

Supplemental information 3 List of Reactions Added from References:

Protein name	Reaction	Gene Name	Gene Locus	Reference
Lysine Catabolism				
Lysine monooxygenase	LYS + O ₂ -> AVALAM + CO ₂ + H ₂ O	<i>davB</i>	PP0383	Revelles et al. 2005
Aminovaleramide amidohydrolase	AVALAM + H ₂ O <-> AVAL + NH ₃	<i>davA</i>	PP0382	
Aminovalerate aminotransferase	AVAL + AKG <-> GLRSAH + GLU	<i>davT</i>	PP0214	
Glutaric semialdehyde dehydrogenase	GLRSAH + NAD -> GLR + NADH	<i>davD</i>	PP0213	
	GLR + ATP + COA -> GCOA + ADP + PI			
	DLYS + AKG -> AMOHEX + DAA		PP3590	
	AMOHEX <-> PIPD2CAR			
	PIPD2CAR + NADPH <-> PIPC + NADP		PP3591	
L-Pipecolate oxidase	PIPC + O ₂ -> PIPD6CAR + H ₂ O ₂		PP5257	
	PIPD6CAR <-> AMADIPSAH			
Peperideine-6-Carboxylate dehydrogenase	AMADIPSAH + NAD -> AMADIP + NADH		PP5258	
	AMADIP + AKG <-> OAP + GLU			
Valine and Leucine Catabolism				
2-oxoisovalerate dehydrogenase	4MOP + COA + NAD -> MCTCOA + CO ₂ + NADH			
methylcrotonoyl-CoA carboxylase	MCTCOA + ATP + CO ₂ -> MGLUCOA + ADP + PI			
methylglutaconyl-CoA hydratase	MGLUCOA -> H3MCOA			
2-oxoisovalerate dehydrogenase	OIVAL + COA + NAD -> 2MPECOA + CO ₂ + NADH			
3-hydroxyisobutyryl-CoA hydrolase	HDXBUTCOA -> HIBUT + COA			
2-oxoisovalerate dehydrogenase	3MOP + COA + NAD -> 2MBECOA + CO ₂ + NADH			
Glucose uptake network				
Glucose dehydrogenase	GLCXt + H ₂ O -> GLUCXt	<i>Gcd</i>	PP1444	del Castillo et al. 2007
Gluconate dehydrogenase	GLUCXt -> KDGxt + H ₂ O	<i>Gad</i>	PP3383	
2-Ketogluconate transporter	KDGxt -> KDG	<i>KguT</i>	PP3377	
2-Ketogluconate kinase	K6PG + NADPH -> D6PGC + NADP	<i>kguD</i>	PP3376	
Aromatic Degradative pathways				
coniferyl alcohol:NADP+ oxidoreductase	CONOL + NADP -> CONAL + NADPH			Jimenez et al. 2002
coniferyl alcohol:NADP+ oxidoreductase	CONAL + NAD -> FER + NADH			
Coniferyl aldehyde:NADP+ oxidoreductase (CoA-cinnamoylating)	CONAL + CoA + NADP -> FERCOA + NADPH			
Ferulate:CoA ligase (AMP-forming)	ATP + FER + COA -> AMP + PPI + FERCOA			Plaggenborg et al 2003
	FERCOA -> VN + COA			
nonenzyme	COUMT -> COUM			
4-Hydroxy-3-methoxybenzoate:oxygen oxidoreductase	VN + O ₂ + NADH -> VNL + NAD + H ₂ O			
	CAFF -> DHBZ	<i>fcs ech vdh</i>	PP_3356 PP_3358 PP_3357	
	CMAR -> 4HBZ	<i>fcs ech vdh</i>	PP_3356 PP_3358 PP_3357	
phenylacetyl-CoA ligase	ATP + PHEACT + COA -> AMP + PPI + 4PHEACCOA	<i>phaE</i>	PP_3279	
	4C2HMUCSAH + H ₂ O -> 4C2O4PENT + FORM			UMBBD
	4C2HMUCSAH + NADP + H ₂ O -> 4C2HMUC + NADPH + H			UMBBD
	4H4M2OGLUT -> 2 PYR			UMBBD
	4C4H2OADIP -> PRY + OA			UMBBD

Miscellaneous pathways

2-methylisocitrate dehydratase	MICIT <-> H2O + MACO	<i>acnM</i>	PP_2336	Ewering et al 2006
Gallic acid dioxygenase	GALL + O2 -> 2 Hxt + 4C2O3HD	<i>galA-kt</i>	PP_2518	Nogales et al 2005
4-oxalmesaconate isomerase	4C2O3HD <-> 4OMC			
4-oxalmesaconate hydratase	H2O + 4OMC -> 4C4H2OADIP			
4-oxalcitromalate aldolase	4C4H2OADIP -> OAA + PYR			
Oxoarginine decarboxylase	GOP + Hxt -> CO2 + GBAL	<i>araI</i>	PP_3723	Fan and Rodwell 1975
nicotinate:NADP+ 6-oxidoreductase (hydroxylating)	NAC + NADP -> HNAC + NADPH	<i>nicAB</i>	PP_3947 PP_3948	
6-Hydroxynicotinate, hydrogen-donor:oxygen oxidoreductase	O2 + 2 HNAC -> 2 DHPY + 2 CO2	<i>nicC</i>	PP_3944	
Maleate cis-trans-isomerase	MALE -> FUM	<i>nicE</i>		
2,5-Dihydroxypyridine:oxygen 5,6-oxidoreductase	DHPY + O2 -> NFM	<i>nicX</i>	PP_3945	Jimenez et al. 2008
	NFM -> MALEM + FORM	<i>nicD</i>	PP_3943	
Aspartate oxidase	ASP + FUM -> IMNASP + SUCC	<i>nadB</i>	PP1426	Foster and Moat 1980
FMN dependent alkanesulfonate monooxygenase	HETHSLF + FMNH2 + O2 -> GLAL + FMN + Hxt + H2O + SLF	<i>ssuD</i>	PP_0238	
FMN dependent alkanesulfonate monooxygenase	MSLF + FMNH2 + O2 -> FALD + FMN + Hxt + H2O + SLF	<i>ssuD</i>	PP_0238	
FMN dependent alkanesulfonate monooxygenase	ETHSLF + FMNH2 + O2 -> ACAL + FMN + Hxt + H2O + SLF	<i>ssuD</i>	PP_0238	
	5 GLY + UPPMN(GN)LADGNMDDADA -> UPPMN(GN)LADGNMD(G)SDADA			
	PPEPTIDO + DALA -> PEPTIDO + DALAxt			
	DB4P + A6RP -> D8RL + PI			
	A6RP5P2 -> A6RP + PI			
	RL5P -> DB4P + FORM			
	GLAL + NAD -> NADH + GLYCOLATE			
	SAH -> HCYS + ADN			
	HEPPP + IPP -> OPP + PPI			
	DTMP + ATP <-> DTDp + ADP			
	HISOLP -> PI + HISOL			
	PNT0 + ATP -> ADP + 4PPNT0			
	ASP -> CO2 + bALA			
	IPP <-> DMPP			
	FPP + IPP -> GGPP + PPI			
	GGPP + IPP -> PPPP + PPI			
	PPPP + IPP -> HPPP + PPI			
	HPPP + IPP -> HEPPP + PPI			

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Ewering, C., et al., (2006) Metabolic engineering of strains of *Ralstonia eutropha* and *Pseudomonas putida* for biotechnological production of 2-methylcitric acid. *Metab Eng* 8: 587-602.

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