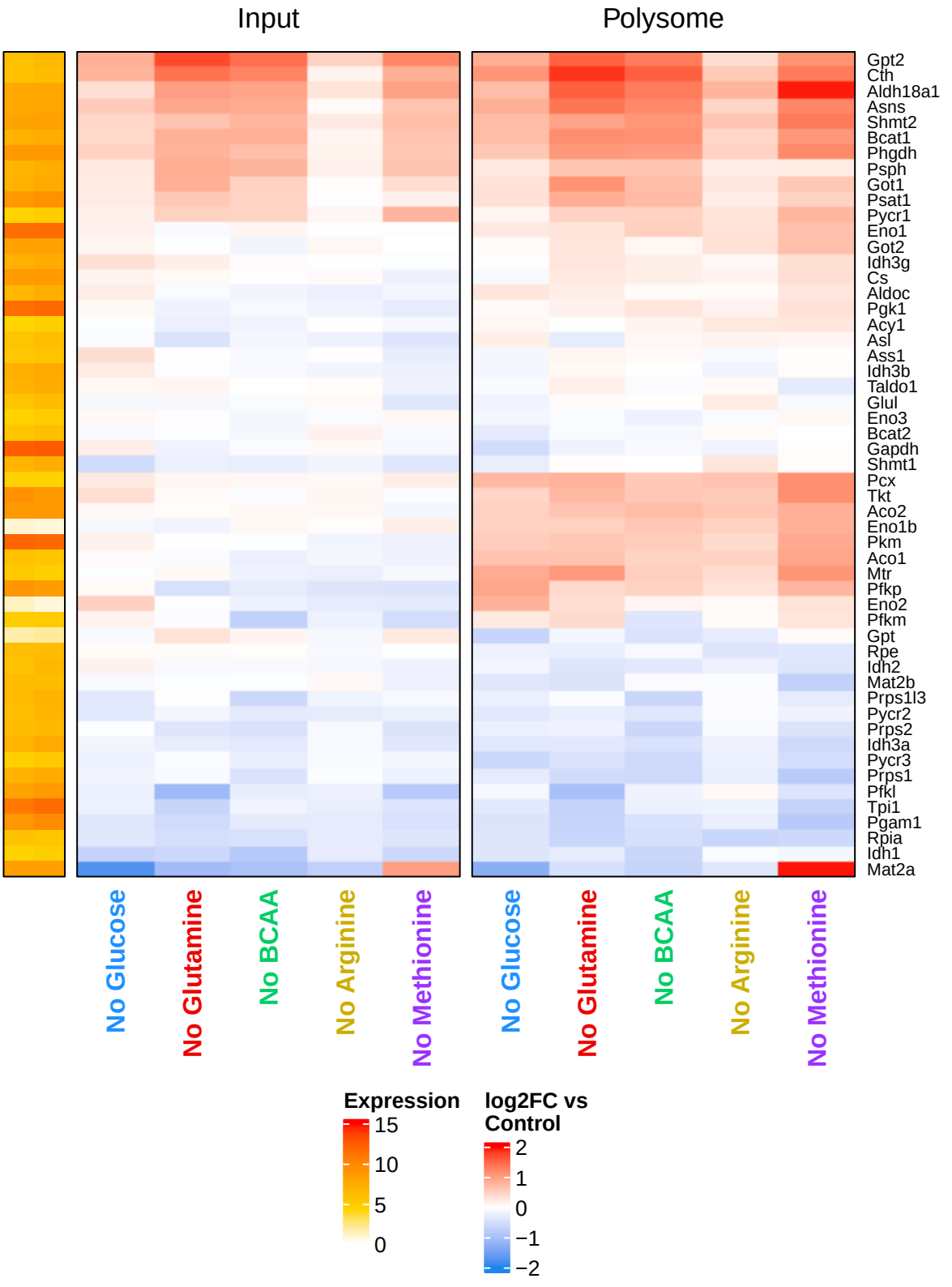
# Arginine biosynthesis



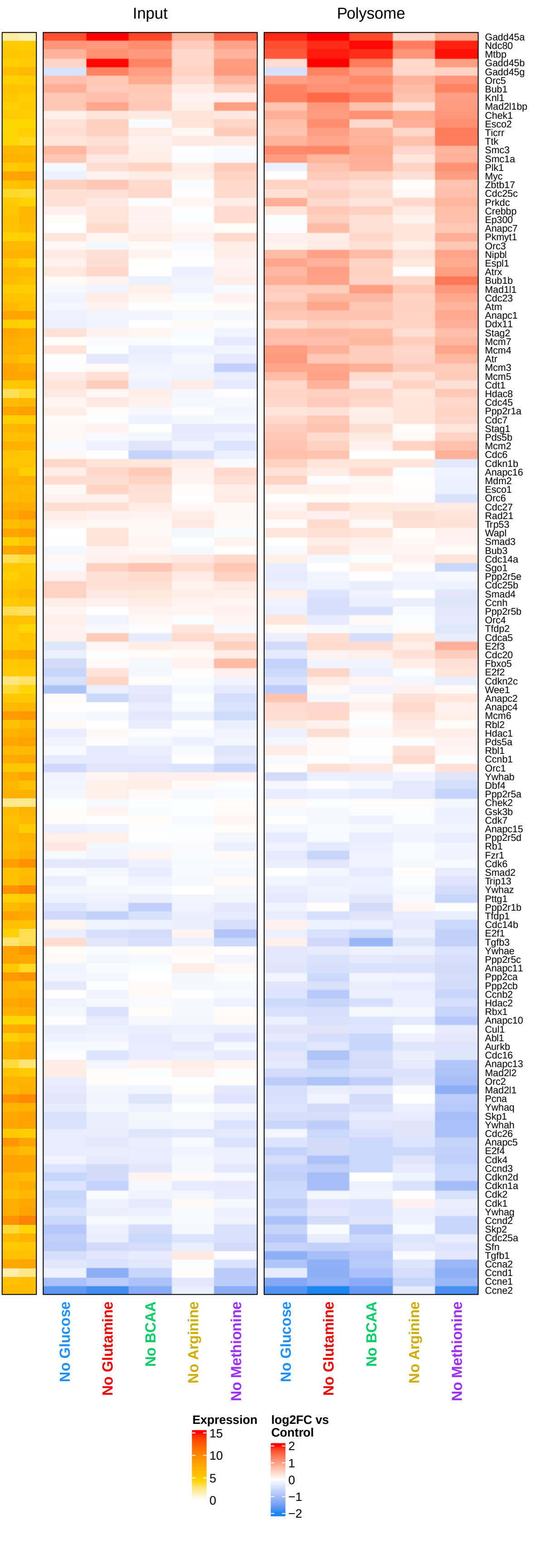
# Autophagy − animal

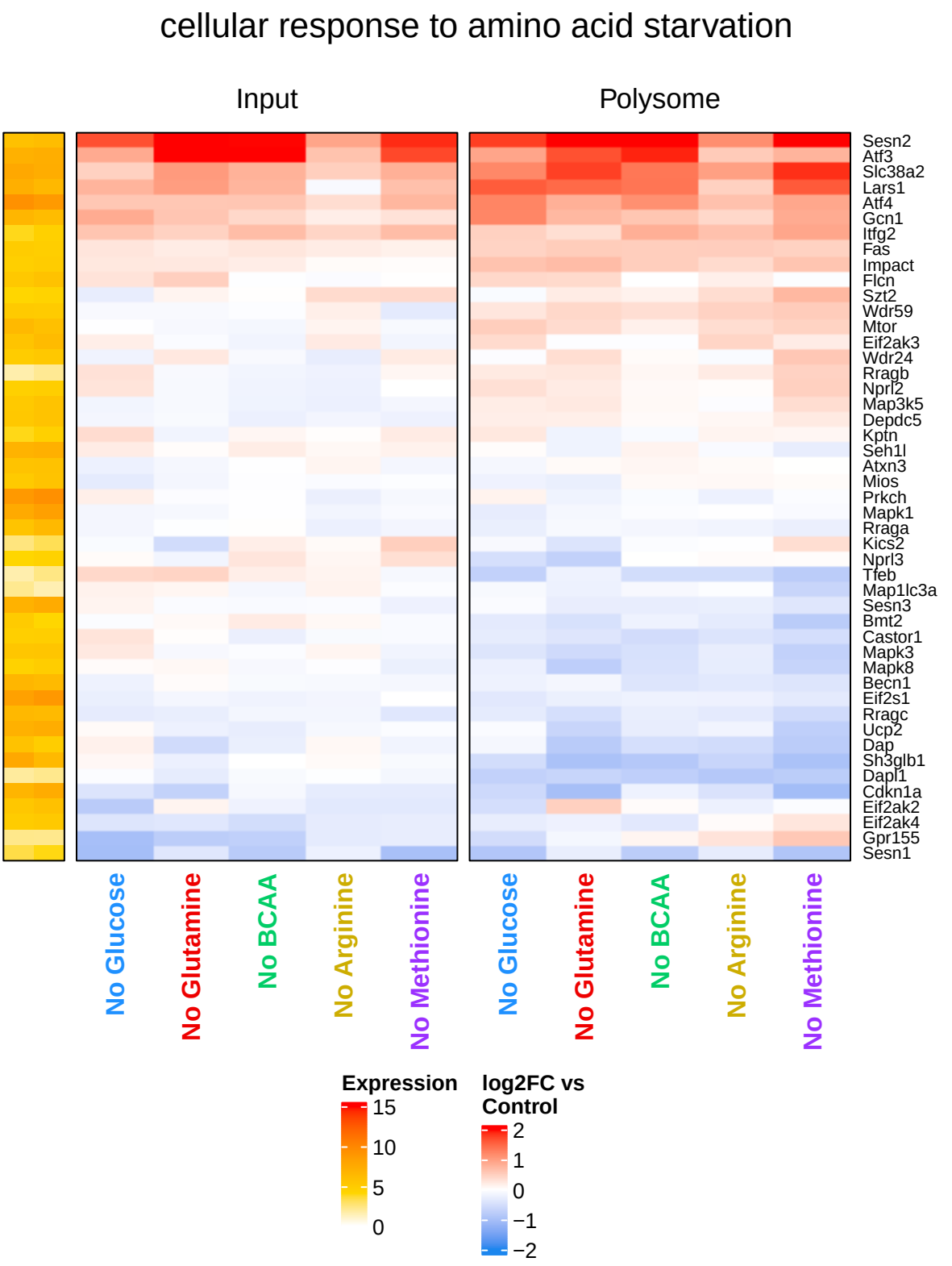


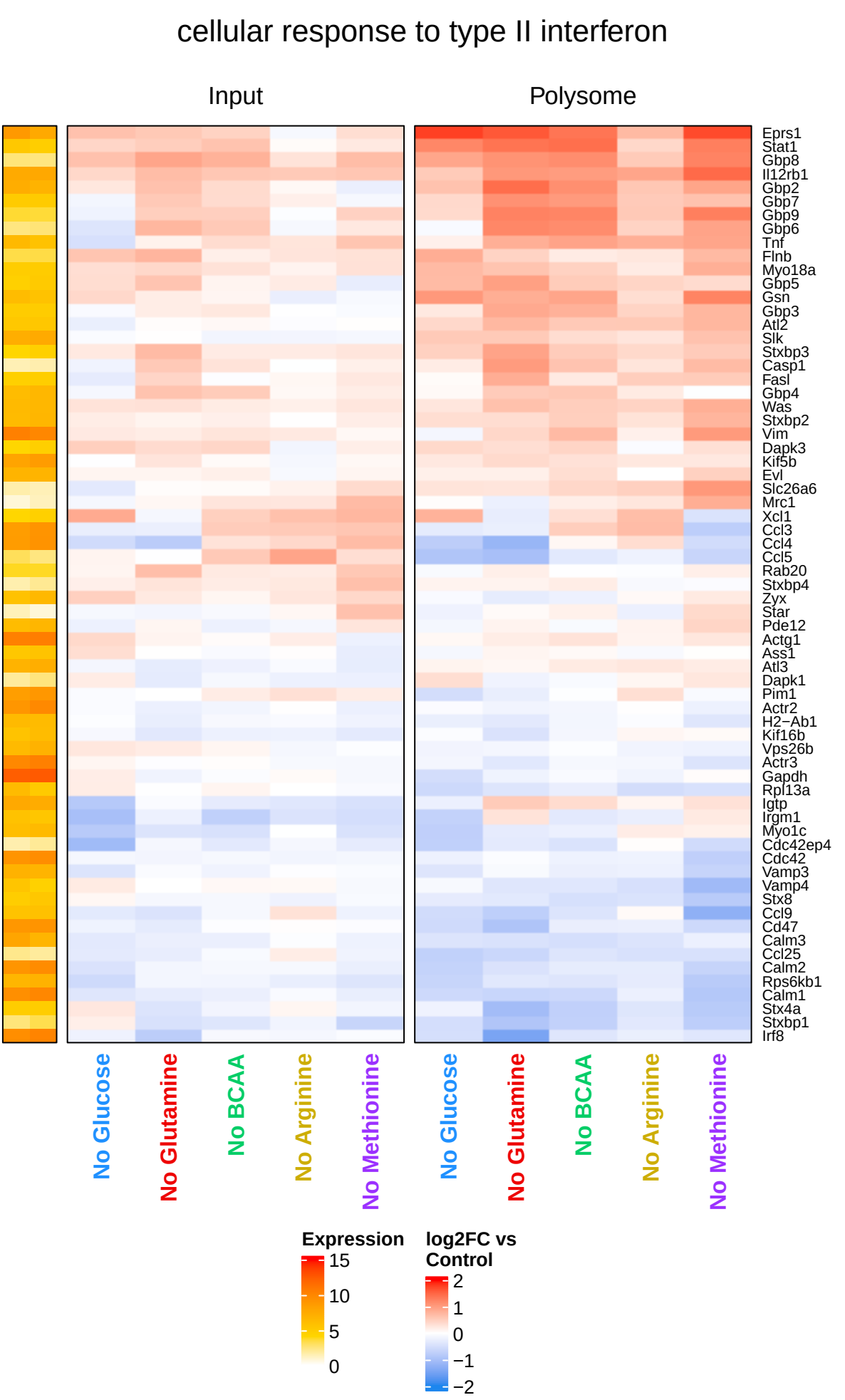
# Biosynthesis of amino acids



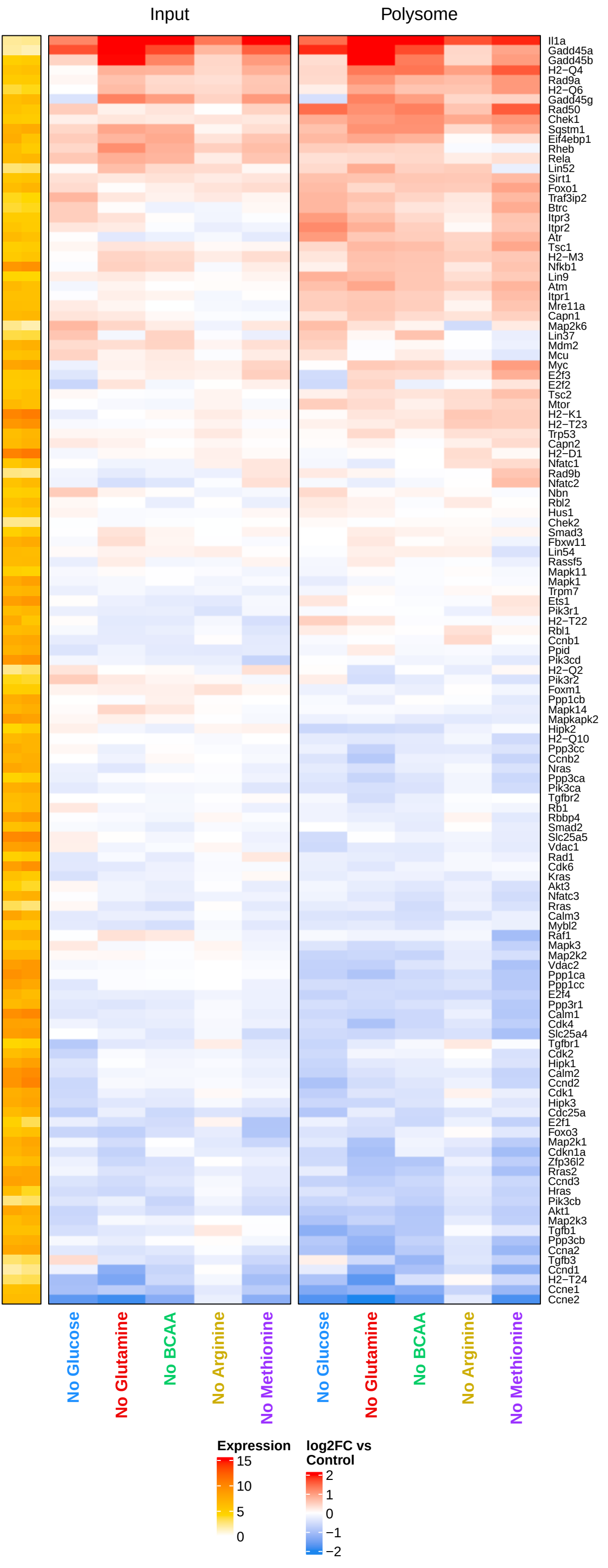
# Cell cycle


Input
Polysome
Gadd45a
Ndc80
Mtbp
Gadd45b
Gadd45g
Orc5
Bub1
Knl1
Mad2l1bp
Chek1
Esco2
Ticrr
Ttk
Smc3
Smc1a
Plk1
Myc
Zbtb17
Cdc25c
Prkdc
Crebbp
Ep300
Anapc7
Pkmyt1
Orc3
Nipbl
Espl1
Atrx
Bub1b
Mad1l1
Cdc23
Atm
Anapc1
Ddx11
Stag2
Mcm7
Mcm4
Atr
Mcm3
Mcm5
Cdt1
Hdac8
Cdc45
Ppp2r1a
Cdc7
Stag1
Pds5b
Mcm2
Cdc6
Cdkn1b
Anapc16
Mdm2
Esco1
Orc6
Cdc27
Rad21
Trp53
Wapl
Smad3
Bub3
Cdc14a
Sgo1
Ppp2r5e
Cdc25b
Smad4
Ccnh
Ppp2r5b
Orc4
Tfdp2
Cdca5
E2f3
Cdc20
Fbxo5
E2f2
Cdkn2c
Wee1
Anapc2
Anapc4
Mcm6
Rbl2
Hdac1
Pds5a
Rbl1
Ccnb1
Orc1
Ywhab
Dbf4
Ppp2r5a
Chek2
Gsk3b
Cdk7
Anapc15
Ppp2r5d
Rb1
Fzr1
Cdk6
Smad2
Trip13
Ywhaz
Pttg1
Ppp2r1b
Tfdp1
Cdc14b
E2f1
Tgfb3
Ywhae
Ppp2r5c
Anapc11
Ppp2ca
Ppp2cb
Ccnb2
Hdac2
Rbx1
Anapc10
Cul1
Abl1
Aurkb
Cdc16
Anapc13
Mad2l2
Orc2
Mad2l1
Pcna
Ywhaq
Skp1
Ywhah
Cdc26
Anapc5
E2f4
Cdk4
Ccnd3
Cdkn2d
Cdkn1a
Cdk2
Cdk1
Ywhag
Ccnd2
Skp2
Cdc25a
Sfn
Tgfb1
Ccna2
Ccnd1
Ccne1
Ccne2
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

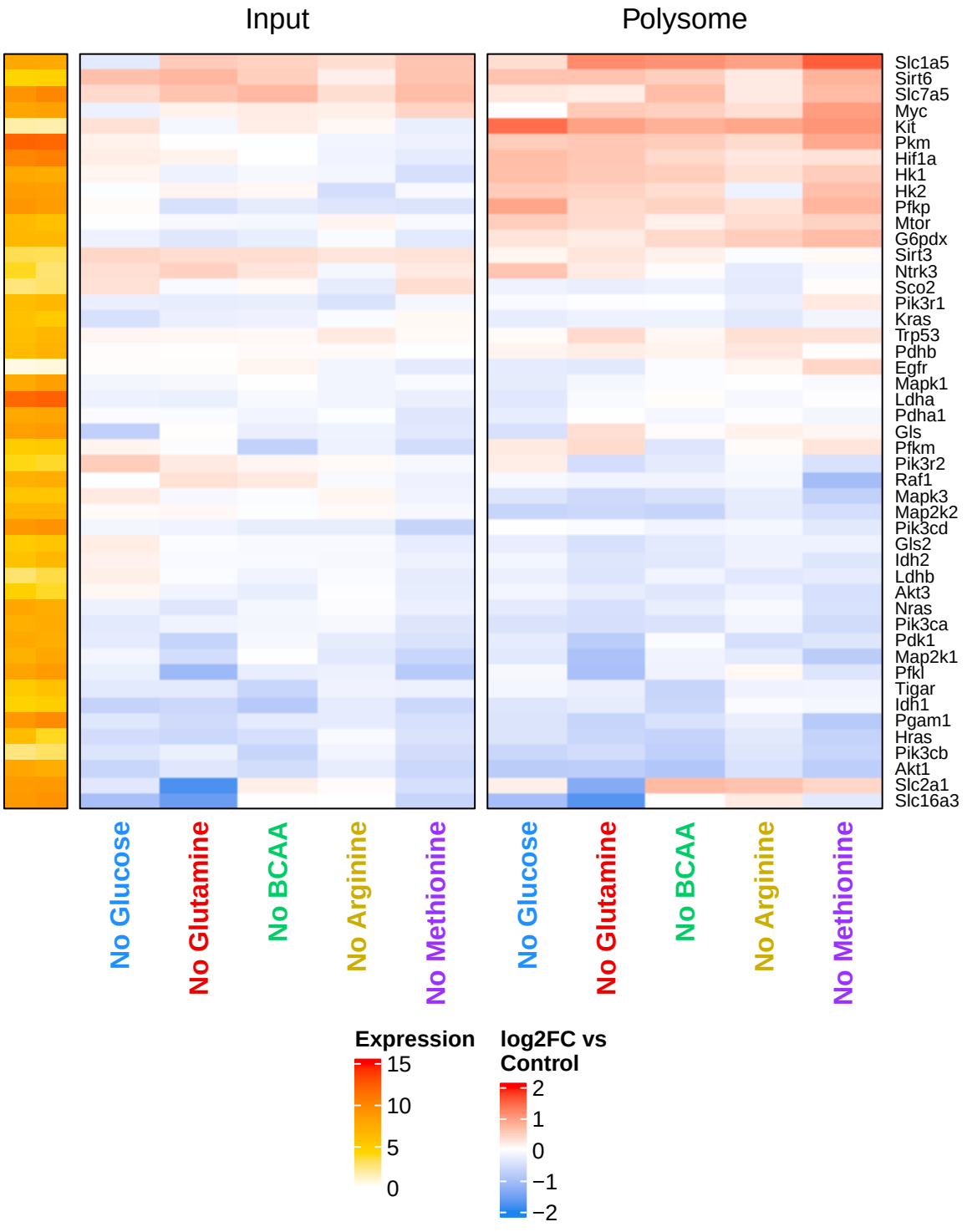

cellular response to amino acid starvation
Input
Polysome
Sesn2
Atf3
Slc38a2
Lars1
Atf4
Gcn1
Itfg2
Fas
Impact
Flcn
Szt2
Wdr59
Mtor
Eif2ak3
Wdr24
Rragb
Nprl2
Map3k5
Depdc5
Kptn
Seh1l
Atxn3
Mios
Prkch
Mapk1
Rraga
Kics2
Nprl3
Tfeb
Map1lc3a
Sesn3
Bmt2
Castor1
Mapk3
Mapk8
Becn1
Eif2s1
Rragc
Ucp2
Dap
Sh3glb1
Dapl1
Cdkn1a
Eif2ak2
Eif2ak4
Gpr155
Sesn1
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2


cellular response to type II interferon
Input
Polysome
Eprs1
Stat1
Gbp8
Il12rb1
Gbp2
Gbp7
Gbp9
Gbp6
Tnf
Flnb
Myo18a
Gbp5
Gsn
Gbp3
Atl2
Slk
Stxbp3
Casp1
Fasl
Gbp4
Was
Stxbp2
Vim
Dapk3
Kif5b
Evl
Slc26a6
Mrc1
Xcl1
Ccl3
Ccl4
Ccl5
Rab20
Stxbp4
Zyx
Star
Pde12
Actg1
Ass1
Atl3
Dapk1
Pim1
Actr2
H2−Ab1
Kif16b
Vps26b
Actr3
Gapdh
Rpl13a
Igtp
Irgm1
Myo1c
Cdc42ep4
Cdc42
Vamp3
Vamp4
Stx8
Ccl9
Cd47
Calm3
Ccl25
Calm2
Rps6kb1
Calm1
Stx4a
Stxbp1
Irf8
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

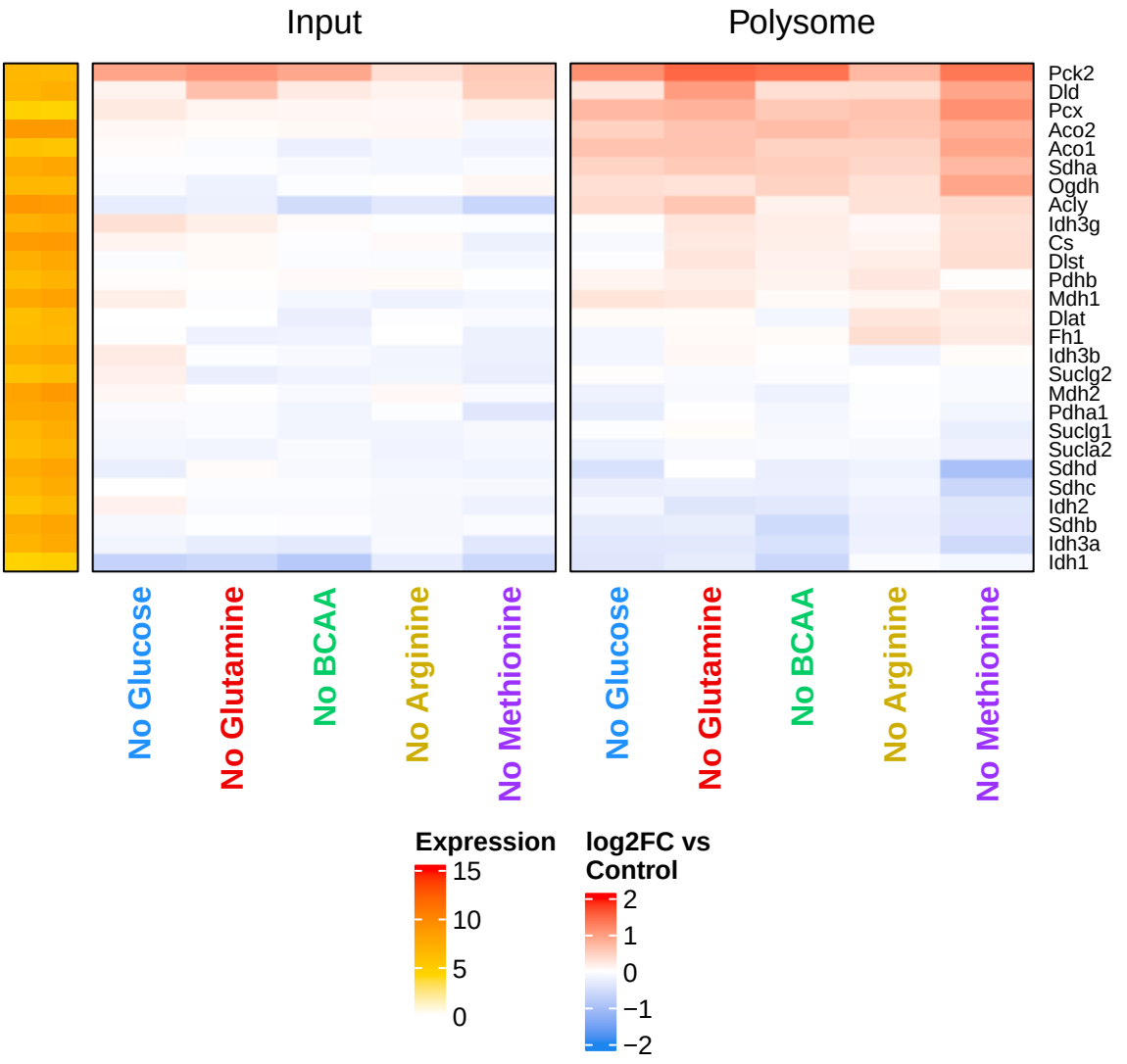
# Cellular senescence



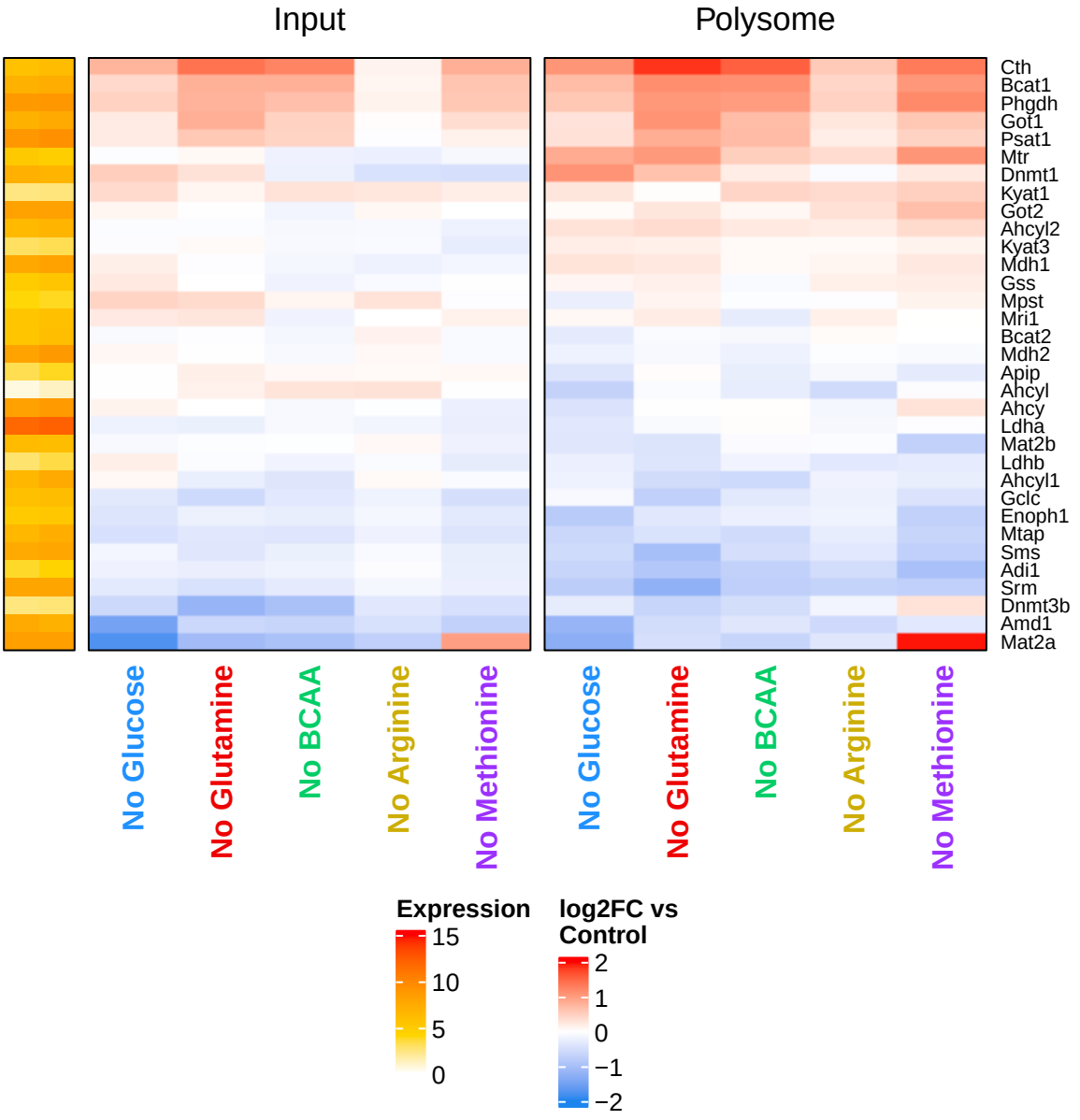
# Central carbon metabolism in cancer

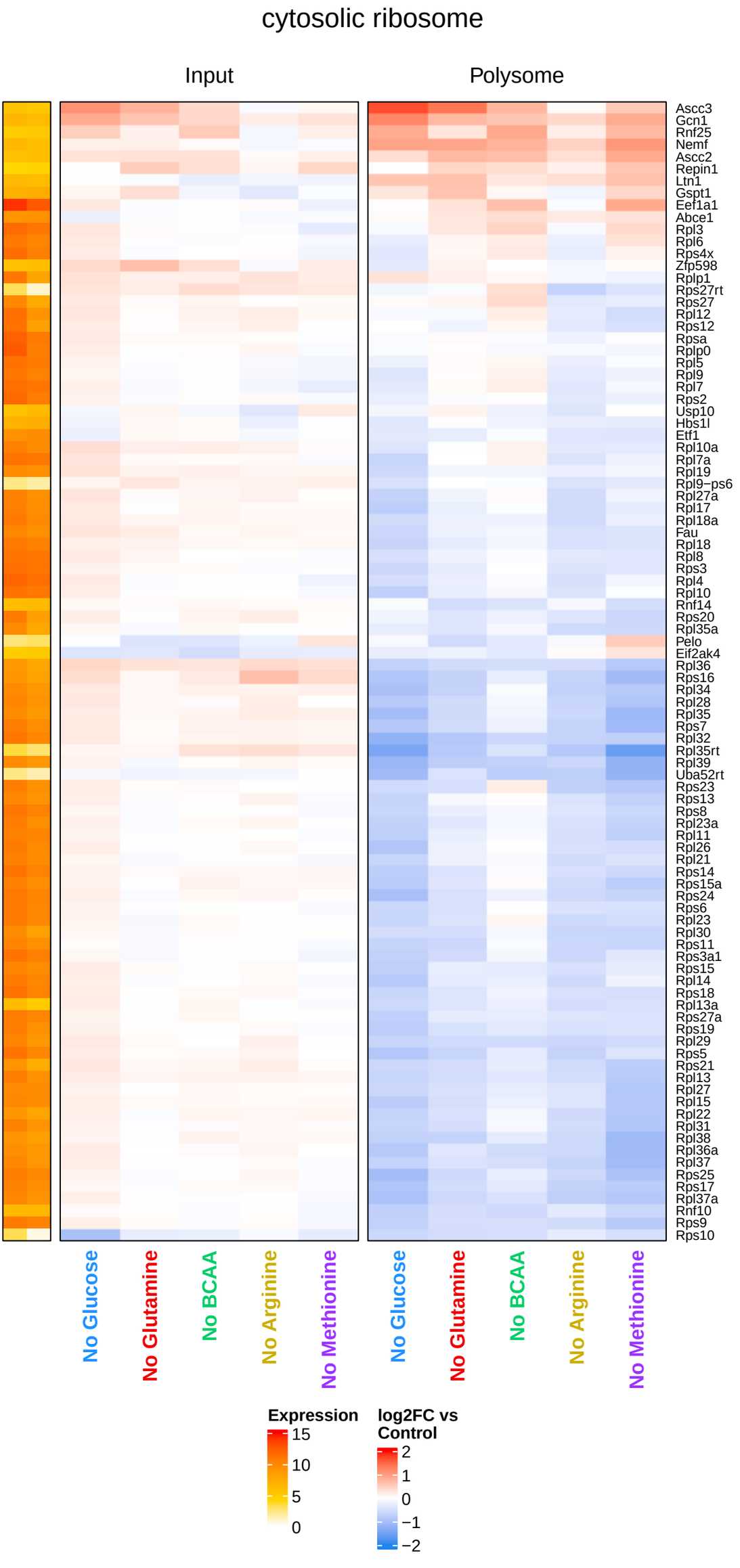


# Citrate cycle (TCA cycle)

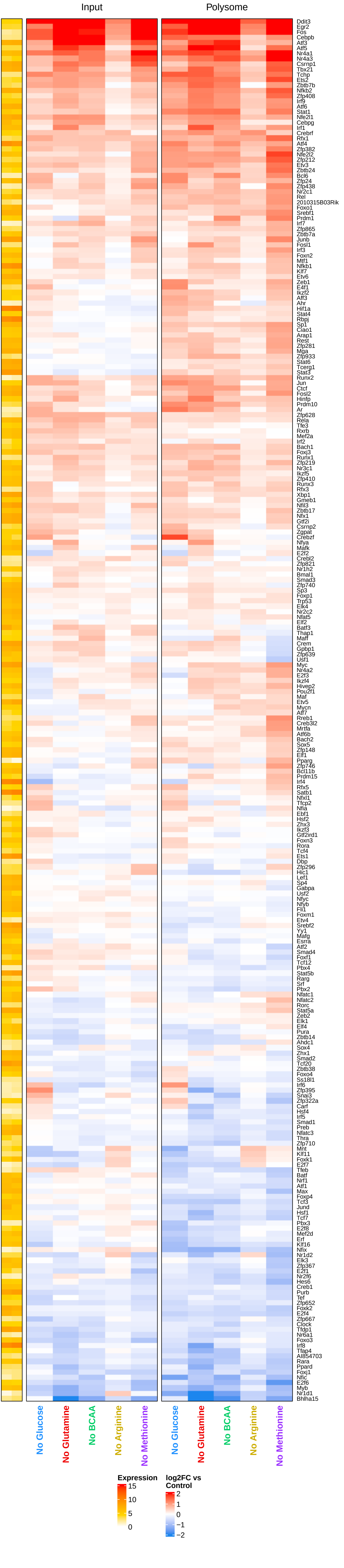


# Cysteine and methionine metabolism

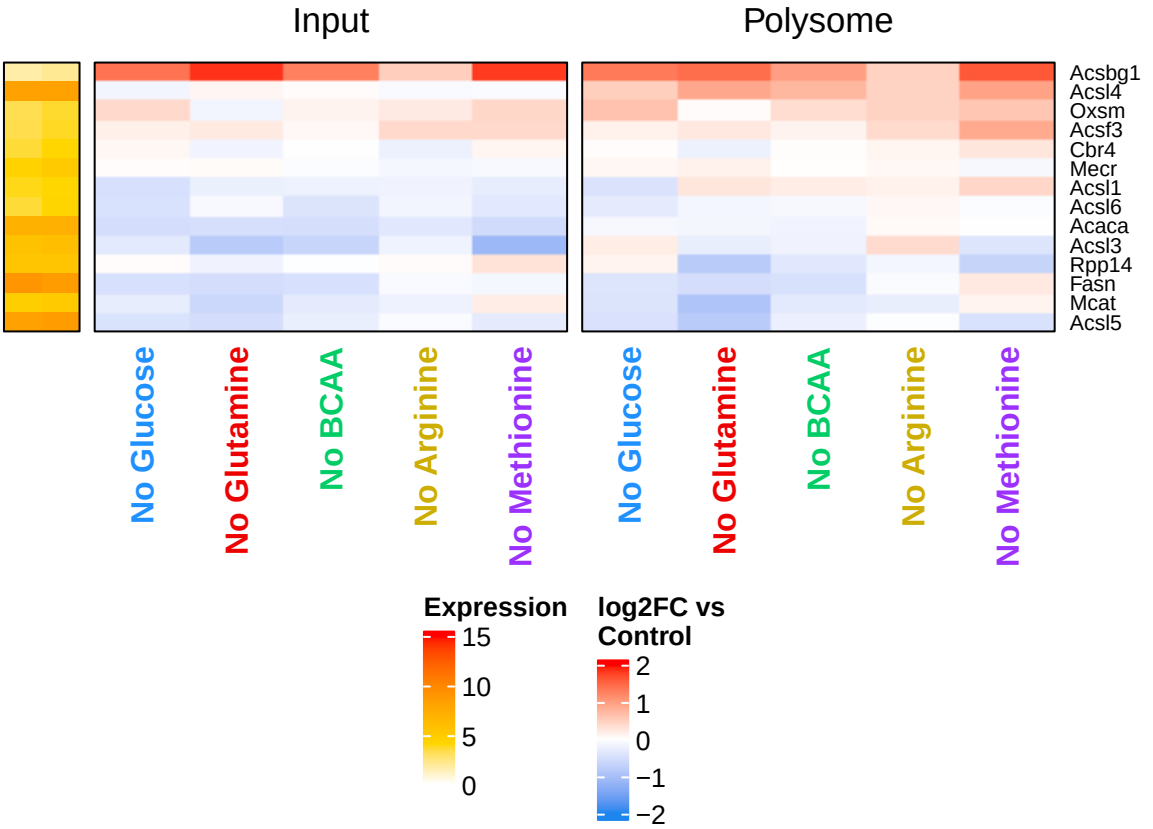



cytosolic ribosome
Input
Polysome
Ascc3
Gcn1
Rnf25
Nemf
Ascc2
Repin1
Ltn1
Gspt1
Eef1a1
Abce1
Rpl3
Rpl6
Rps4x
Zfp598
Rplp1
Rps27rt
Rps27
Rpl12
Rps12
Rpsa
Rplp0
Rpl5
Rpl9
Rpl7
Rps2
Usp10
Hbs1l
Etf1
Rpl10a
Rpl7a
Rpl19
Rpl9−ps6
Rpl27a
Rpl17
Rpl18a
Fau
Rpl18
Rpl8
Rps3
Rpl4
Rpl10
Rnf14
Rps20
Rpl35a
Pelo
Eif2ak4
Rpl36
Rps16
Rpl34
Rpl28
Rpl35
Rps7
Rpl32
Rpl35rt
Rpl39
Uba52rt
Rps23
Rps13
Rps8
Rpl23a
Rpl11
Rpl26
Rpl21
Rps14
Rps15a
Rps24
Rps6
Rpl23
Rpl30
Rps11
Rps3a1
Rps15
Rpl14
Rps18
Rpl13a
Rps27a
Rps19
Rpl29
Rps5
Rps21
Rpl13
Rpl27
Rpl15
Rpl22
Rpl31
Rpl38
Rpl36a
Rpl37
Rps25
Rps17
Rpl37a
Rnf10
Rps9
Rps10
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

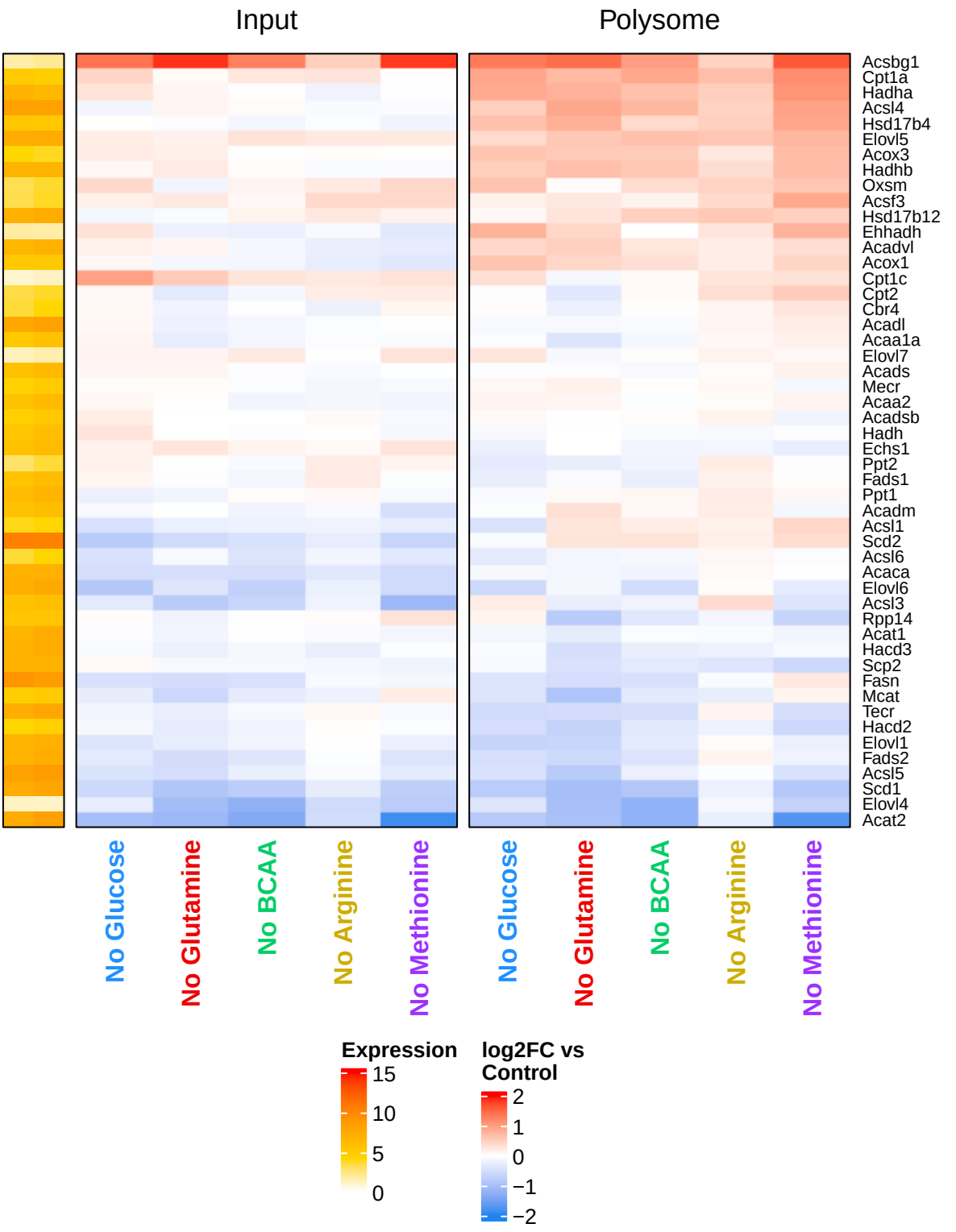
# DNA−binding transcription factor activity



# Fatty acid biosynthesis

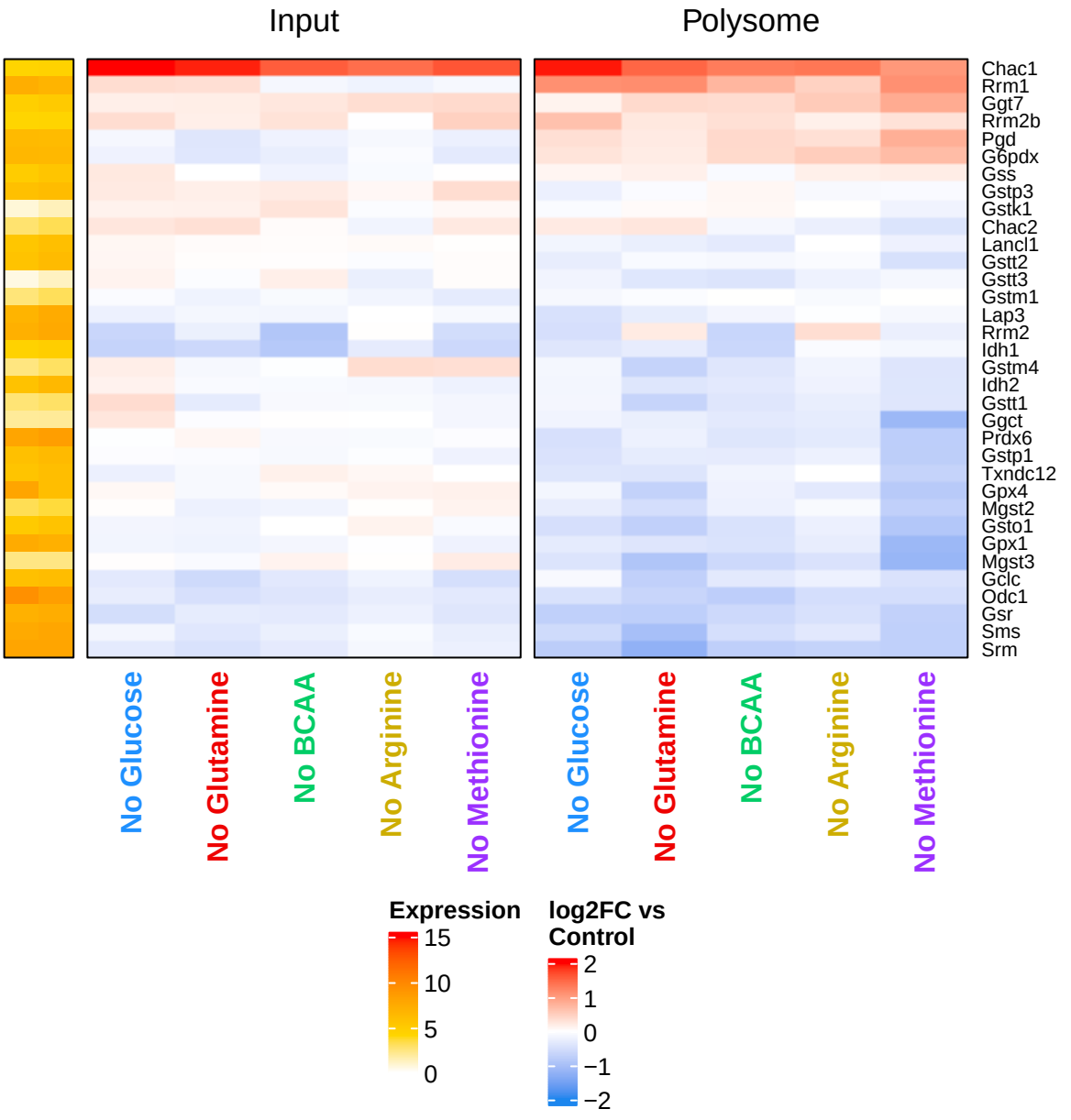


# Fatty acid metabolism

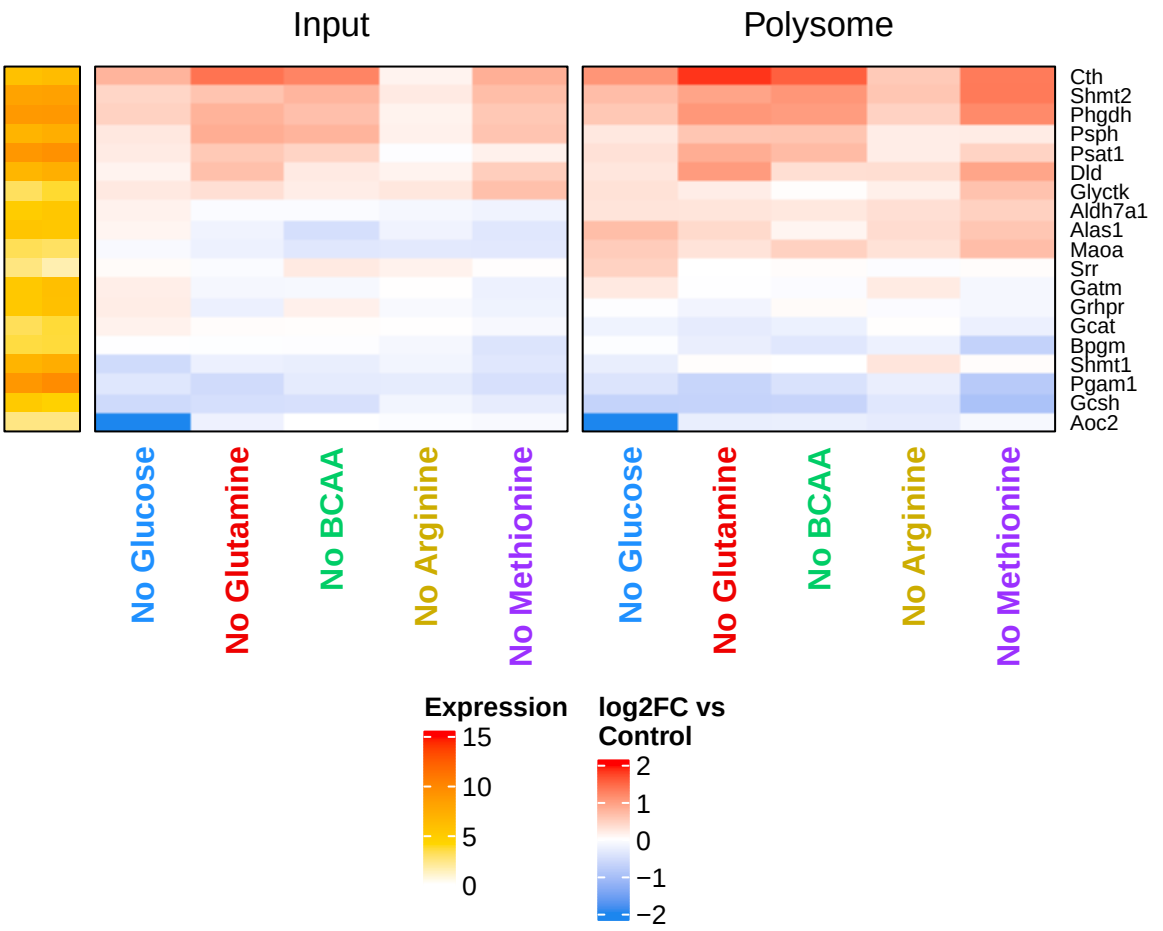


# FoxO signaling pathway

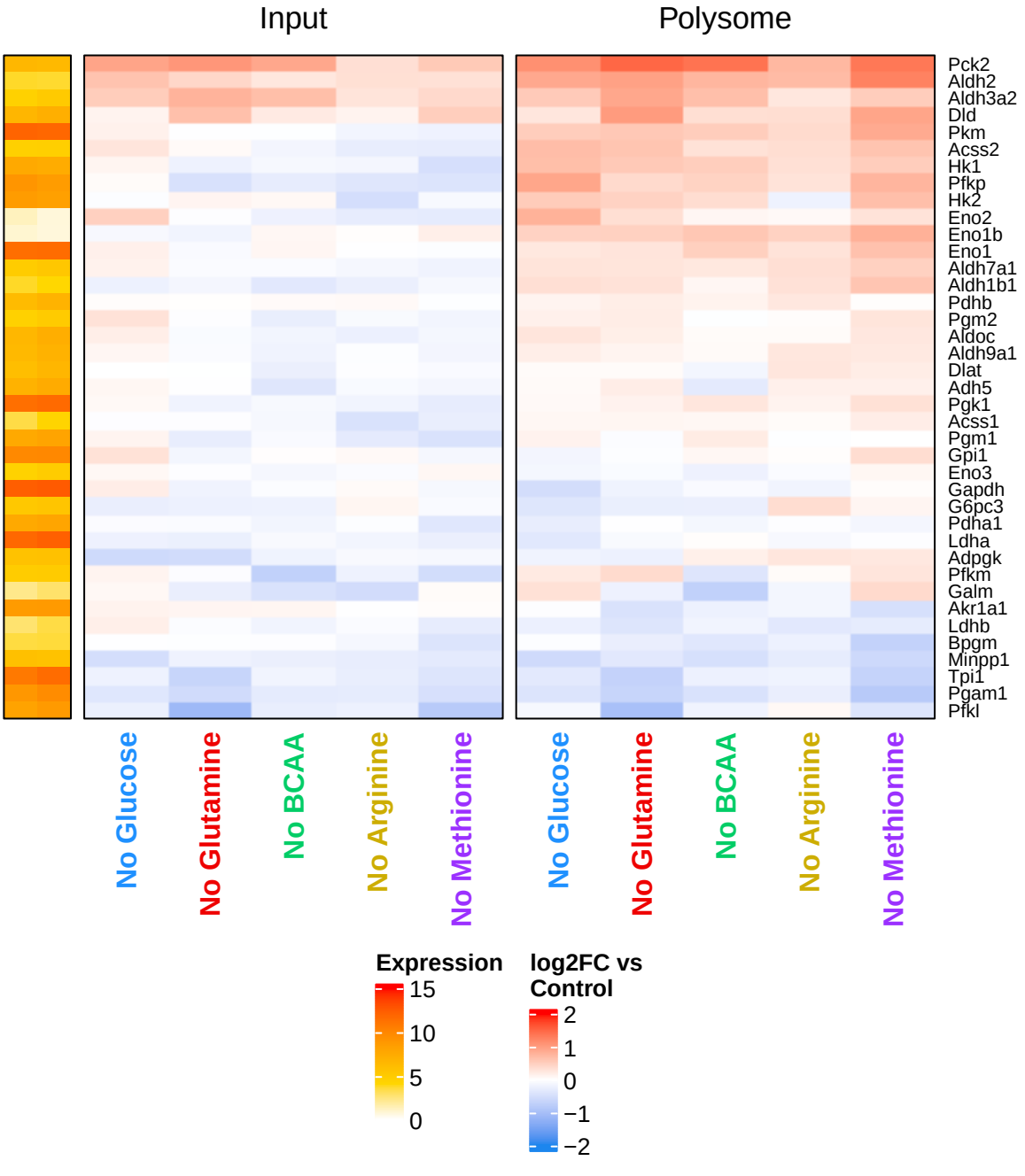
# Glutathione metabolism



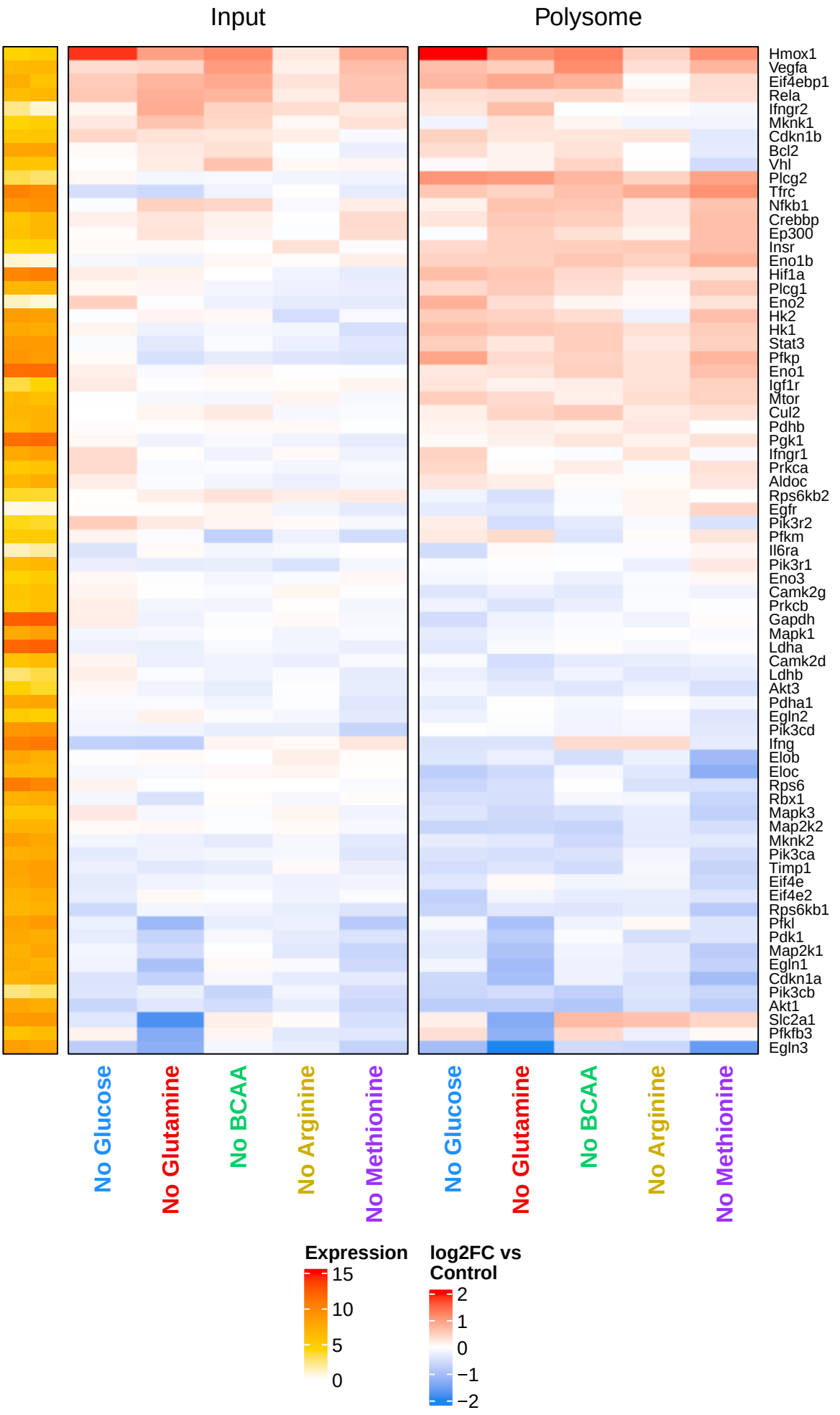
# Glycine, serine, and threonine metabolism



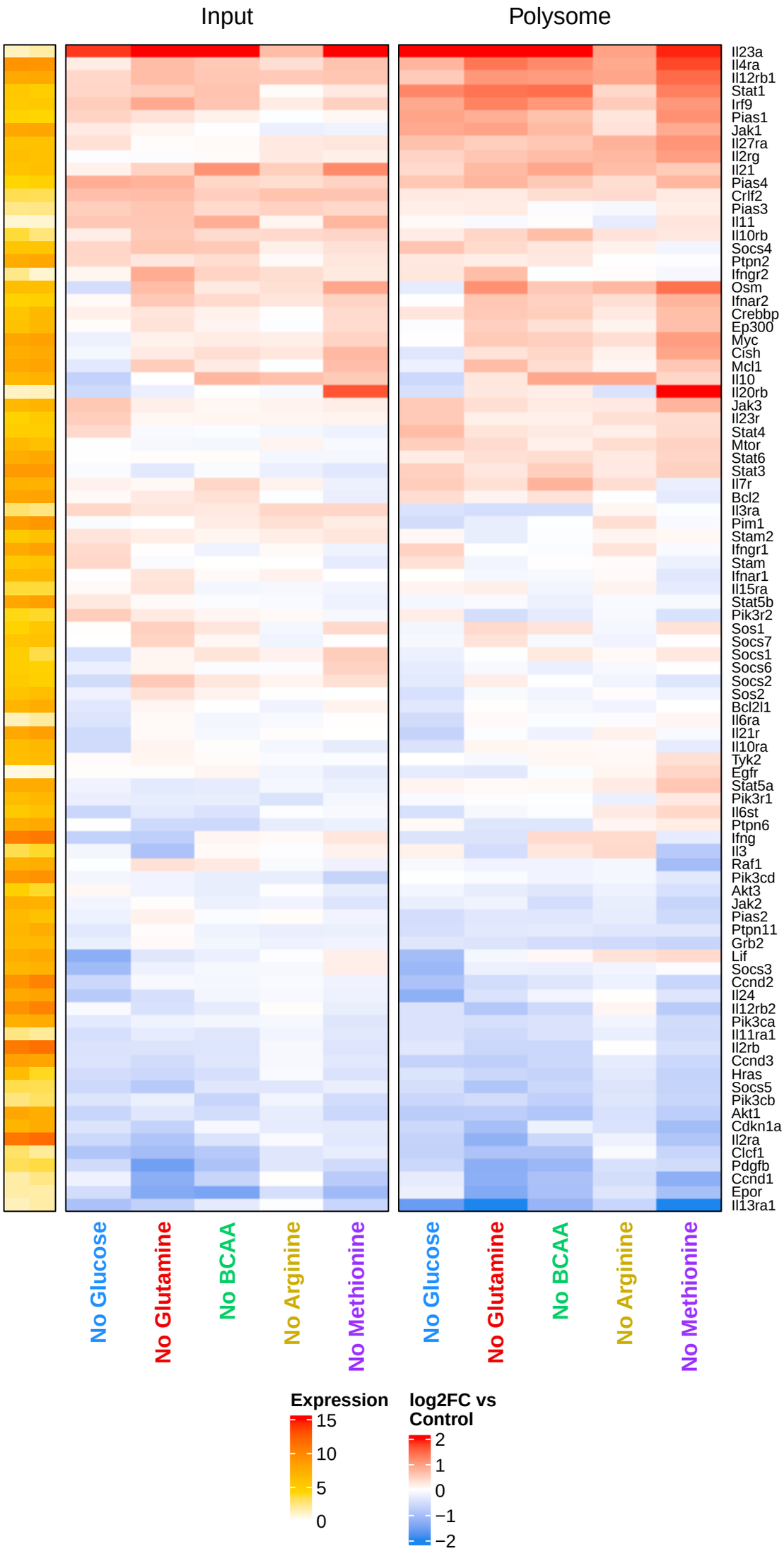
# Glycolysis and Gluconeogenesis



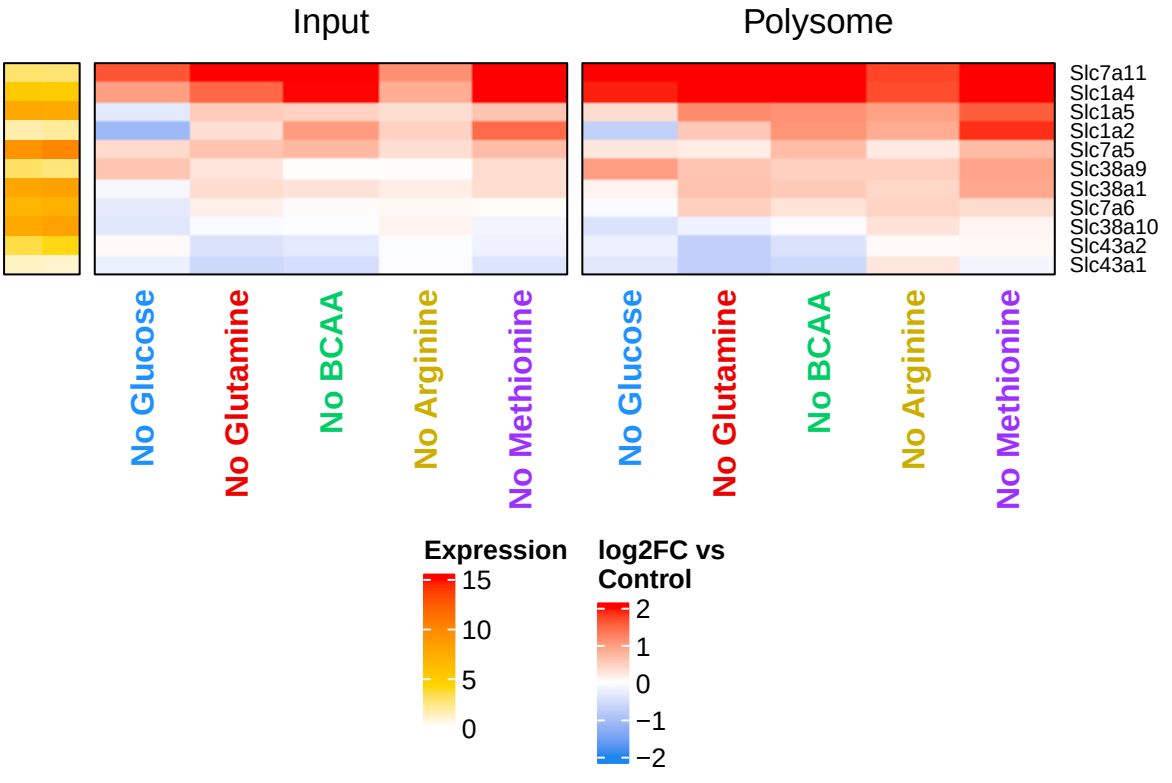
# HIF−1 signaling pathway



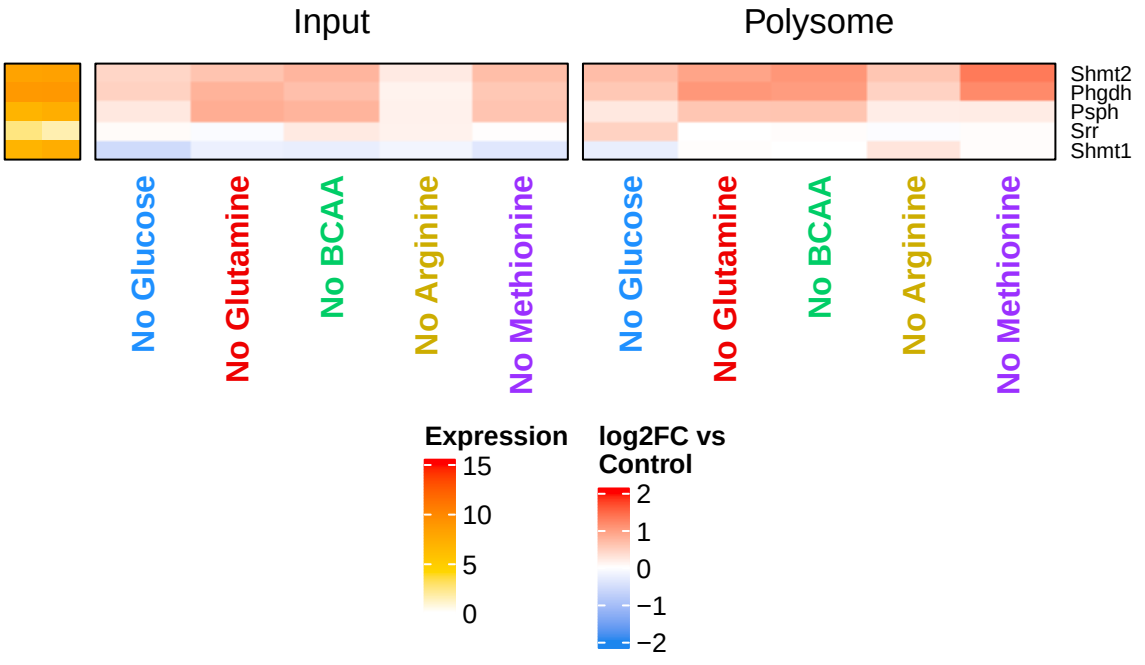
# JAK−STAT signaling pathway



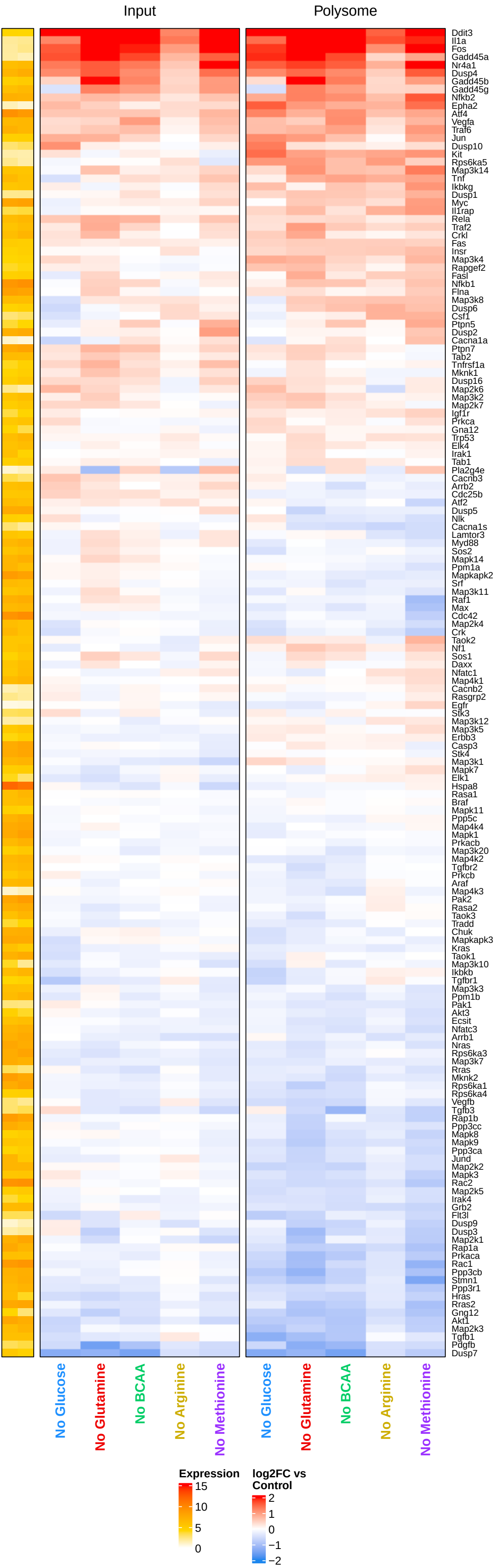
# L−amino acid transmembrane transporter activity

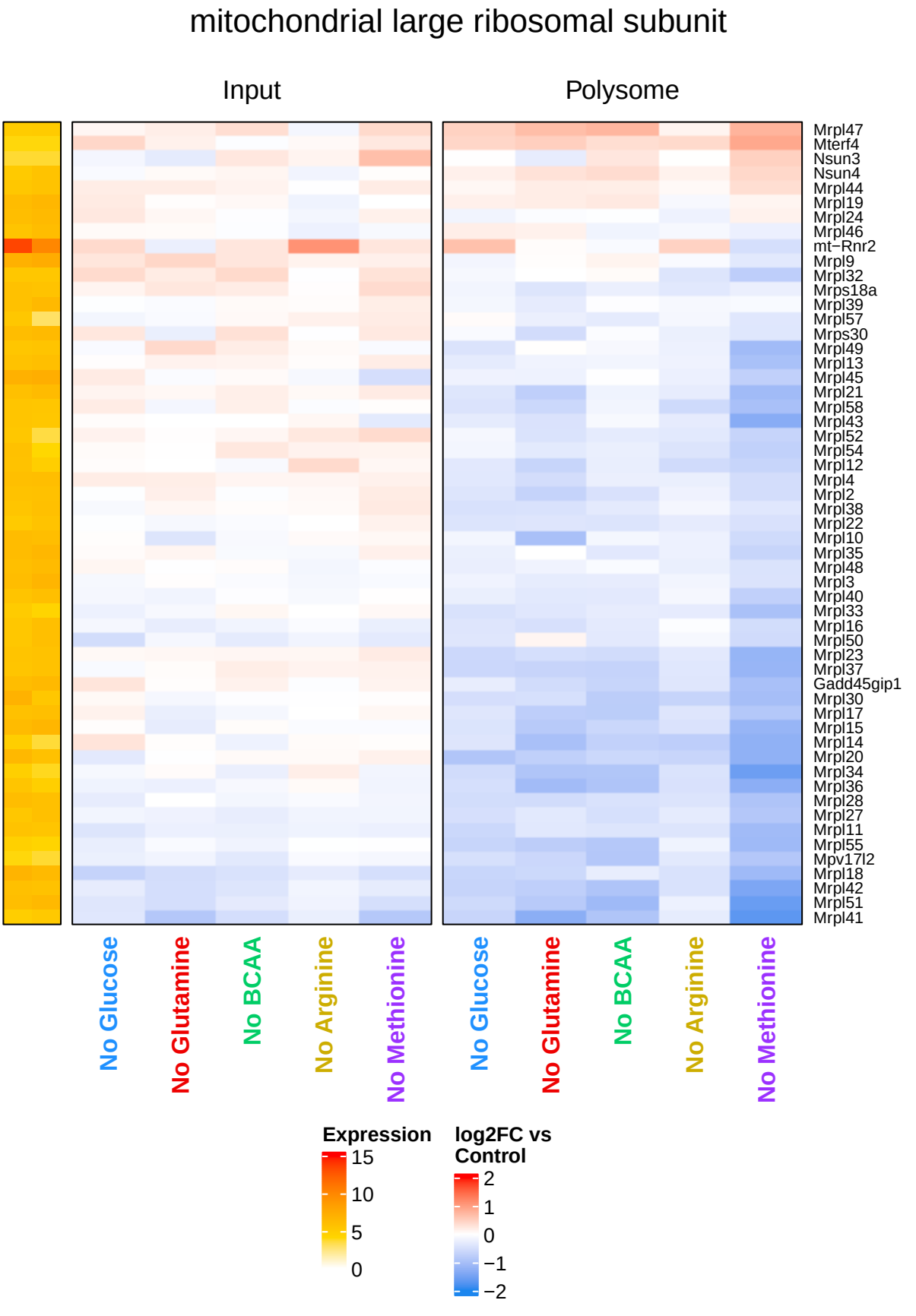


# L−serine metabolic process

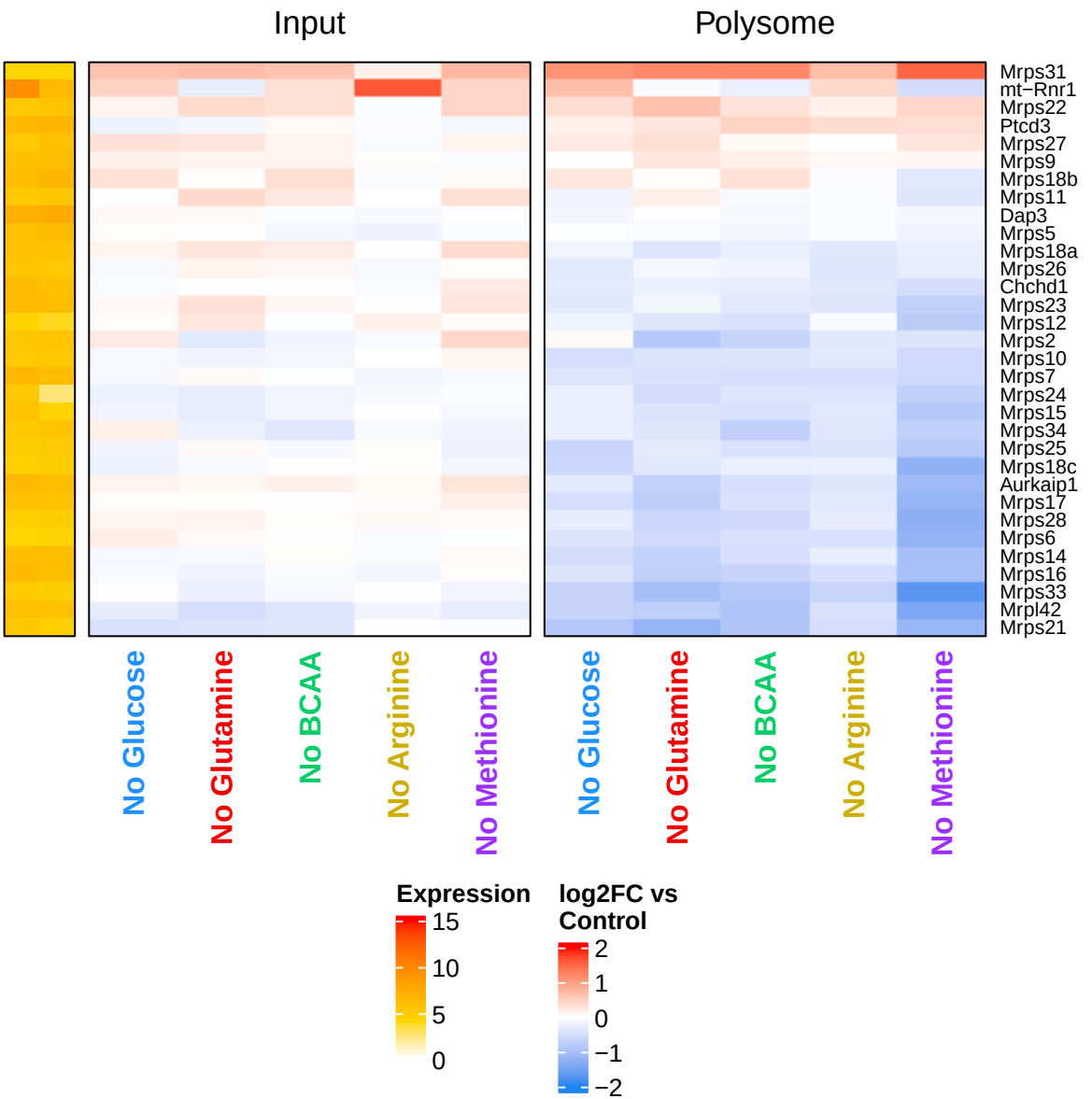


# MAPK signaling pathway

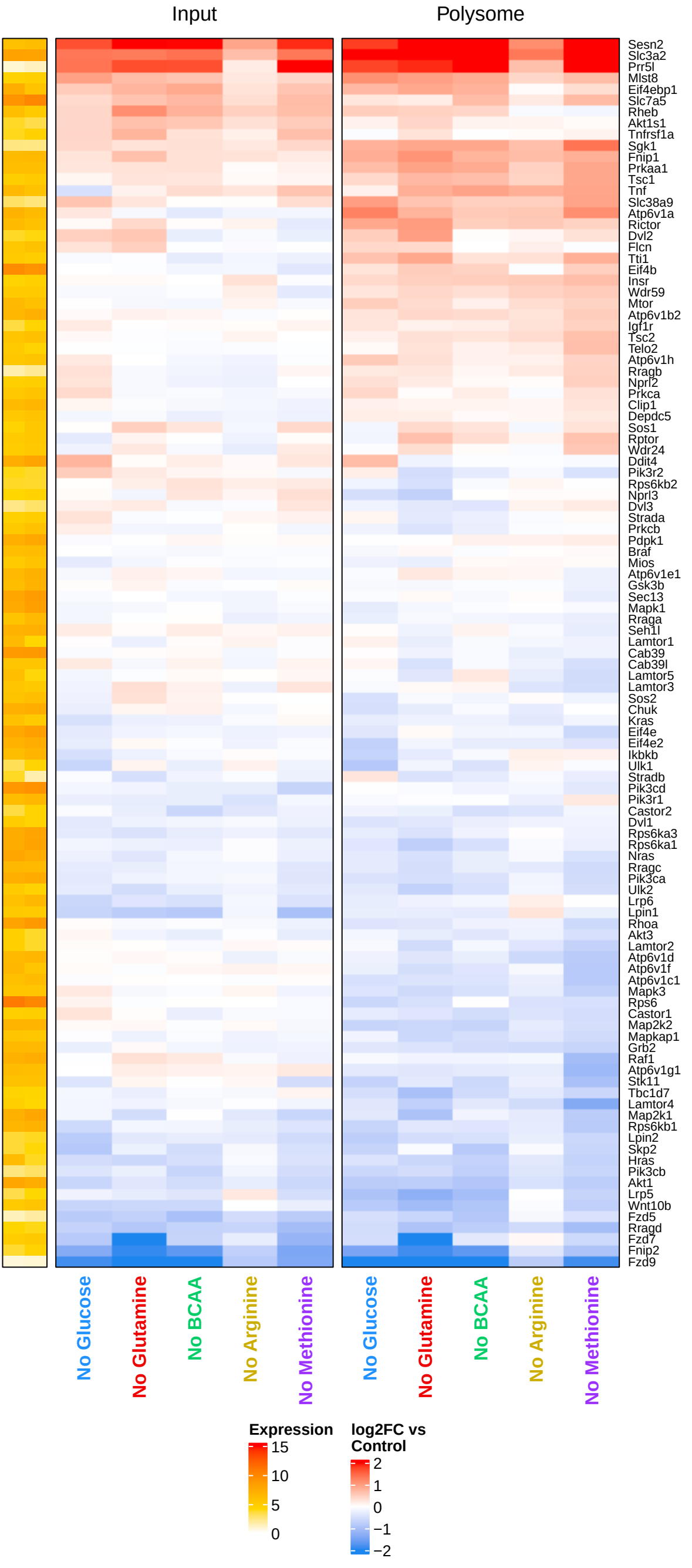



mitochondrial large ribosomal subunit
Input
Polysome
Mrpl47
Mterf4
Nsun3
Nsun4
Mrpl44
Mrpl19
Mrpl24
Mrpl46
mt−Rnr2
Mrpl9
Mrpl32
Mrps18a
Mrpl39
Mrpl57
Mrps30
Mrpl49
Mrpl13
Mrpl45
Mrpl21
Mrpl58
Mrpl43
Mrpl52
Mrpl54
Mrpl12
Mrpl4
Mrpl2
Mrpl38
Mrpl22
Mrpl10
Mrpl35
Mrpl48
Mrpl3
Mrpl40
Mrpl33
Mrpl16
Mrpl50
Mrpl23
Mrpl37
Gadd45gip1
Mrpl30
Mrpl17
Mrpl15
Mrpl14
Mrpl20
Mrpl34
Mrpl36
Mrpl28
Mrpl27
Mrpl11
Mrpl55
Mpv17l2
Mrpl18
Mrpl42
Mrpl51
Mrpl41
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

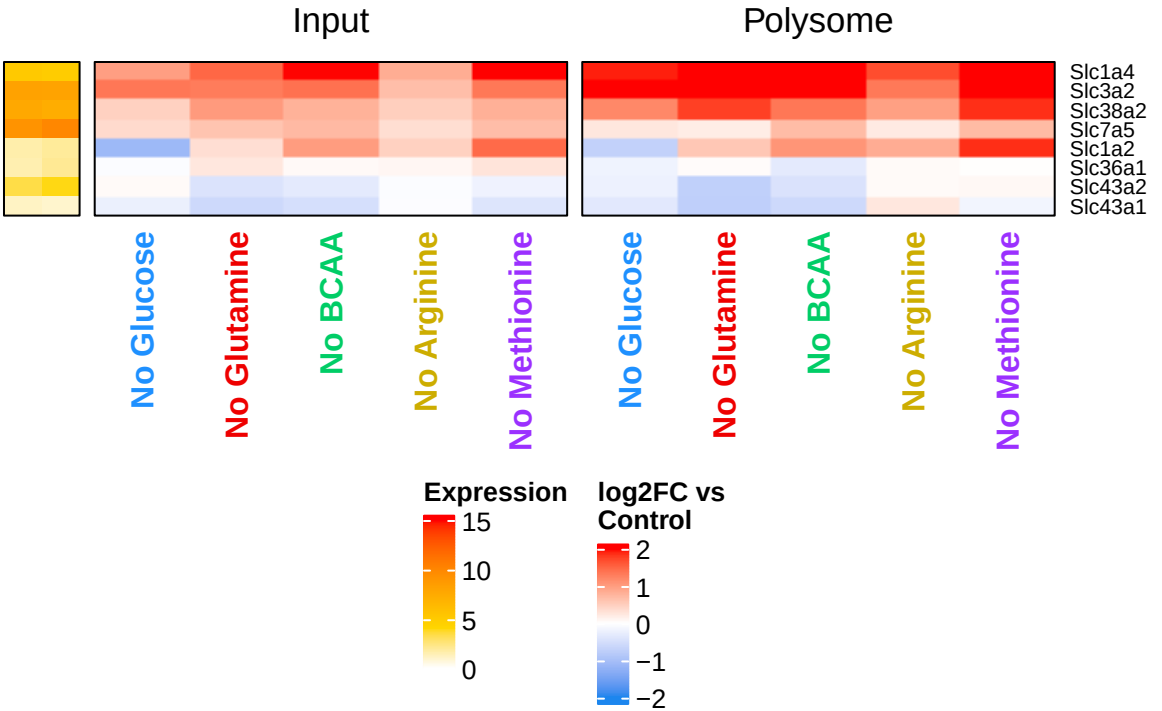
# mitochondrial small ribosomal subunit



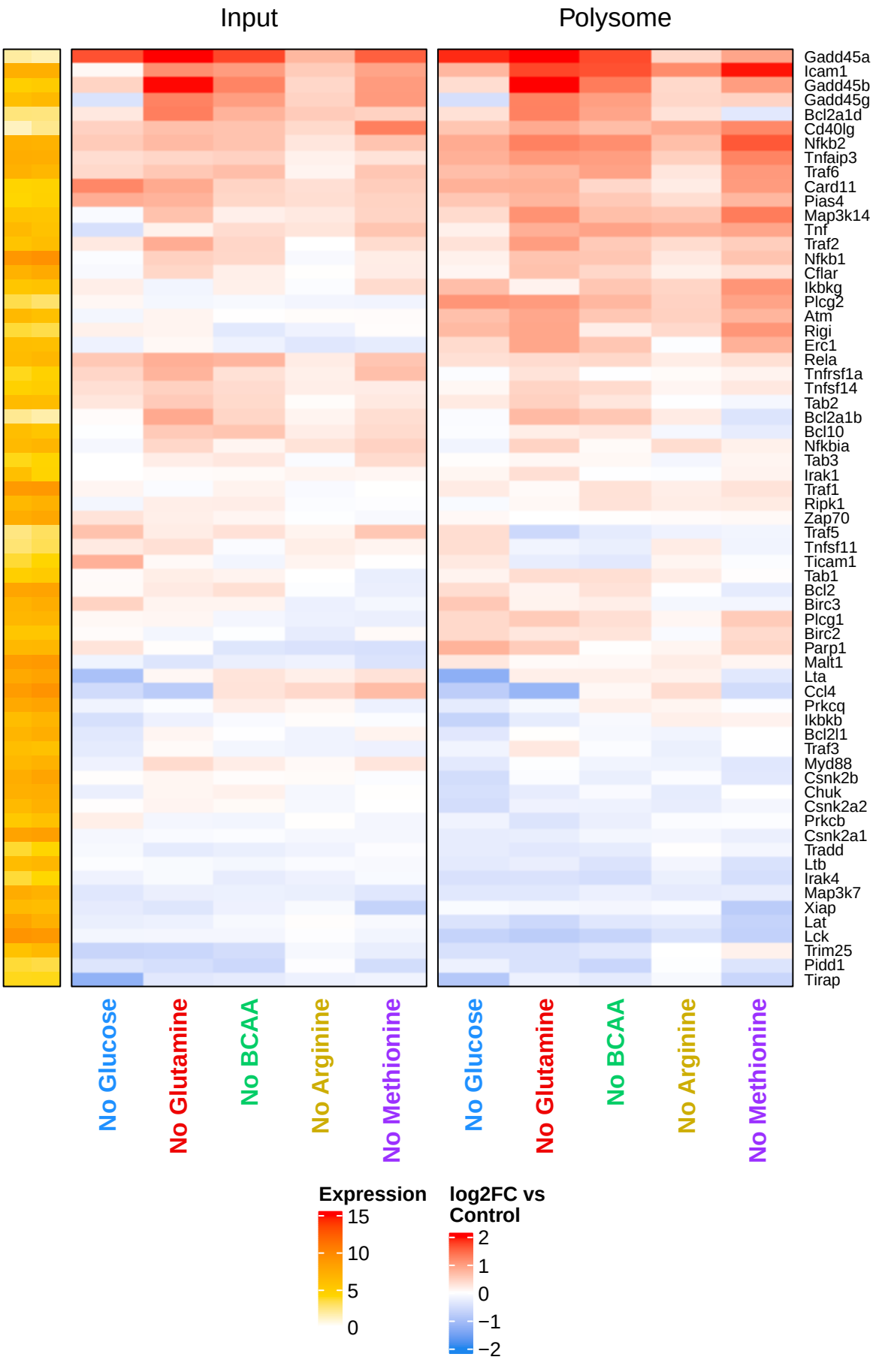
# mTOR signaling pathway



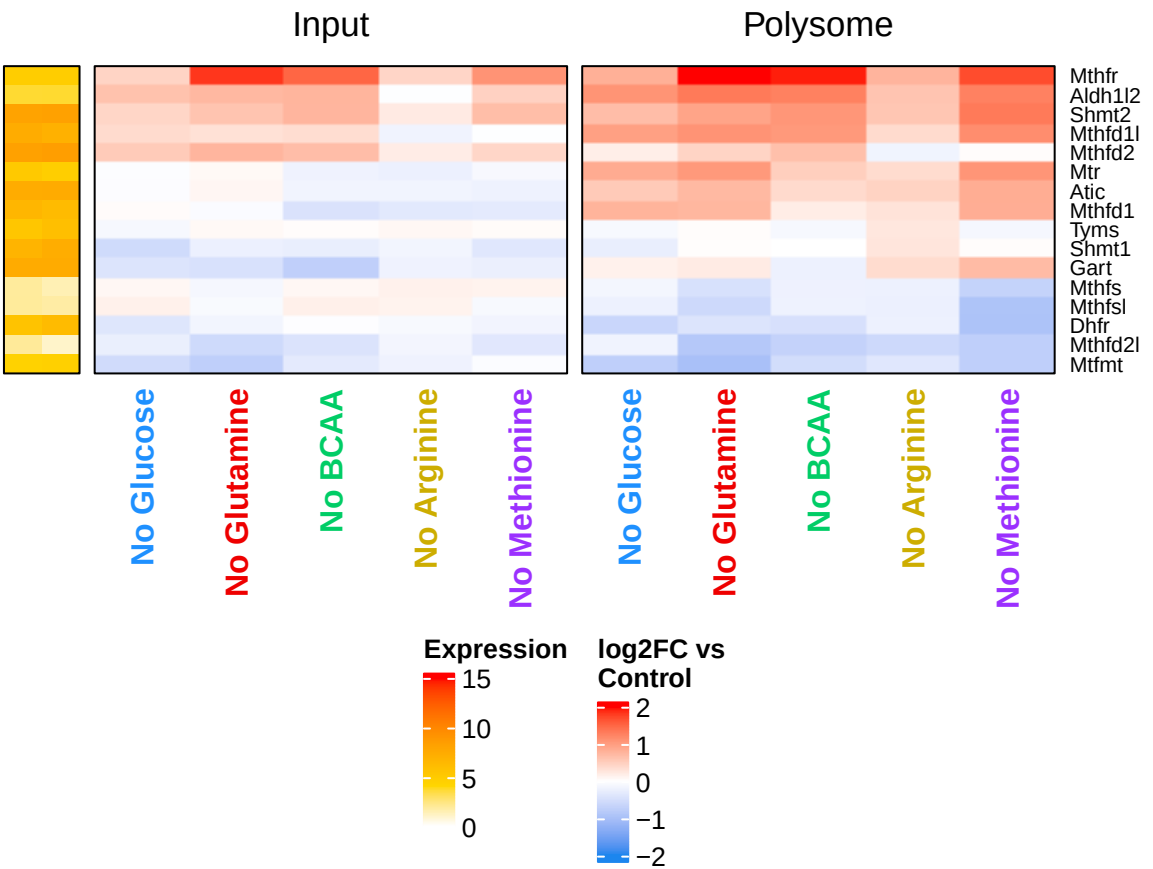
# neutral amino acid transmembrane transporter activity



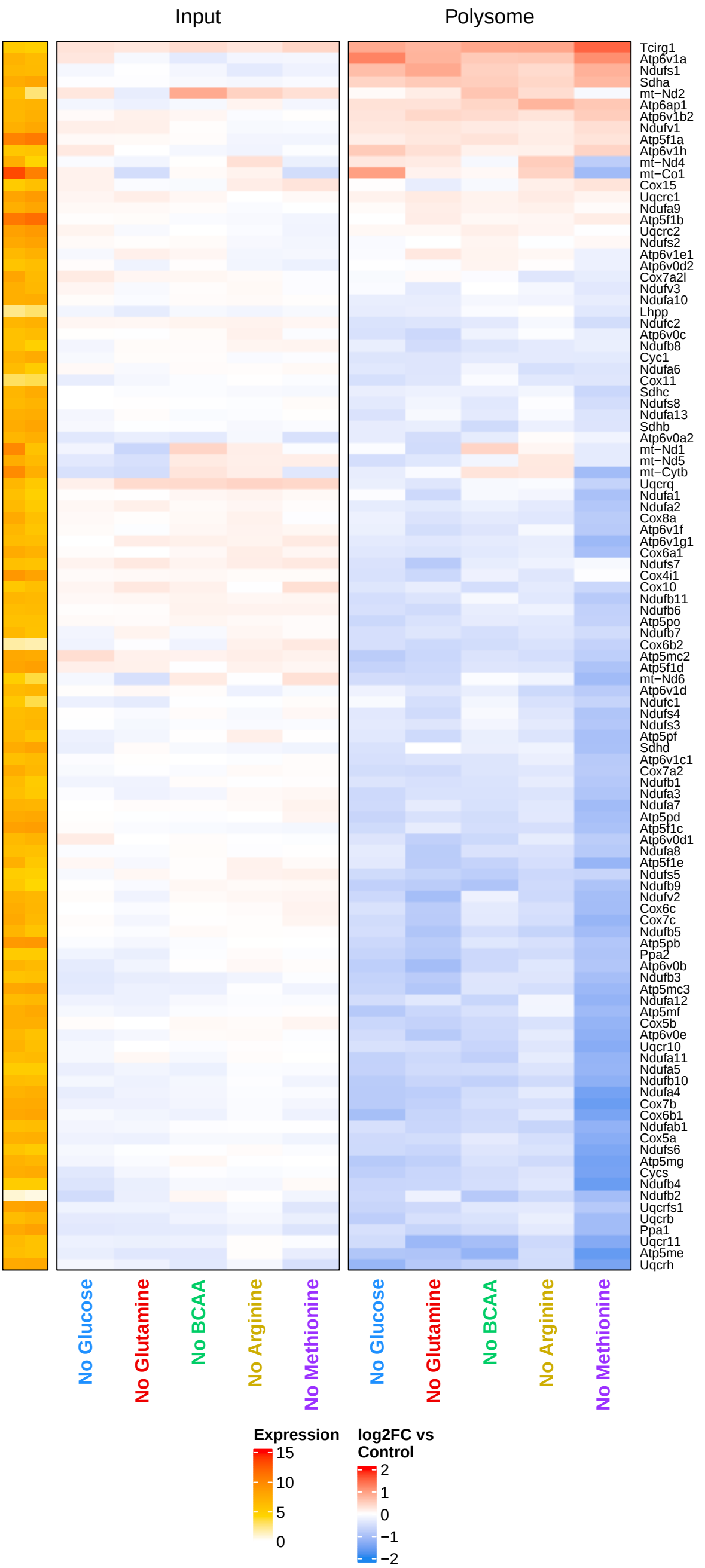
# NF−kappa B signaling pathway



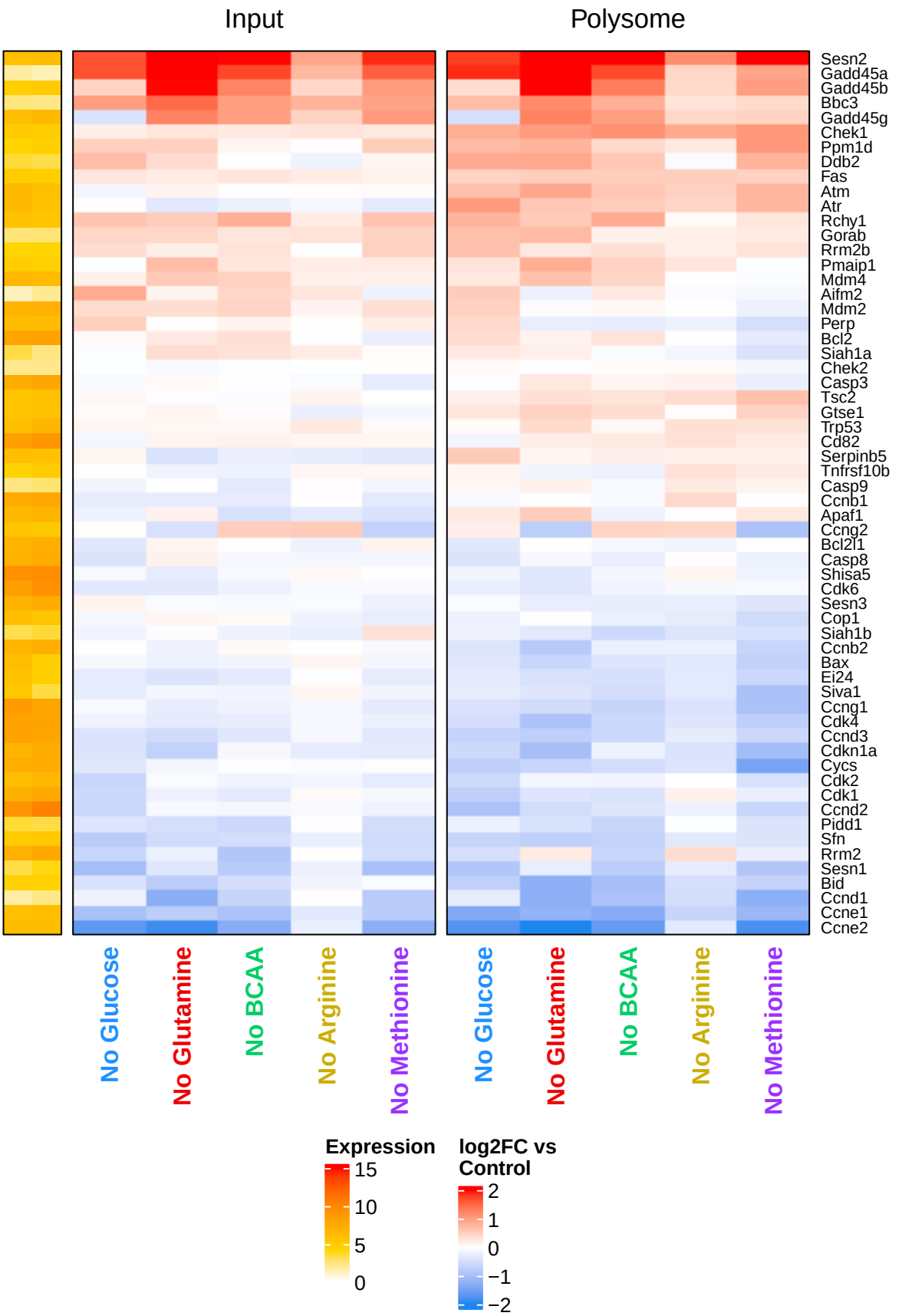
# One carbon pool by folate



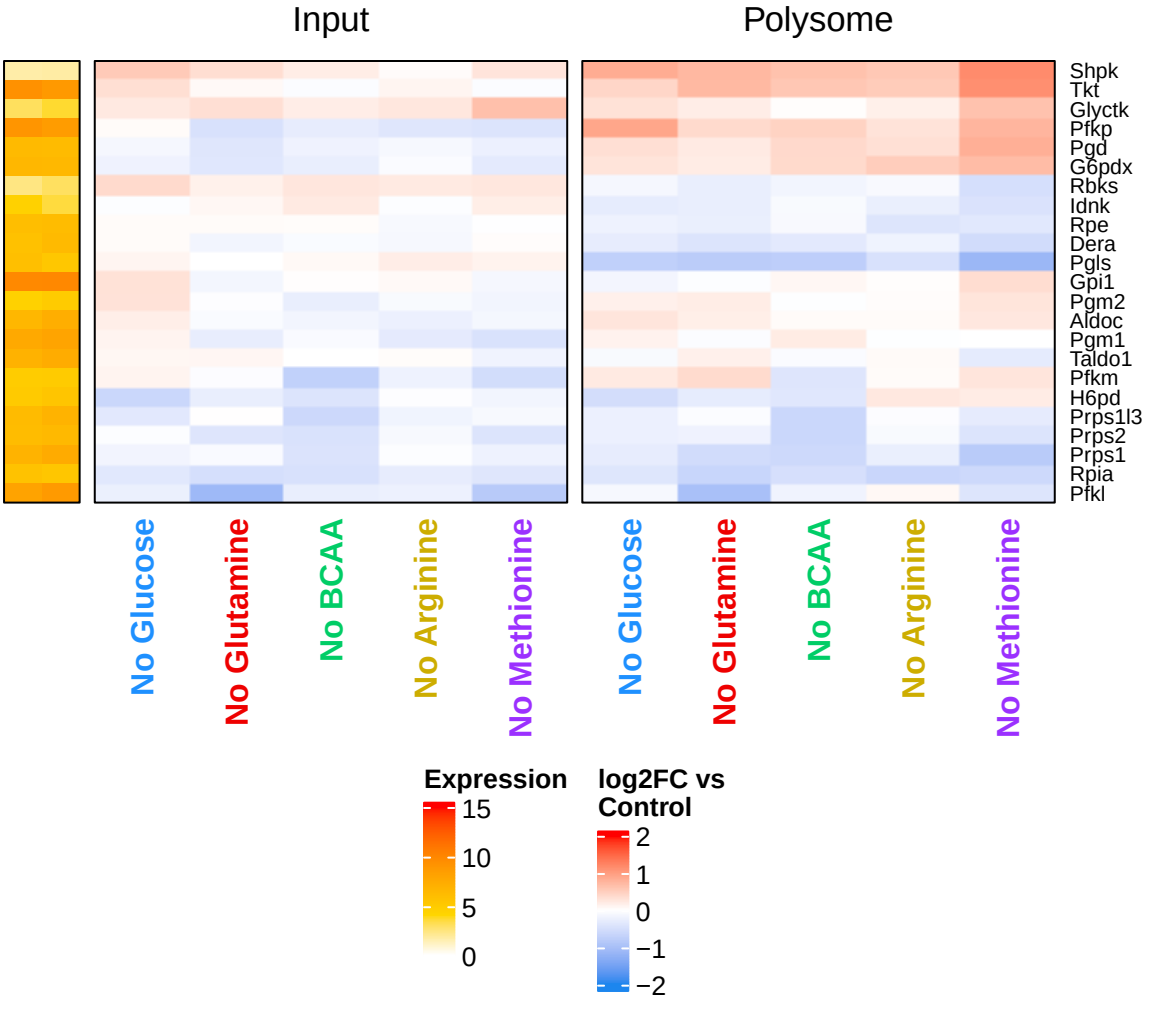
# Oxidative phosphorylation



# p53 signaling pathway



# Pentose phosphate pathway



# PI3K−Akt signaling pathway

Input

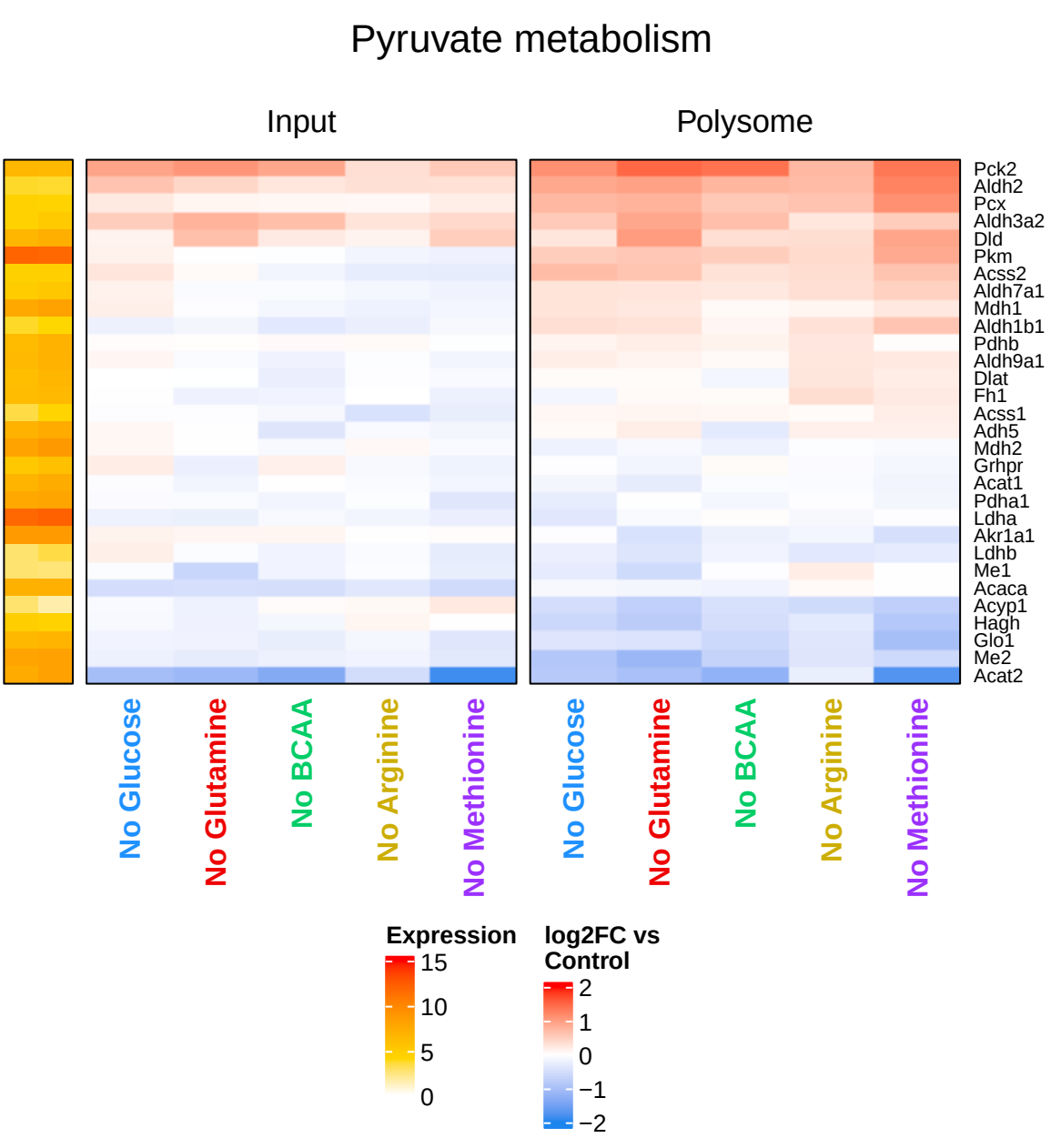
Polysome

Nr4a1
Pck2
Il4ra
Lama5
Atf4
Mlst8
Gys1
Vegfa
Sgk1
Lamc1
Itgb7
Itgav
Phlpp1
Prkaa1
Tsc1
Epha2
Kit
Brca1
Osm
Ifnar2
Nfkb1
Itga4
Myc
Mcl1
Sos1
Ppp2r2a
Fasl
Rptor
Spp1
Csf1
Itga5
Eif4ebp1
Them4
Rela
Rheb
Il7r
Cdkn1b
Ppp2r3a
Bcl2
Mdm2
Ddit4
Jak1
Hsp90aa1
Il2rg
Thbs3
Insr
Hsp90b1
Itga3
Jak3
Itgb3
Ikbkg
Creb3l2
Pik3ap1
Itga7
Prkca
Atf6b
Tsc2
Igf1r
Ppp2r1a
Trp53
Hsp90ab1
Eif4b
Mtor
Itga6
Pkn3
Lamc2
Ppp2r5e
Crtc2
Rps6kb2
Il3ra
Sos2
Ywhab
Chuk
Bcl2l1
Il6ra
Lpar2
Pik3r2
Ifnar1
Ppp2r3c
Gsk3b
Ppp2r5d
Ppp2r2d
Atf2
Gng5
Raf1
Pdpk1
Ptk2
Mapk1
Egfr
Itgb1
F2r
G6pc3
Ikbkb
Pik3r1
Cdk6
Kras
Rbl2
Casp9
Erbb3
Pik3cg
Lamb3
Pik3cd
Gnb5
Ppp2r1b
Il3
Ywhae
Ywhaz
Ppp2ca
Ppp2r5a
Pkn2
Ppp2cb
Rps6
Cdc37
Akt3
Ppp2r5c
Nras
Pik3ca
Creb1
Ppp2r5b
Mapk3
Gnb2
Map2k2
Pkn1
Vegfb
Eif4e
Cdk2
Eif4e2
Ywhag
Jak2
Grb2
Stk11
Gng2
Ywhaq
Gnb1
Bad
Gngt2
Rac1
Flt3l
Ccnd2
Rps6kb1
Sgk3
Map2k1
Ywhah
Cdkn1a
Foxo3
Phlpp2
Il2rb
Ccnd3
Hras
Cdk4
Gnb4
Pik3cb
Akt1
Pik3r5
Gng12
Il2ra
Ccnd1
Pdgfb
Myb
Epor
Lpar5
Ccne1
Ccne2

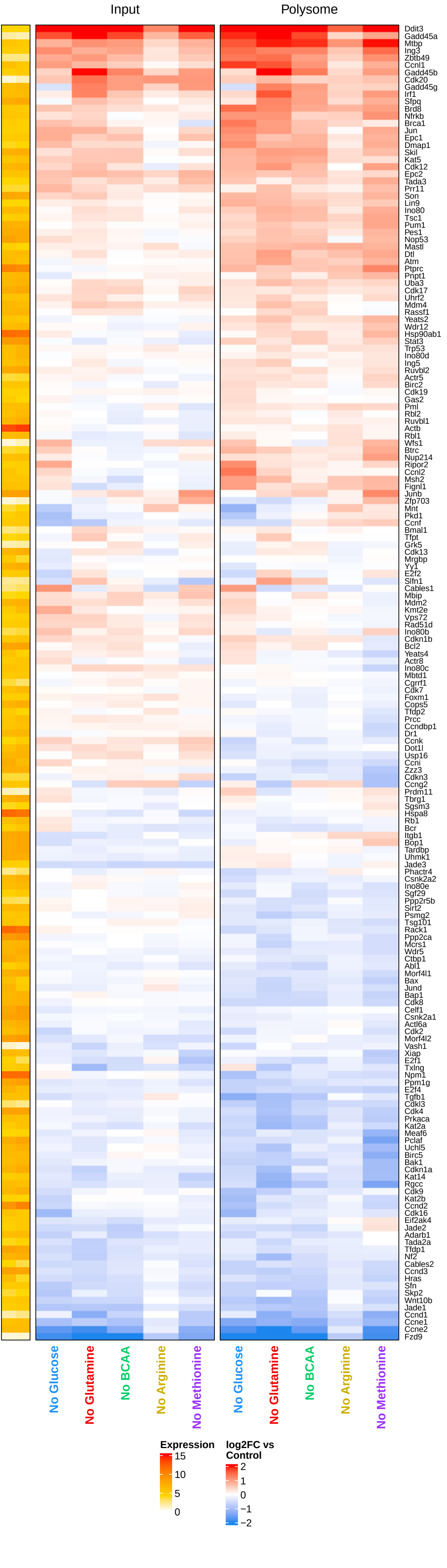
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine

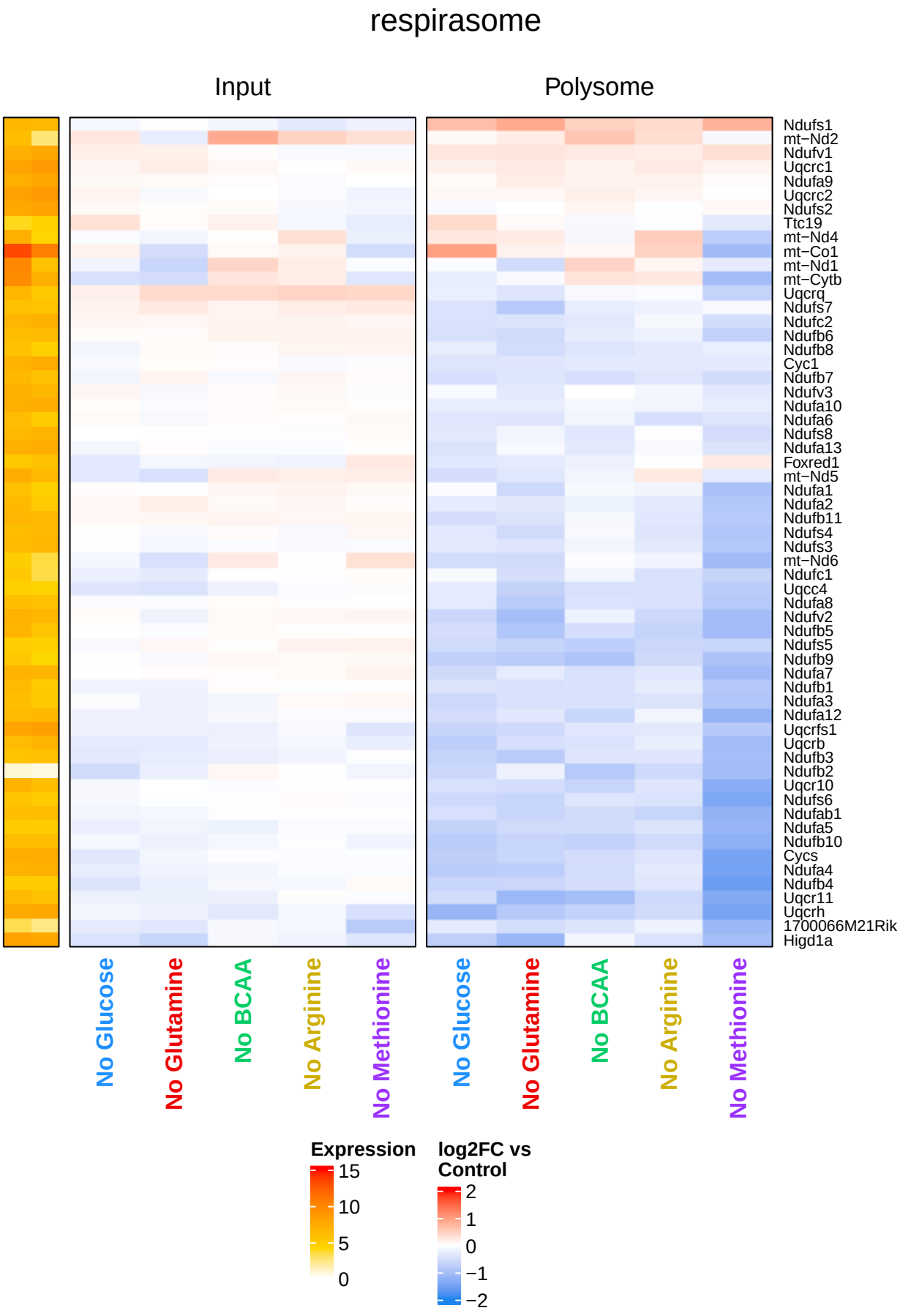
**Expression**
15
10
5
0

**log2FC vs Control**
2
1
0
−1
−2

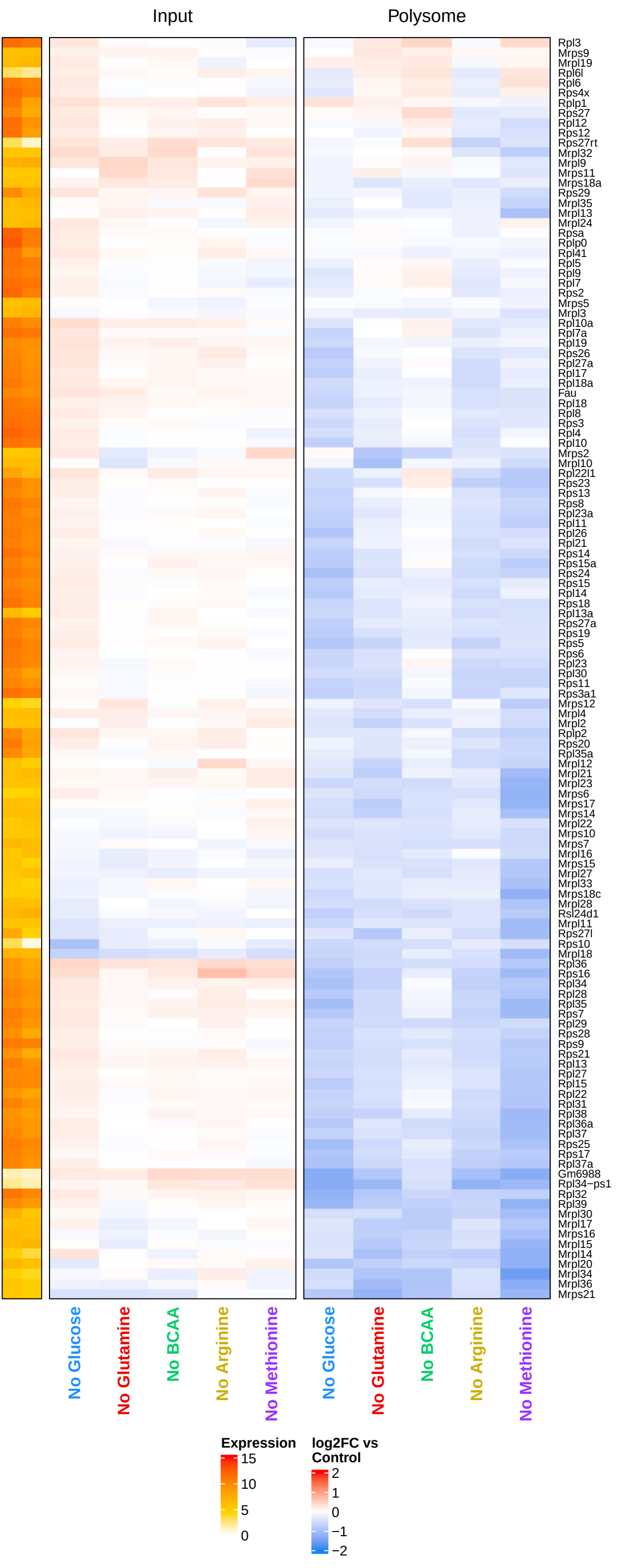

Pyruvate metabolism
Input
Polysome
Pck2
Aldh2
Pcx
Aldh3a2
Dld
Pkm
Acss2
Aldh7a1
Mdh1
Aldh1b1
Pdhb
Aldh9a1
Dlat
Fh1
Acss1
Adh5
Mdh2
Grhpr
Acat1
Pdha1
Ldha
Akr1a1
Ldhb
Me1
Acaca
Acyp1
Hagh
Glo1
Me2
Acat2
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

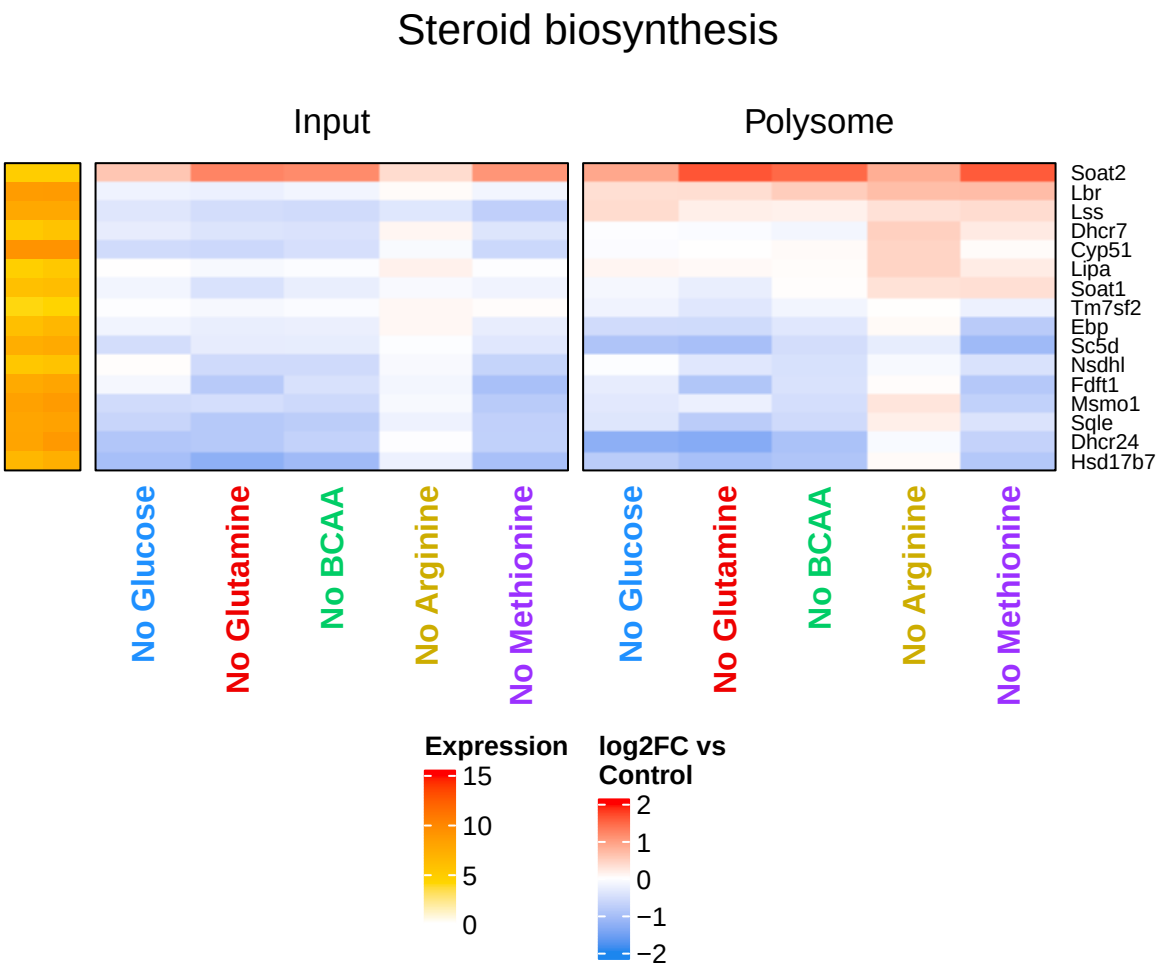
# regulation of cell cycle

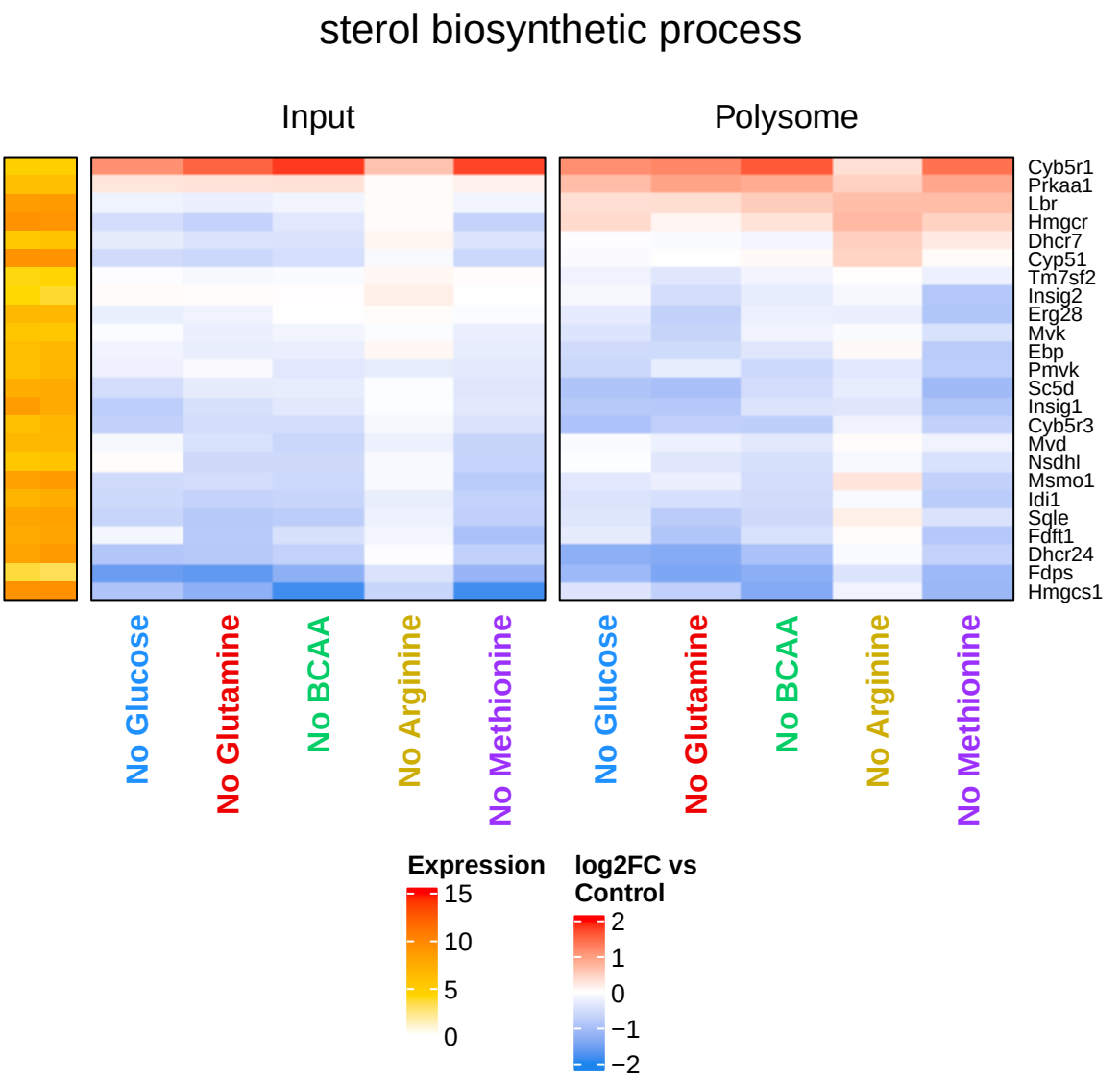



respirasome
Input
Polysome
Ndufs1
mt−Nd2
Ndufv1
Uqcrc1
Ndufa9
Uqcrc2
Ndufs2
Ttc19
mt−Nd4
mt−Co1
mt−Nd1
mt−Cytb
Uqcrq
Ndufs7
Ndufc2
Ndufb6
Ndufb8
Cyc1
Ndufb7
Ndufv3
Ndufa10
Ndufa6
Ndufs8
Ndufa13
Foxred1
mt−Nd5
Ndufa1
Ndufa2
Ndufb11
Ndufs4
Ndufs3
mt−Nd6
Ndufc1
Uqcc4
Ndufa8
Ndufv2
Ndufb5
Ndufs5
Ndufb9
Ndufa7
Ndufb1
Ndufa3
Ndufa12
Uqcrfs1
Uqcrb
Ndufb3
Ndufb2
Uqcr10
Ndufs6
Ndufab1
Ndufa5
Ndufb10
Cycs
Ndufa4
Ndufb4
Uqcr11
Uqcrh
1700066M21Rik
Higd1a
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

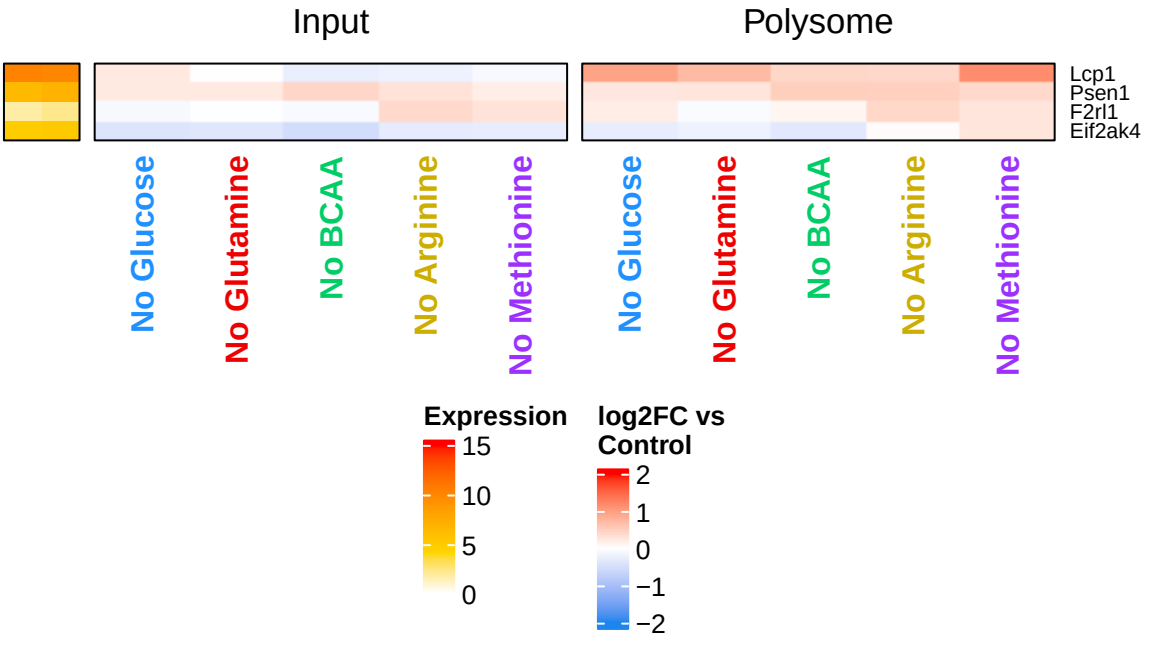
# Ribosome


Input
Polysome
Rpl3
Mrps9
Mrpl19
Rpl6l
Rpl6
Rps4x
Rplp1
Rps27
Rpl12
Rps12
Rps27rt
Mrpl32
Mrpl9
Mrps11
Mrps18a
Rps29
Mrpl35
Mrpl13
Mrpl24
Rpsa
Rplp0
Rpl41
Rpl5
Rpl9
Rpl7
Rps2
Mrps5
Mrpl3
Rpl10a
Rpl7a
Rpl19
Rps26
Rpl27a
Rpl17
Rpl18a
Fau
Rpl18
Rpl8
Rps3
Rpl4
Rpl10
Mrps2
Mrpl10
Rpl22l1
Rps23
Rps13
Rps8
Rpl23a
Rpl11
Rpl26
Rpl21
Rps14
Rps15a
Rps24
Rps15
Rpl14
Rps18
Rpl13a
Rps27a
Rps19
Rps5
Rps6
Rpl23
Rpl30
Rps11
Rps3a1
Mrps12
Mrpl4
Mrpl2
Rplp2
Rps20
Rpl35a
Mrpl12
Mrpl21
Mrpl23
Mrps6
Mrps17
Mrps14
Mrpl22
Mrps10
Mrps7
Mrpl16
Mrps15
Mrpl27
Mrpl33
Mrps18c
Mrpl28
Rsl24d1
Mrpl11
Rps27l
Rps10
Mrpl18
Rpl36
Rps16
Rpl34
Rpl28
Rpl35
Rps7
Rpl29
Rps28
Rps9
Rps21
Rpl13
Rpl27
Rpl15
Rpl22
Rpl31
Rpl38
Rpl36a
Rpl37
Rps25
Rps17
Rpl37a
Gm6988
Rpl34−ps1
Rpl32
Rpl39
Mrpl30
Mrpl17
Mrps16
Mrpl15
Mrpl14
Mrpl20
Mrpl34
Mrpl36
Mrps21
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

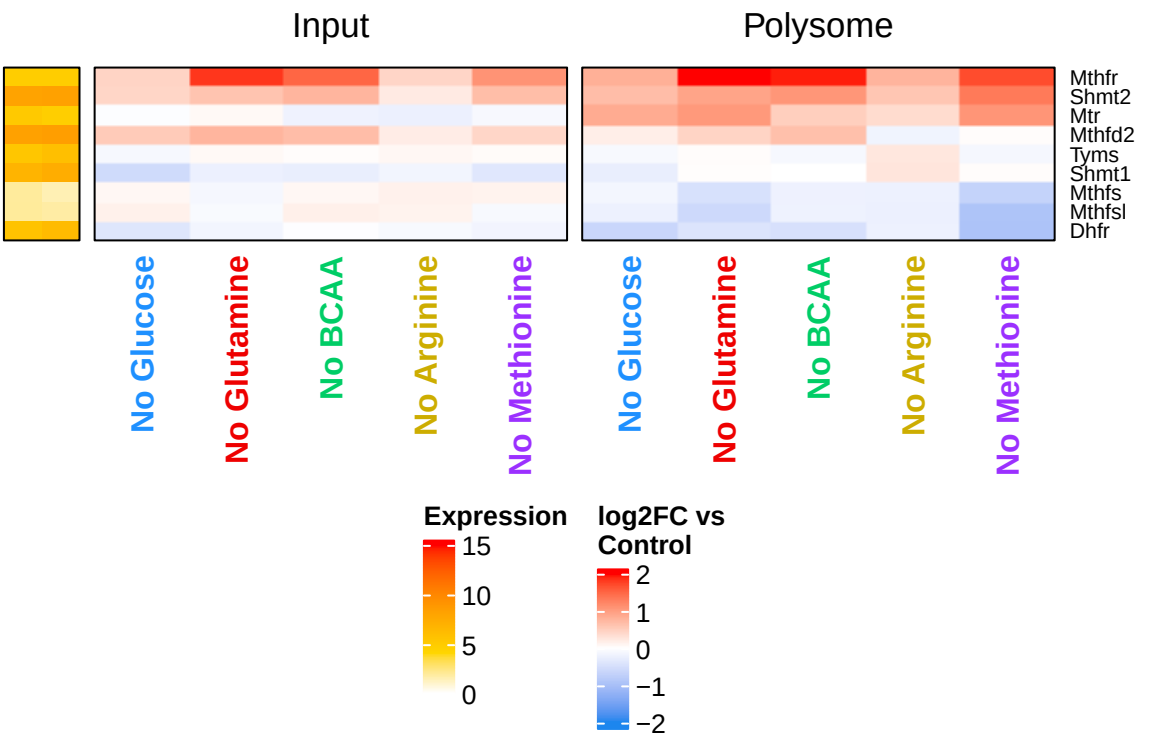

Steroid biosynthesis
Input
Polysome
Soat2
Lbr
Lss
Dhcr7
Cyp51
Lipa
Soat1
Tm7sf2
Ebp
Sc5d
Nsdhl
Fdft1
Msmo1
Sqle
Dhcr24
Hsd17b7
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

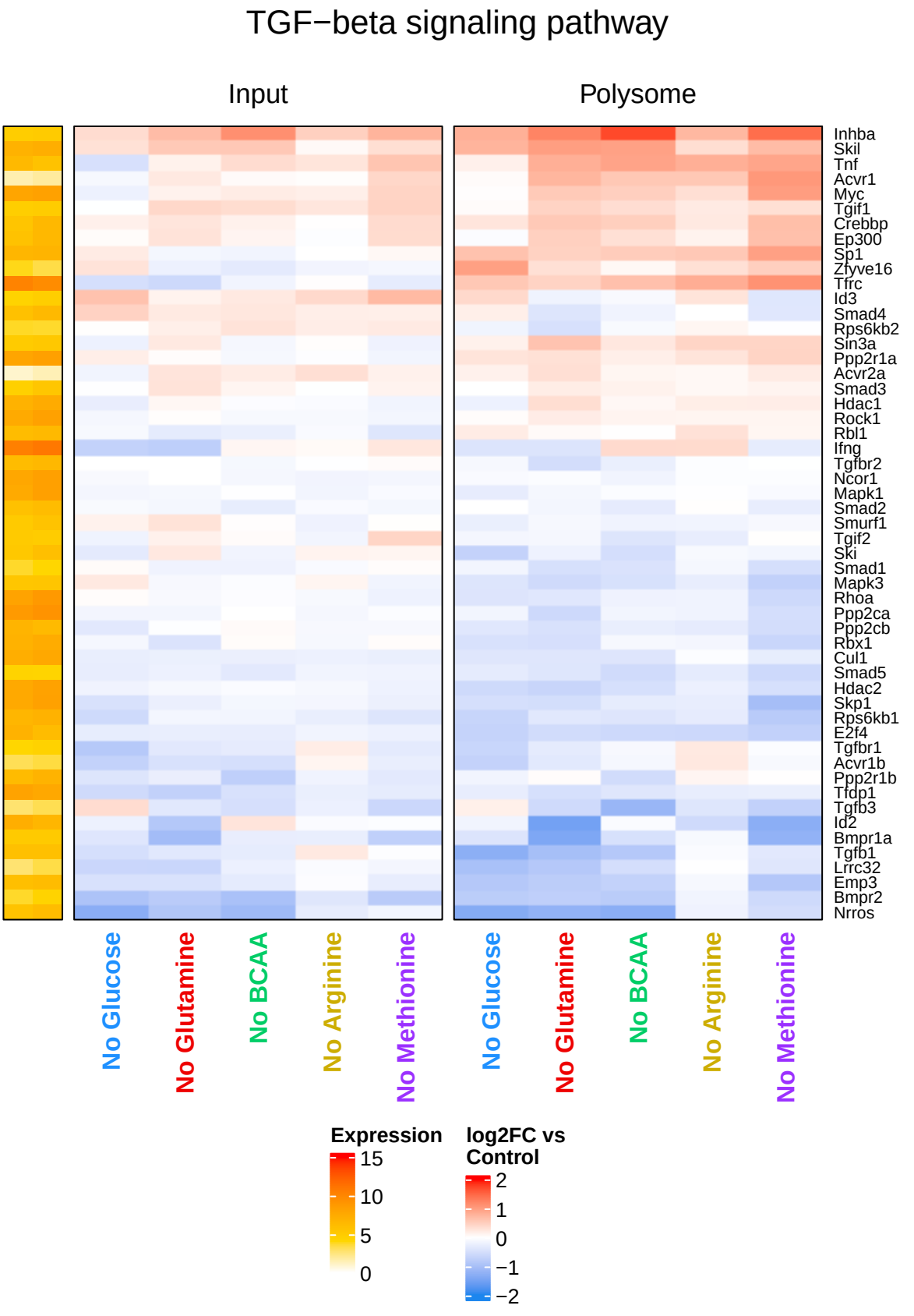

sterol biosynthetic process
Input
Polysome
Cyb5r1
Prkaa1
Lbr
Hmgcr
Dhcr7
Cyp51
Tm7sf2
Insig2
Erg28
Mvk
Ebp
Pmvk
Sc5d
Insig1
Cyb5r3
Mvd
Nsdhl
Msmo1
Idi1
Sqle
Fdft1
Dhcr24
Fdps
Hmgcs1
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

# T cell activation involved in immune response

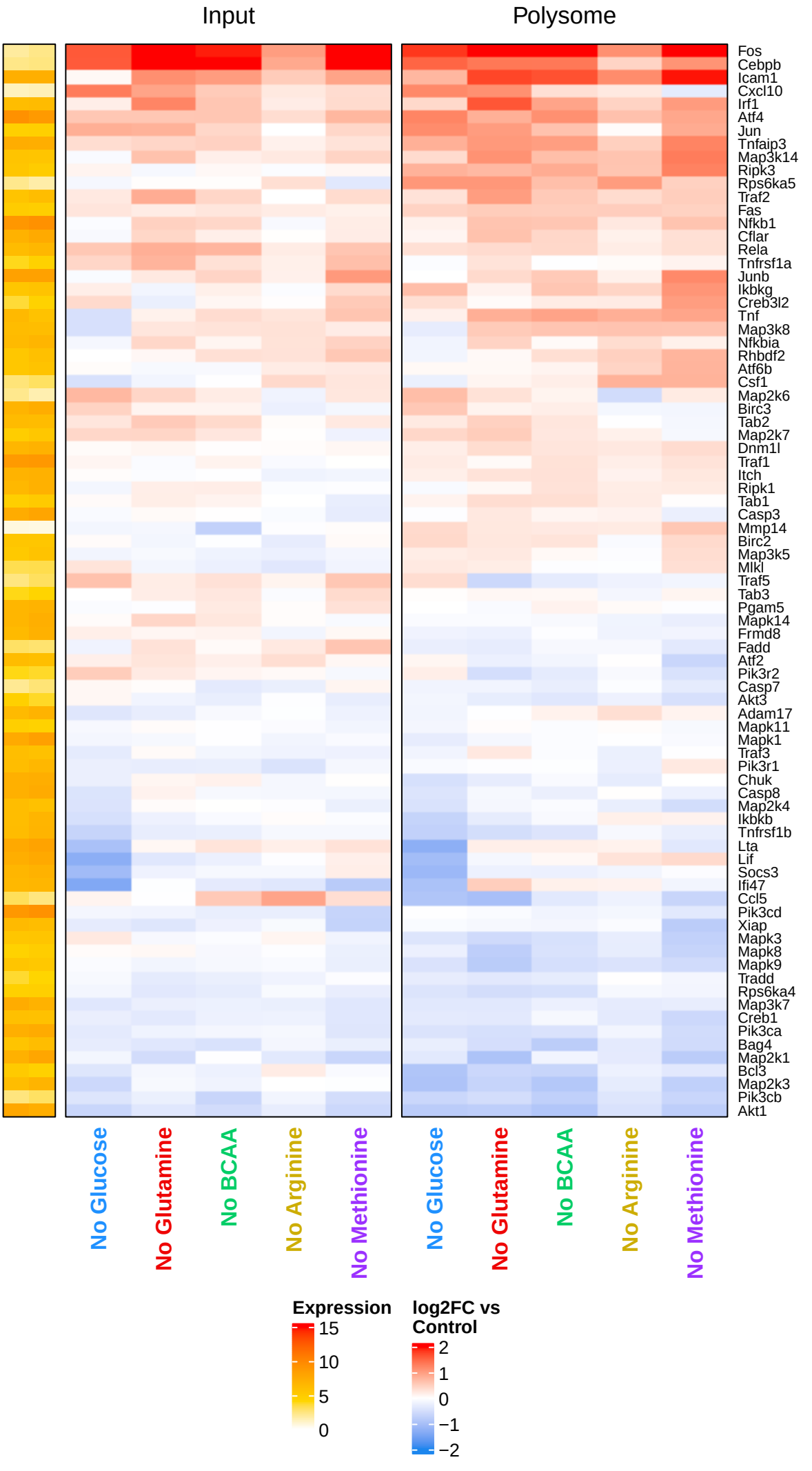


# tetrahydrofolate metabolic process

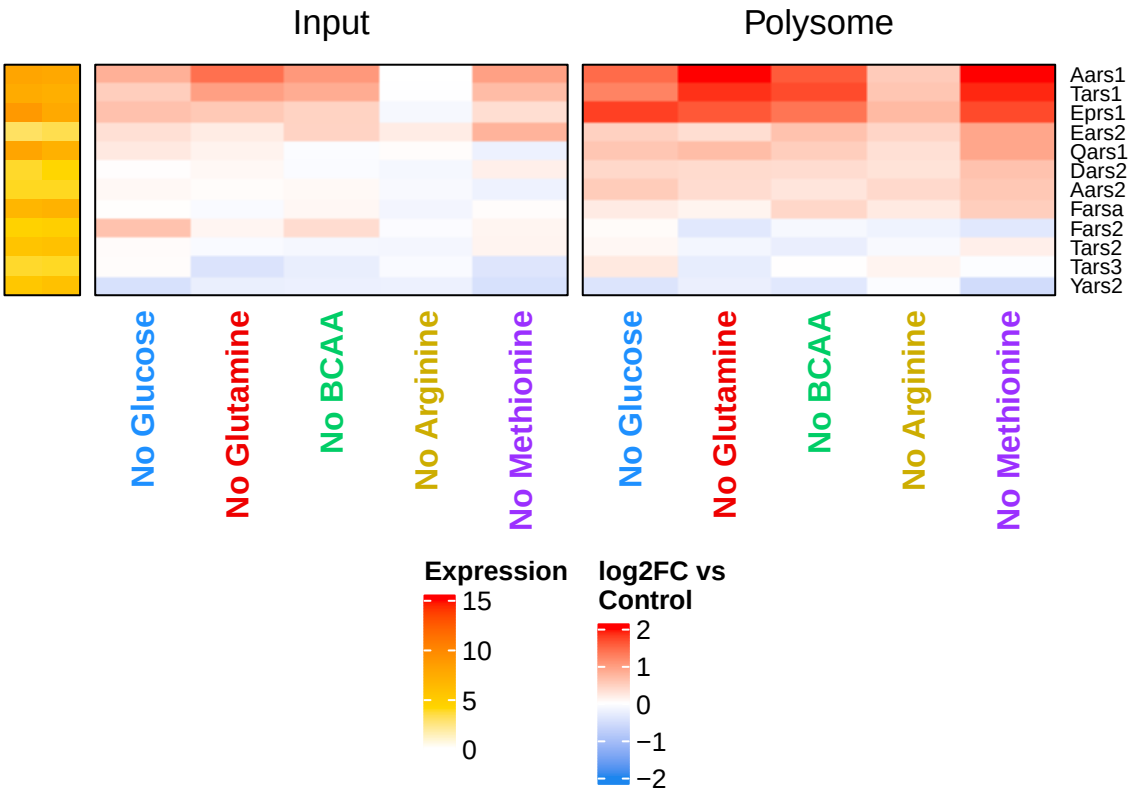



TGF−beta signaling pathway
Input
Polysome
Inhba
Skil
Tnf
Acvr1
Myc
Tgif1
Crebbp
Ep300
Sp1
Zfyve16
Tfrc
Id3
Smad4
Rps6kb2
Sin3a
Ppp2r1a
Acvr2a
Smad3
Hdac1
Rock1
Rbl1
Ifng
Tgfbr2
Ncor1
Mapk1
Smad2
Smurf1
Tgif2
Ski
Smad1
Mapk3
Rhoa
Ppp2ca
Ppp2cb
Rbx1
Cul1
Smad5
Hdac2
Skp1
Rps6kb1
E2f4
Tgfbr1
Acvr1b
Ppp2r1b
Tfdp1
Tgfb3
Id2
Bmpr1a
Tgfb1
Lrrc32
Emp3
Bmpr2
Nrros
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
No Glucose
No Glutamine
No BCAA
No Arginine
No Methionine
Expression
15
10
5
0
log2FC vs Control
2
1
0
−1
−2

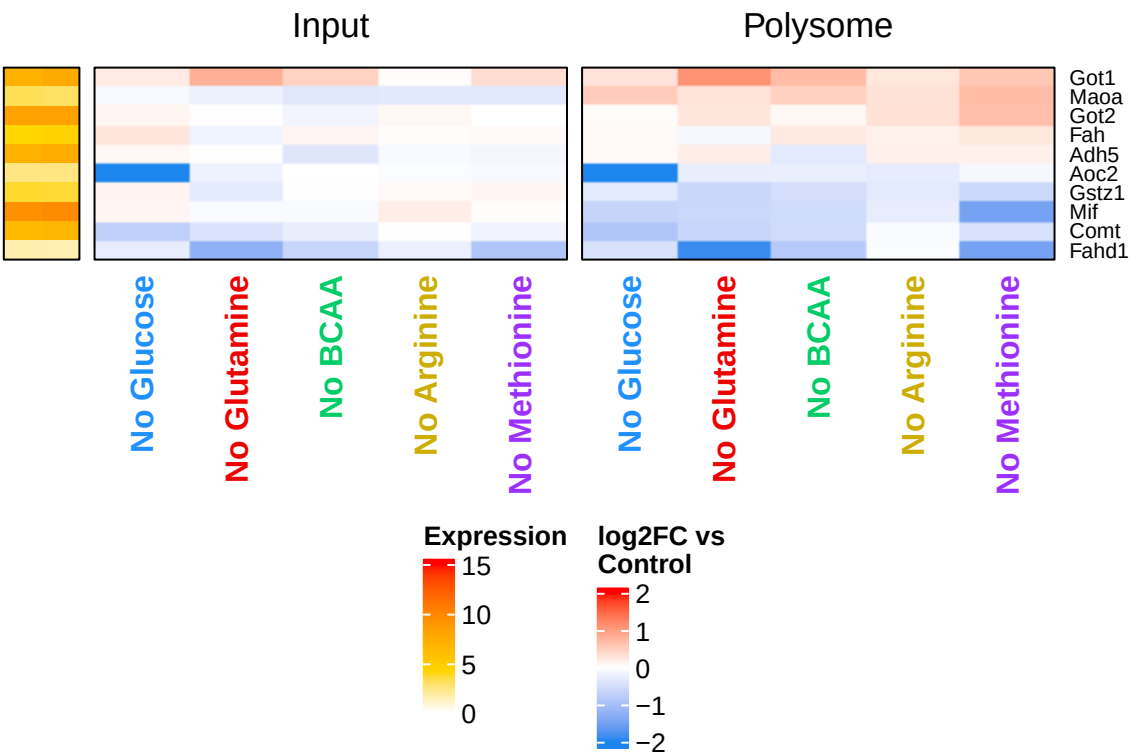
# TNF signaling pathway



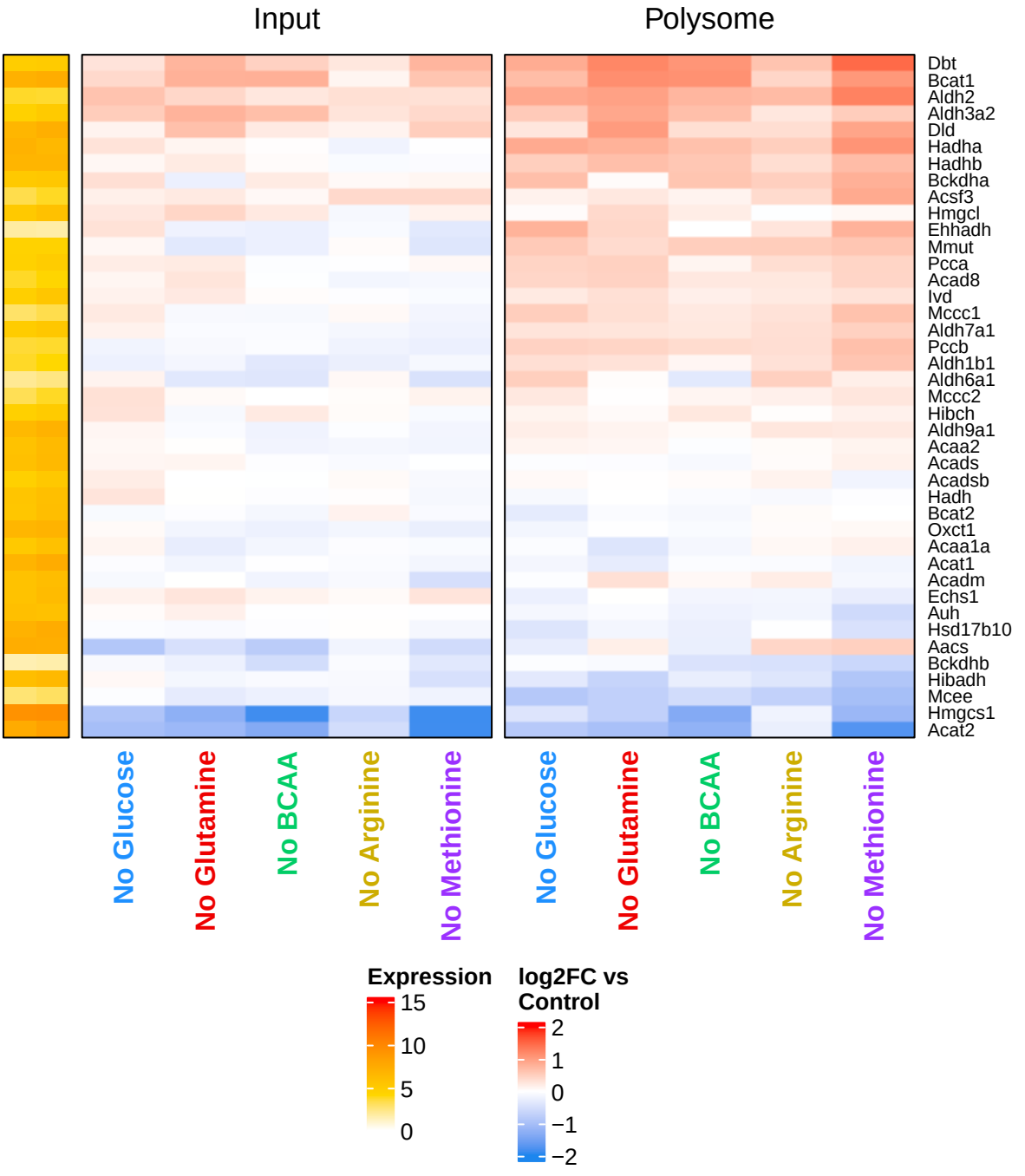
# tRNA aminoacylation



# Tyrosine metabolism



# Valine, leucine and isoleucine degradation



# Wnt signaling pathway