**Supplemental Table 11.** Gene designations, functions and protein identifiers for key enzyme systems known to be or potentially involved in methylotrophy

Gene name Protein/ function Protein identifiers JLW8 301 SIP3-4

***Methanol oxidation***

*mxaF* MDH large subunit - - Msip34\_0734

*mxaJ*  essential for MDH function - - Msip34\_0735

*mxaG* cytochrome, electron acceptor from MDH - - Msip34\_0736

*mxaI* MDH small subunit - - Msip34\_0737

*mxaR* chaperonin Mmol\_1107 M301\_1093 Msip34\_0738

Mmol\_1541 M301\_2233 Msip34\_0870

- - Msip34\_2692

*mxaS*  unknown Mmol\_1106 M301\_1092 Msip34\_0739

Mmol\_1542 M301\_2232 Msip34\_0869

- - Msip34\_2693

*mxaA* essential for Ca2+ insertion into MDH Mmol\_1105 M301\_1091 Msip34\_0740

Mmol\_1543 M301\_2231 Msip34\_0868

- - Msip34\_2694

*mxaC* essential for Ca2+ insertion into MDH Mmol\_1104 M301\_1090 Msip34\_0741

Mmol\_1544 M301\_2230 Msip34\_0867

- - Msip34\_2695

*mxaK* essential for Ca2+ insertion into MDH Mmol\_1103 M301\_1089 Msip34\_0742

Mmol\_1545 M301\_2229 Msip34\_0866

- - Msip34\_2696

*mxaL* essential for Ca2+ insertion into MDH Mmol\_1102 M301\_1088 Msip34\_0743

Mmol\_1546 M301\_2228 Msip34\_0865

- - Msip34\_2697

*mxaD* unknown - - Msip34\_0744

*xoxF* MxaF homolog Mmol\_1770 M301\_1208 Msip34\_0016

Mmol\_2048 M301\_2463 Msip34\_2348

- - Msip34\_2549

- M301\_1659 Msip34\_1813

*xoxJ* MxaJ homolog Mmol\_2047 M301\_2462 Msip34\_2347

*xoxG* MxaG homolog Mmol\_2045 M301\_2459 Msip34\_2346

Mmol\_2046 - -

- M301\_2460 -

- M301\_2461 -

- - Msip34\_0015

- - Msip34\_2345

***Pyrroloquinoline quinone (PQQ) biosynthesis***

*pqqA* PQQ synthesis Mmol\_0021 M301\_0054 Msip34\_0020

Mmol\_0459 M301\_1191 Msip34\_1529

Mmol\_0794 M301\_2123 Msip34\_2759

Mmol\_0993 M301\_2651 Msip34\_2777

*pqqB* PQQ synthesis Mmol\_0994 M301\_1192 Msip34\_1528

*pqqC* PQQ synthesis Mmol\_0995 M301\_1193 Msip34\_1527

*pqqD* PQQ synthesis Mmol\_0996 M301\_1194 Msip34\_1596

*pqqE* PQQ synthesis Mmol\_0997 M301\_1195 Msip34\_1525

*pqqF* PQQ synthesis Mmol\_1750 M301\_2041 Msip34\_1921

*pqqG* PQQ synthesis Mmol\_1751 M301\_2042 Msip34\_1922

***Methylamine oxidation (methylamine dehydrogenase, MADH)***

*mauF* unknown Mmol\_1576 - -

*mauB*  MADH large subunit Mmol\_1575 - -

*mauE* essential for small subunit maturation Mmol\_1574 - -

*mauD* essential for small subunit maturation Mmol\_1573 - -

*mauA* MADH small subunit Mmol\_1572 - -

*mauG* TTQ biosynthesis Mmol\_1571 - -

*mauL* unknown Mmol\_1570 - -

*mauM* unknown Mmol\_1569 - -

*mauN* unknown Mmol\_1568 - -

*mauO* cytochrome Mmol\_1567 - -

***Methylamine oxidation (N-methylglutamate pathway)***

*mgdA* N-methylglutamate DH sub. A - M301\_1421 Msip34\_2428

*mgdB* N-methylglutamate DH sub. B - M301\_1420 Msip34\_2427

*mgdC* N-methylglutamate DH sub. C - M301\_1419 Msip34\_2426

*mgdD* N-methylglutamate DH sub. D - M301\_1418 Msip34\_2425

gma g-glutamylmethylamide synthase - M301\_1417 Msip34\_2424

*mgsA* N-methylglutamate synthase sub. A - M301\_1416 Msip34\_2423

*mgsB* N-methylglutamate synthase sub. B - M301\_1415 Msip34\_2422

*mgsC* N-methylglutamate synthase sub. C - M301\_1414 Msip34\_2421

***H4MPT-linked formaldehyde oxidation***

*fhcB* Fhc, subunit B Mmol\_0862 M301\_0913 Msip34\_1506

*fhcA* Fhc, subunit A Mmol\_0861 M301\_0912 Msip34\_1507

orf FMN-binding protein Mmol\_0860 M301\_0911 -

*fhcD* Fhc, subunit D Mmol\_0859 M301\_0910 Msip34\_1508

*fhcC* Fhc, subunit C Mmol\_0858 M301\_0909 Msip34\_1509

*mptG* -RFAP synthase Mmol\_1347 M301\_1557 Msip34\_1505

*mtdB* methylene H4MPT dehydrogenase Mmol\_1346 M301\_1556 Msip34\_1504

*orfY* unknown Mmol\_1345 M301\_1555 Msip34\_1503

*mch* methenyl H4MPT cyclohydrolase Mmol\_1344 M301\_1554 Msip34\_1502

*orf5* biosynthesis of H4MPT Mmol\_1343 M301\_1553 Msip34\_1501

*orf7*  unknown Mmol\_1342 M301\_1552 Msip34\_1500

*fae*  formaldehyde activating enzyme Mmol\_1253 M301\_0896 Msip34\_1495

Mmol\_2056 M301\_1343 Msip34\_1496

*orf17* unknown Mmol\_1336 M301\_1545 Msip34\_1494

*orf1* unknown Mmol\_1335 M301\_1544 Msip34\_1493

*orf9* biosynthesis of H4MPT Mmol\_1334 M301\_1543 Msip34\_1492

*pabB* para-aminobenzoate synthase component I Mmol\_1333 M301\_1542 Msip34\_1491

*orf21* biosynthesis of H4MPT Mmol\_1332 M301\_1541 Msip34\_1490

*pcbD* unknown Mmol\_1331 M301\_1540 Msip34\_1489

*orf22* biosynthesis of H4MPT Mmol\_0899 M301\_0953 Msip34\_1682

*orf19* biosynthesis of H4MPT Mmol\_0898 M301\_0952 Msip34\_1683

*orf20* biosynthesis of H4MPT Mmol\_0897 M301\_0951 Msip34\_1684

*afp* dihydromethanopterin reductase Mmol\_0896 M301\_0950 Msip34\_1685

*fae2* formaldehyde activating enzyme homolog Mmol\_0024 M301\_2758 Msip34\_2608

*fae3*  formaldehyde activating enzyme homolog - M301\_1423 Msip34\_2416

***Formate oxidation***

*fdh1A* FDH1, dehydrogenase alpha subunit Mmol\_2033 M301\_2447 Msip34\_1179

*fdh1B* FDH1, beta subunit Mmol\_2034 M301\_2448 Msip34\_1178

*fdh1C* FDH1, gamma subunit Mmol\_2035 M301\_2449 Msip34\_1177

*fdh1D* FDH1, accessory protein Mmol\_2032 M301\_2446 Msip34\_1180

*fdh1E* FDH1, delta subunit Mmol\_2031 M301\_2445 Msip34\_1181

*fdh4A* FDH4, dehydrogenase alpha subunit Mmol\_0470 - Msip34\_1600

*fdh4B* FDH4-associated protein Mmol\_0469 - Msip34\_1599

***Ribulose monophosphate cycle for formaldehyde assimilation/oxidation***

*hps1* hexulosephosphate synthase Mmol\_0313 M301\_0304 Msip34\_0268

*hps2* Mmol\_1338 M301\_1547 Msip34\_1498

*hpi* hexulosephosphate isomerase Mmol\_1337 M301\_1546 Msip34\_1497

*tal* transaldolase Mmol\_1339 M301\_1548 Msip34\_1499

*pgi* glucose 6-phosphate isomerase Mmol\_0827 M301\_1501 Msip34\_1269

*zwf* glucose 6-phosphate dehydrogenase Mmol\_1527 M301\_1112 Msip34\_1093

*pgl* 6-phosphogluconolactonase Mmol\_1526 M301\_1114 Msip34\_1095

*gndA* 6-phosphogluconate dehydrogenase (NAD) - - Msip34\_1094

*gndB* 6-phosphogluconate dehydrogenase (NADP) Mmol\_0143 M301\_2666 -

*edd* 6-phosphogluconate dehydratase Mmol\_1727 M301\_2019 Msip34\_1897

*eda* 2-keto 3-deoxy 6-phosphogluconate aldolase Mmol\_1726 M301\_2018 Msip34\_1896

*tkt* transketolase Mmol\_1980 M301\_2400 Msip34\_0483

*rpe* ribulosephosphate 3-epimerase Mmol\_2239 M301\_2582 Msip34\_2516

*ppi* ribose 5-phosphate isomerase Mmol\_0287 M301\_0182 Msip34\_0164

Mmol\_1429 M301\_1566 Msip34\_1138

***Methylcitric acid cycle***

*prpD* Methylcitrate dehydratase Mmol\_0748 M301\_0686 -

*prpC* Methylcitrate synthase Mmol\_0749 M301\_0687 -

*prpB* Methylisocitrate lyase Mmol\_0750 M301\_0688 -

*cyl1* Citrate lyase-like Mmol\_0751 M301\_0689 -

*maoC* Dehydratase Mmol\_0752 M301\_0690 -

*cyl2* Citrate lyase-like Mmol\_0753 M301\_0691 -

*gntR* Transcriptional regulator Mmol\_0754 M301\_0692 -

*mdh* Malate dehydrogenase Mmol\_0756 M301\_0693 Msip34\_2203

*sdhC* Succinate dehydrogenase, C subunit Mmol\_0757 M301\_0694 -

*sdhD* Succinate dehydrogenase, D subunit Mmol\_0758 M301\_0695 -

*sdhA* Succinate dehydrogenase, A subunit Mmol\_0759 M301\_0696 -

*sdhB* Succinate dehydrogenase, B subunit Mmol\_0760 M301\_0697 -

*orf* Hypothetical protein Mmol\_0761 M301\_0698 -

*cyl3* Citrate lyase-like Mmol\_0762 M301\_0699 -

*prpE* Propionyl-CoA synthase Mmol\_0763 M301\_0700 -

*fum* Fumarase Mmol\_0764 M301\_0701 -

*orf* Hypothetical protein Mmol\_0765 M301\_0702

*acn* Aconitate hydratase Mmol\_0766 M301\_0703 -

MDH, methanol dehydrogenase; H4MPT, tetrahydromethanopterin;-RFAP, -ribofuranosylaminobenzene.