##### 5-aminoimidazole ribonucleotide biosynthesis I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *purF* | 2.4.2.14 | + | + | + |
| *purD* | 6.3.4.13 | + | + | + |
| *purN* | 2.1.2.2 | + | + | + |
| *purL* | 6.3.5.3 | + | + | + |
| *PurM* | 6.3.3.1 | + | + | + |

purN, phosphoribosylglycinamide formyltransferase 1.

[an *N*10-formyl-tetrahydrofolate + *N*1-(5-phospho-β-D-ribosyl)glycinamide ↔ a tetrahydrofolate + *N*2-formyl-*N*1-(5-phospho-β-D-ribosyl)glycinamide + H+](http://metacyc.org/META/NEW-IMAGE?type=REACTION&object=GART-RXN)

##### 5-aminoimidazole ribonucleotide biosynthesis II

Not present in S.mutans UA159 and S.pneumonia Tigr4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *purF* | 2.4.2.14 | + | + | + |
| *purD* | 6.3.4.13 | + | + | + |
| *purT* | 2.1.2.- | + | - | - |
| *purL* | 6.3.5.3 | + | + | + |
| *PurM* | 6.3.3.1 | + | + | + |

purT, phosphoribosylglycinamide formyltransferase 2.

N1-(5-phospho-β-D-ribosyl)glycinamide + formate + ATP → N2-formyl-N1-(5-phospho-β-D-ribosyl)glycinamide + ADP + phosphate + H+ acetate + ATP ↔ acetyl phosphate + ADP

##### formate reduction to 5,10-methylenetetrahydrofolate

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *fthS, fhs* | 6.3.4.3 | - | SMU\_1073 | SP\_1229 |
| *folD* | 3.5.4.9 | b0529 | SMU\_572 | SP\_0825 |
| *folD* | 1.5.1.5 | b0529 | SMU\_572 | SP\_0825 |
|  |  |  |  |  |

##### glycine biosynthesis I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *glyA* | 2.1.2.1 | b2551 | SMU\_1082 | SP\_1024 |
|  |  |  |  |  |

##### superpathway of L-serine and glycine biosynthesis I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *glyA* | 2.1.2.1 | b2551 | SMU\_1082 | SP\_1024 |
| *serA* | 1.1.1.95 | b2913 | SMU\_1653 | - |
| *serB* | 3.1.3.3 | b4388 | SMU\_1269 | WP\_001808482.1 |
| *serC* | 2.6.1.52 | b0907 | SMU\_1656 | - |

##### inosine-5'-phosphate biosynthesis I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *purK* | 6.3.4.18 | B0522 | NP\_720534.1  | WP\_000099054.1 |
| *purE* | 5.4.99.18 | B0523 | NP\_720533.1 | WP\_000805601.1 |
| *purC* | 6.3.2.6 | B2476 | SMU\_29 | SP\_0044 |
| *purB* | 4.3.2.2 | B1131 | SMU\_59 | SP\_0056 |
| *purH* | 2.1.2.3; 3.5.4.10 | B4006 | SMU\_37 | SP\_0050 |

##### L-homoserine and L-methionine biosynthesis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *metL* | 2.7.2.4;  | B3940 | SMU\_1748 | SP\_0413 |
| *metL* | 1.1.1.3; | B3940 | SMU\_965 | SP\_1361 |
| *asd* | 1.2.1.11 | B3433 | SMU\_989 | SP\_1013 |
| *metB* | 2.5.1.48 | B3939 | SMU\_1675 | SP\_1525 |
| *metA* | 2.3.1.46 | B4013 | SMU\_1466 | SP\_1576 |
| *metC* | 4.4.1.8 | B3008 | - | - |
| *malY* | 4.4.1.8 | B1622 | - | - |
| *metE(metH)* | 2.1.1.14 | B3829(B4019) | SMU\_873 | SP\_0585 |
| *metH* | 2.1.1.13 | B4019 | SMU\_873 | SP\_0585 |

##### N10-formyl-tetrahydrofolate biosynthesis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *metH* | 2.1.1.13 | B4019NP\_418443 | SMU\_952 | SP\_0585 |
| *folM* | 1.5.1.3 | B1616NP\_416123 | SMU\_947(*drfA*) | SP\_1571 |
| *folA* | 1.5.1.3 | B0048NP\_414590 | NP\_721345.1  | WP\_000162484.1 |
| *thyA* | 2.1.1.45 | B2827NP\_417304 | SMU\_944 | SMU\_0669 |
| *glyA* | 2.1.2.1 | B2551NP\_417046 | SMU\_1082 | SP\_1024 |
| *lpd* |  | B0116NP\_414658 | NP\_720603.1 | WP\_001162908.1 |
| *gcvP* |  | B2903NP\_417379 | - | - |
| *gcvH* |  | B2904NP\_417380 | - | - |
| *gcvT* |  | B2905NP\_417381 | - | - |
| *metF* | 1.5.1.20 | B3941NP\_418376 | SMU\_874(not ortholog) | WP\_000089968.1 |
| *folD* | 1.5.1.5 | B0529NP\_415062 | SMU\_572NP\_721007.1 | WP\_000192090.1 |
| *folD* | 3.5.4.9 | B0529 | SMU\_572 | WP\_000192090.1 |
| *fau* | 6.3.3.2 | B2912NP\_417387 | SMU\_320 | WP\_000834312.1 |
|  | 6.3.2.12 | - | - | SP\_0197NP\_344737.1 |
|  | 6.3.2.12 | - | - | SP\_0290NP\_344828.1 |

##### pantothenate and coenzyme A biosynthesis I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *panB* | 2.1.2.11 | B0134NP\_414676 | - | - |
| *ilvC* | 1.1.1.169 | B3774NP\_418222 | NP\_720698.1 | WP\_000218054.1 |
| *panE* | 1.1.1.169 | B0425NP\_414959 | - | - |
| *panC* | 6.3.2.1 | B0133NP\_414675 | - | - |
| *coaA* | 2.7.1.33 | B3974NP\_418405 | NP\_721513.1 | WP\_000180487.1 |
| *dfP* | 6.3.2.5 | B3639NP\_418096 | NP\_721467.1 | WP\_001284128.1 |
| *dfp* | 4.1.1.36 | B3639NP\_418096 | NP\_721467.1 | WP\_001284128.1 |
| *coaD* | 2.7.1.3 | B3634NP\_418091 | NP\_720955.1 | WP\_001280753.1 |
| *coaE* | 2.7.1.24 | B0103NP\_414645 | NP\_721948.1 | WP\_000516207.1 |

##### polymyxin resistance

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *amA* | 1.1.1.305 | B2255NP\_416758 | - | - |
| *amA* | 2.1.2.13 | B2255NP\_416758 | - | - |
| *amB* | 2.6.1.87 | B2253NP\_416756 | - | WP\_001134540.1 |
| *amC* | 2.4.2.53 | B2254NP\_416757 | - | - |
| *amT* | 2.4.2.43 | B2257NP\_416760 | - | - |

##### pyrimidine deoxyribonucleosides salvage

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *cdd* | 3.5.4.5 | NP\_416648.1 | SMU\_1122NP\_721509.1 | WP\_000246086.1?? |
| *kitH* | 2.7.1.21; 2.7.1.145 | NP\_415754.1 | SMU\_1086NP\_721478.1 | WP\_000068144.1 |
| *thyA* | 2.1.1.45 | B2827NP\_417304 | SMU\_944 | SP\_0669 |
|  | 2.7.1.74 |  |  |  |
|  |  |  |  |  |

##### pyrimidine deoxyribonucleotides biosynthesis from CTP

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
|  | 3.6.1.15 | - | - | - |
| *nrdG* | 1.17.4.1 | NP\_417162.1 | SMU\_667NP\_721095.1 | WP\_000451370.1 |
|  | 1.17.4.1 | NP\_417161.1 | SMU\_668cNP\_721096.1 | WP\_000523249.1 |
|  | 1.17.4.1 | - | SMU\_991NP\_721386.1 | WP\_001196049.1 |
|  | 3.6.1.6 | - | - | - |
| *comEB* | **3.5.4.12** |  | **SMU\_1849****NP\_722165.1** | **WP\_000136976.1** |
| *thyA* | 2.1.1.45 | B2827NP\_417304 | SMU\_944 | SP\_0669 |
| *kthY* | 2.7.4.9; 2.7.4.12; 2.7.4.13 | NP\_415616.1 | SMU\_1663NP\_721996.1 | WP\_000033362.1 |
| *ndK* | 2.7.4.6 | NP\_417013.1 |  | WP\_000438289 |

##### pyrimidine deoxyribonucleotides de novo biosynthesis I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *nrdA* | 1.17.4.1 | B2234NP\_416737 | - | - |
| *nrdB* | 1.17.4.1 | B2235NP\_416738 | - | - |
| *ndk* | 2.7.4.6 | B2518NP\_417013 | - | WP\_000438289.1 |
| *nudL* | 3.6.1.19; 3.6.1.23 | B2251NP\_416754 | - | - |
| *dut* | 3.6.1.19; 3.6.1.23 | B3640NP\_418097 | NP\_720778.1 | WP\_000701992.1 |
| *mazG* | 3.6.1.19; 3.6.1.23 | B2781NP\_417261 | - | - |
| *thyA* | 2.1.1.45 | B2827NP\_417304 | SMU\_944 | SP\_0669 |
| *tmk* | 2.7.4.9; 2.7.4.12; 2.7.4.13 | B1098NP\_415616 | NP\_721996.1 | WP\_000033362.1 |

##### pyrimidine deoxyribonucleotides de novo biosynthesis II

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *nrdD* | 1.17.4.2 | B4238 | SMU\_991 | SP\_0202 |
| *dcd* | 3.5.4.13 | B2065 | - | SP\_0744(Not ortholog) |
| *nudL* | 3.6.1.19; 3.6.1.23 | B2251NP\_416754 | - | - |
| *dut* | 3.6.1.19; 3.6.1.23 | B3640NP\_418097 | NP\_720778.1 | WP\_000701992.1 |
| *mazG* | 3.6.1.19; 3.6.1.23 | B2781NP\_417261 | - | - |
| *thyA* | 2.1.1.45 | B2827NP\_417304 | SMU\_944 | SMU\_0669 |
| *tmk* | 2.7.4.9; 2.7.4.12; 2.7.4.13 | B1098NP\_415616 | NP\_721996.1 | WP\_000033362.1 |
|  |  |  |  |  |

##### S-adenosyl-L-methionine cycle I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Gene name | EC | *E.coli* MG1655 | *S.mutans* UA159 | *S.pneumonia* Tigr4 |
| *metK* | 2.5.1.6 | B2942 | SMU\_1573 | SP\_0762 |
|  | 2.1.1.- |  |  |  |
| *mtn* | 3.2.2.9 | B0159NP\_414701 | SMU\_1632(pfs)NP\_721966.1 | SP\_0991WP\_000689766.1 |
| *luxS* | 4.4.1.21 | B2687 | SMU\_474 | SP\_0340 |
| *metE(metH)* | 2.1.1.14 | B3829(B4019) | SMU\_873 | SP\_0585 |
| *metH* | 2.1.1.13 | B4019 | SMU\_952 | SP\_0585 |