

| Locus | Annotation | Gene | |
|---|---|--|-------------|
| cronobactin | iron-chelator utilization protein | <i>viuB</i> | |
| | Putative membrane protein | <i>shiF</i> | |
| | Citrate:6-N-acetyl-6-N-hydroxy-L-lysine ligase, alpha subunit (EC 6.3.2.27), aerobactin biosynthesis protein lucA @ Siderophore synthetase superfamily, group A @ Siderophore synthetase large component, acetyltransferase | <i>iucA</i> | |
| | N6-hydroxylysine O-acetyltransferase (EC 2.3.1.102), aerobactin biosynthesis protein lucB @ Siderophore synthetase small component, acetyltransferase | <i>iucB</i> | |
| | Citrate:6-N-acetyl-6-N-hydroxy-L-lysine ligase, alpha subunit (EC 6.3.2.27), aerobactin biosynthesis protein lucA @ Siderophore synthetase superfamily, group C @ Siderophore synthetase component, ligase | <i>iucC</i> | |
| | L-lysine 6-monooxygenase [NADPH] (EC 1.14.13.59), aerobactin biosynthesis protein lucD @ Siderophore biosynthesis protein, monooxygenase | <i>iucD</i> | |
| | Aerobactin siderophore receptor lutA/TonB-dependent siderophore receptor | <i>iutA</i> | |
| | 4'-phosphopantetheinyl transferase (EC 2.7.8.-) | <i>entD</i> | |
| | TonB-dependent receptor; Outer membrane receptor for ferric enterobactin and colicins B, D | <i>fepA</i> | |
| | Enterobactin esterase | <i>fes</i> | |
| enterobactin | FIG005032: Putative cytoplasmic protein YbdZ | <i>ybdZ</i> | |
| | Enterobactin synthetase component F, serine activating enzyme (EC 2.7.7.-) | <i>entF</i> | |
| | Ferric enterobactin uptake protein FepE | <i>fepE</i> | |
| | Proofreading thioesterase in enterobactin biosynthesis EntH | <i>entH</i> | |
| | 2,3-dihydro-2,3-dihydroxybenzoate dehydrogenase (EC 1.3.1.28) | <i>entA</i> | |
| | Isochorismatase (EC 3.3.2.1)/ Apo-aryl carrier domain of EntB | <i>entB</i> | |
| | 2,3-dihydroxybenzoate-AMP ligase (EC 2.7.7.58) | <i>entE</i> | |
| | Isochorismate synthase (EC 5.4.4.2) | <i>entC</i> | |
| | Ferric enterobactin-binding periplasmic protein FepB (TC 3.A.1.14.2) | <i>fepB</i> | |
| | Enterobactin exporter EntS | <i>entS</i> | |
| | Ferric enterobactin transport system permease protein FepD (TC 3.A.1.14.2) | <i>fepD</i> | |
| | Ferric enterobactin transport system permease protein FepG (TC 3.A.1.14.2) | <i>fepG</i> | |
| | Ferric enterobactin transport ATP-binding protein FepC (TC 3.A.1.14.2) | <i>fepC</i> | |
| | Fhu transporter | Ferric hydroxamate outer membrane receptor FhuA | <i>fhuA</i> |
| | | Ferric hydroxamate ABC transporter (TC 3.A.1.14.3), ATP-binding protein FhuC | <i>fhuC</i> |
| | | Ferric hydroxamate ABC transporter (TC 3.A.1.14.3), periplasmic substrate binding protein FhuD | <i>fhuD</i> |
| Ferric hydroxamate ABC transporter (TC 3.A.1.14.3), permease component FhuB | | <i>fhuB</i> | |
| Eit transporter | ABC transporter (iron.B12.siderophore.hemin) , ATP-binding component | <i>eitC</i> | |
| | ABC transporter (iron.B12.siderophore.hemin) , permease component | <i>eitB</i> | |
| | ABC transporter (iron.B12.siderophore.hemin) , periplasmic substrate-binding component | <i>eitA</i> | |
| | Transporter, MFS superfamily | <i>eitD</i> | |
| ferric dictrate | Probable RNA polymerase sigma factor <i>fecl</i> | <i>fecl</i> | |
| | heme uptake transmembrane sensor | <i>fecR</i> | |
| | Vibrio ferrin receptor PvuA | <i>fecA</i> | |
| | Fe-bacillibactin uptake system FeuA, Fe-bacillibactin binding | <i>fecB</i> | |
| | Iron(III) dictrate transport system permease protein <i>fecC</i> (TC 3.A.1.14.1) | <i>fecC</i> | |

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|---------------------|--|-------------|
| | Fe-bacillibactin uptake system FeuB | <i>fecD</i> |
| | Fe-bacillibactin uptake system FeuD | <i>fecE</i> |
| Feo | Ferrous iron transport protein A | <i>feoA</i> |
| | Ferrous iron transport protein B | <i>feoB</i> |
| | Ferrous iron-sensing transcriptional regulator FeoC | <i>feoC</i> |
| Efe | Ferrous iron transport permease EfeU | <i>efeU</i> |
| | Ferrous iron transport periplasmic protein EfeO, contains peptidase-M75 domain and (frequently) cupredoxin-like domain | <i>efeO</i> |
| | Ferrous iron transport peroxidase EfeB | <i>efeB</i> |
| Ferric reductase | Ferric reductase (1.6.99.14) | <i>fhuF</i> |
| TonB receptors | Ferrichrome-iron receptor | <i>fcuA</i> |
| | Ferrichrome-iron receptor | <i>fcT</i> |
| | Probable tonB-dependent receptor <i>yncD</i> precursor | <i>yncD</i> |
| | Outer membrane vitamin B12 receptor BtuB | <i>btuB</i> |
| | Ferrichrome-iron receptor | <i>foxA</i> |
| | FhuE receptor precursor | <i>fhuE</i> |
| | Outer Membrane Siderophore Receptor, IroN | <i>pfeA</i> |
| Heme-iron extractor | Predicted iron-dependent peroxidase, Dyp-type family | <i>yfeX</i> |

^aLocus tag, with start and stop positions, are shown according to GenBank Accessions CP000783.1 (chromosome) and CP000785.1 (plasmid pESA3).

^bLocus tag, with start and stop positions, are shown according to GenBank Accessions FN543093.2 (chromosome) and FN543096.1 (plasmid pCTU1).

^cFirst number denotes last four digits of contig ID, second and third number represent nucleotide position of start and stop codons, respectively.

| Gene | <i>C. dub. dublinensis</i> LMG23823 | <i>C. dub. lactaridi</i> LMG23825 | <i>C. dub. lausanensis</i> LMG23824 |
|-------------|--|--|--|
| <i>viuB</i> | 1705 24790 23900 ^c | 2159 982 1869 | Not sequenced |
| <i>shiF</i> | 1705 25755 24787 | 2165 975 1166; 2159 1 985 | Not sequenced |
| <i>iucA</i> | 1705 26134 27882 | 2165 839 1; 2153 1 908 | Not sequenced |
| <i>iucB</i> | 1705 27875 28822 | 2153 901 1848 | Not sequenced |
| <i>iucC</i> | 1705 28819 30564 | 2153 1845 2806; 2179 1162 515 | Not sequenced |
| <i>iucD</i> | 1705 30561 31883 | 2179 518 1; 2183 1 366 | Not sequenced |
| <i>iutA</i> | 1705 31908 34103 | 2183 391 776; 2141 1 1755 | Not sequenced |
| <i>entD</i> | 1702 315855 315196 | 2516 193172 193831 | 4000 240536 241195 |
| <i>fepA</i> | 1702318164 315891 | 2516 190863 193136 | 4000 238227 240500 |
| <i>fes</i> | 1702 318445 319674 | 2516 190582 189353 | 4000 237946 236717 |
| <i>ybdZ</i> | 1702 319690 319911 | 2516 189337 189116 | 4000 236701 236480 |
| <i>entF</i> | 1702 319913 323818 | 2516 189114 185209 | 4000 236475 232573 |
| <i>fepE</i> | Not present | 2497 212765 211836 | Not present |
| <i>entH</i> | 1695 321728 321333 | 2504 7239 7634 | 3984 146459 146854 |
| <i>entA</i> | 1695 322499 321747 | 2504 6468 7220 | 3984 145688 146440 |
| <i>entB</i> | 1695 323365 322496 | 2504 5602 6471 | 3984 144822 145691 |
| <i>entE</i> | 1695 324979 323375 | 2504 3988 5592 | 3984 143208 144812 |
| <i>entC</i> | 1695 326155 324989 | 2504 2812 3978 | 3984 142032 143198 |
| <i>fepB</i> | 1695 326343 327302 | 2504 2624 1665 | 3984 141843 140884 |
| <i>entS</i> | 1695 328573 327329 | 2504 394 1638 | 3984 139613 140857 |
| <i>fepD</i> | 1695 328708 329688 | 2504 286 1; 2139 8314 7592 | 3984 139505 138498 |
| <i>fepG</i> | 1695 329712 330677 | 2139 7595 6603 | 3984 138501 137509 |
| <i>fepC</i> | 1965 330674 331465 | 2139 6606 5815 | 3984 137512 136721 |
| <i>fhuA</i> | 1700 480100 482298 | 2519 57977 55800 | 3982 60326 58134 |
| <i>fhuC</i> | 1700 482345 483142 | 2519 55753 54956 | 3982 58000 57290 |
| <i>fhuD</i> | 1700 483142 484038 | 2519 54956 54060 | 3982 57248 56394 |
| <i>fhuB</i> | 1700 484035 486020 | 2519 54063 52078 | 3982 56397 54412 |
| <i>eitC</i> | 1488 2882 2124 | 1488 2882 2124 | Not sequenced |
| <i>eitB</i> | 1488 3343 2879 | 1488 3857 2879 | Not sequenced |
| <i>eitA</i> | 1488 4925 3918 | 1488 4925 3918 | Not sequenced |
| <i>eitD</i> | 1488 5167 6008; 1491 1 353 | 1488 5167 6008; 1491 1 353 | Not sequenced |
| <i>fecl</i> | Not present | Not present | Not present |
| <i>fecR</i> | Not present | Not present | Not present |
| <i>fecA</i> | Not present | Not present | Not present |
| <i>fecB</i> | Not present | Not present | Not present |
| <i>fecC</i> | Not present | Not present | Not present |
| <i>fecD</i> | Not present | Not present | Not present |
| <i>fecE</i> | Not present | Not present | Not present |
| <i>feoA</i> | 1698 366650 366874 | 2518 29102 29326 | 4003 26405 26629 |
| <i>feoB</i> | 1698 366895 369216 | 2518 29347 31668 | 4003 26650 28971 |
| <i>feoC</i> | 1698 369216 369452 | 2518 31668 31904 | 4003 28971 29207 |

| | | | |
|-------------|--------------------|--------------------|------------------------------|
| <i>efeU</i> | 1702 714285 715115 | 2514 124245 123415 | 3997 362 1; 3996 61760 61288 |
| <i>efeO</i> | 1702 715172 716299 | 2514123358 122231 | 3996 61231 60104 |
| <i>efeB</i> | 1702 16305 17588 | 2514 122225 120942 | 3996 60098 58815 |
| <i>fhuF</i> | 1700 274968 274180 | 2520 57931 58719 | 3982 276324 277112 |
| <i>fcuA</i> | 1702 9049 6896 | 2516 493268 495421 | 4001 183157 185310 |
| <i>fcT</i> | 1709 11677 9527 | 2510 79804 77654 | 3989 116968 114818 |
| <i>yncD</i> | 1709 207728 209845 | 2512 92400 94517 | 3969 7686 5662 |
| <i>btuB</i> | 1693 96025 97878 | 2524 5905 4136 | 3978 92856 94709 |
| <i>foxA</i> | 1696 32336 34513 | 2508 149806 147629 | 3986 210835 208658 |
| <i>fhuE</i> | 1702 793439 791292 | 2514 47729 49930 | 3995 135840 137987 |
| <i>pfeA</i> | 1708 86059 83870 | 2509 8146 5957 | 3989 3238 1049 |
| <i>yfeX</i> | 1695 303400 302498 | 2504 27477 28379 | 3984 165646 166548 |

| Gene | <i>C. universalis</i> NCTC9529 | <i>C. malonaticus</i> LMG23826 | <i>C. muytjensii</i> ATCC51329 |
|-------------|---|---------------------------------------|---------------------------------------|
| <i>viuB</i> | 5492 4386 5273 | 4507 741 819; 4668 0 660 | Not present |
| <i>shiF</i> | 5492 3178 4389 | 4498 1310 1766; 4507 1 744 | Not present |
| <i>iucA</i> | 5492 3042 1291 | 4559 7641 7201 | Not present |
| <i>iucB</i> | 5492 1298 351 | 4559 7208 6261 | Not present |
| <i>iucC</i> | 5491 43876 42503 | 4559 6264 4519 | Not present |
| <i>iucD</i> | 5491 42506 41184 | 4559 4522 3200 | Not present |
| <i>iutA</i> | 5491 41161 38966 | 4559 3177 982 | Not present |
| <i>entD</i> | 5498 317628 316960 | 4692 107193 106489 | 5427 164818 164321 |
| <i>fepA</i> | 5498 319937 317664 | 4692 109469 107196 | 5427 167289 165016 |
| <i>fes</i> | 5498 320217 321461 | 4692 109748 110992 | 5427 167628 168800 |
| <i>ybdZ</i> | 5498 321465 321686 | 4692 110996 111217 | 5427 168816 169037 |
| <i>entF</i> | 5498 321688 325602 | 4692 111219 115136 | 5427 169039 172974 |
| <i>fepE</i> | 5495 466954 468096 | 4666 14668 13526 | 5441 264226 263207 |
| <i>entH</i> | 5500 152617 152222 | 4662 314648 314253 | 5439 156036 155623 |
| <i>entA</i> | 5500 153388 152636 | 4663 243 1; 4662 315161 314667 | 5439 156789 156037 |
| <i>entB</i> | 5500 154254 153385 | 4663 1079 210 | 5439 157655 156786 |
| <i>entE</i> | 5500 155868 154264 | 4663 2693 1089 | 5439 159269 157665 |
| <i>entC</i> | 5500 157045 155879 | 4663 3870 2704 | 5439 160449 159280 |
| <i>fepB</i> | 5500 157232 158191 | 4663 4059 5018 | 5439 160637 161596 |
| <i>entS</i> | 5500 159461 158217 | 4663 6288 5044 | 5439 162831 161623 |
| <i>fepD</i> | 5500 159617 160576 | 4663 6447 7403 | 5439 163026 163982 |
| <i>fepG</i> | 5500160615 161565 | 4663 7442 8392 | 5439 164072 164971 |
| <i>fepC</i> | 5500 161562 162353 | 4663 8395 9180 | 5439 164968 165759 |
| <i>fhuA</i> | 5497 269699 271891 | 4686 142371 144563 | 5425 120288 122525 |
| <i>fhuC</i> | 5497 271999 272736 | 4686 144611 145408 | 5425 122632 123369 |
| <i>fhuD</i> | 5497 272730 273632 | 4686 145408 146304 | 5425 123411 124265 |
| <i>fhuB</i> | 5497 273629 275614 | 4686 145316 147659; 4687 1 582 | 5425 124307 126247 |
| <i>eitC</i> | 5492 46043 | 4671 2337 2793 | Not present |
| <i>eitB</i> | 5492 45006 46046 | 4671 1302 2340 | Not present |
| <i>eitA</i> | 5492 43999 45006 | 4671 199 1302 | Not present |
| <i>eitD</i> | 5492 43692 42523 | 4671 55 1; 4670 2592 1888 | Not present |
| <i>fecI</i> | Not present | Not present | Not present |
| <i>fecR</i> | Not present | Not present | Not present |
| <i>fecA</i> | Not present | Not present | Not present |
| <i>fecB</i> | Not present | Not present | Not present |
| <i>fecC</i> | Not present | Not present | Not present |

| | | | |
|-------------|----------------------|--------------------|--------------------|
| <i>fecD</i> | Not present | Not present | Not present |
| <i>fecE</i> | Not present | Not present | Not present |
| <i>feoA</i> | 5494 615911 615687 | 4666 518379 518603 | 5420 110786 110562 |
| <i>feoB</i> | 5494 615660 613345 | 4666 518630 520945 | 5420 110541 108220 |
| <i>feoC</i> | 5494613345 613109 | 4666 520945 521181 | 5420 108220 107984 |
| <i>efeU</i> | 5499 354892 355722 | 4693 52208 53038 | 5429 23580 24410 |
| <i>efeO</i> | 5499 355778 356905 | 4693 53094 54221 | 5429 24466 25593 |
| <i>efeB</i> | 5499 356911 358194 | 4693 54227 55510 | 5429 25623 26882 |
| <i>fhuF</i> | 5497 64957 64169 | 4685 22801 22013 | 5424 35894 35106 |
| <i>fcuA</i> | Not present | Not present | 5426 15371 13197 |
| <i>fcT</i> | Not present | Not present | 5434 1150 3207 |
| <i>yncD</i> | 5499 862268 860154 | 4653 34095 31978 | 5431 108237 106429 |
| <i>btuB</i> | 5494 91674 89818 | 4681 80819 82675 | 5416 101275 99197 |
| <i>foxA</i> | 5499 1169794 1171971 | 4657 88864 91041 | 5434 212350 214464 |
| <i>fhuE</i> | 5499 433586 431439 | 4694 4945 2798 | 5429 99208 97007 |
| <i>pfeA</i> | 5499 1078144 1080258 | 4657 2935 5124 | 5434 120200 122389 |
| <i>yfeX</i> | 5500 134251 133349 | 4662 295965 295063 | 5439 136976 136074 |

| Gene | <i>C. sakazakii</i> 2151 | <i>C. sakazakii</i> ATCCBAA894 ^a | <i>C. turicensis</i> z3032 ^b |
|-------------|--------------------------|---|---|
| <i>viuB</i> | 7918 11338 10454 | ESA_pESA3p05545 117909 117025 | Ctu_1p01020 97461 96541 |
| <i>shiF</i> | 7918 12546 11335 | ESA_pESA3p05546 119117 117906 | Ctu_1p01030 98636 97425 |
| <i>iucA</i> | 7918 12682 14430 | ESA_pESA3p05547 119253 121001 | Ctu_1p01040 98772 100520 |
| <i>iucB</i> | 7918 14420 15370 | ESA_pESA3p05548120991 121941 | Ctu_1p01050 100582 101460 |
| <i>iucC</i> | 7918 15367 17112 | ESA_pESA3p05549 121938 123683 | Ctu_1p01060 101454 103202 |
| <i>iucD</i> | 7918 17109 18431 | ESA_pESA3p05550 123680 125002 | Ctu_1p01070 103196 104521 |
| <i>iutA</i> | 7918 18454 20649 | ESA_pESA3p05551 125070 127220 | Ctu_1p01080 104540 106741 |
| <i>entD</i> | 7925 1460532 1461236 | ESA_02731 2682887 2683591 | CTU_12310 1295376 1294708 |
| <i>fepA</i> | 7925 1458256 1460529 | ESA_02730 2680443 2682884 | CTU_12320 1297685 1295412 |
| <i>fes</i> | 7925 1457975 1456731 | ESA_02729 2680330 2679086 | CTU_12330 1297965 1299209 |
| <i>ybdZ</i> | 7925 1456727 1456506 | ESA_02728 2679082 2678861 | CTU_12340 1299213 1299434 |
| <i>entF</i> | 7925 1456480 1452587 | ESA_02727 2678835 2674954 | CTU_12350 1299403 1303350 |
| <i>fepE</i> | 7923 766692 767924 | ESA_00459 432125 433267 | CTU_33980 3555403 3554270 |
| <i>entH</i> | 7924 235325 235720 | ESA_00800 776567 776980 | CTU_30430 3173893 3173480 |
| <i>entA</i> | 7924 234554 235306 | ESA_00799 775814 776566 | CTU_30440 3174742 3173894 |
| <i>entB</i> | 7924 233688 234557 | ESA_00798 774948 775817 | CTU_30450 3175512 3174643 |
| <i>entE</i> | 7924232074 233678 | ESA_00797 773334 774938 | CTU_30460 3177126 3175522 |
| <i>entC</i> | 7924 230897 232063 | ESA_00796 772157 773323 | CTU_30470 3178303 3177137 |
| <i>fepB</i> | 7924 230709 229750 | ESA_00795 771970 771011 | CTU_30480 3178535 3179449 |
| <i>entS</i> | 7924 228480 229724 | ESA_00794 769741 770985 | CTU_30490 3180682 3179474 |
| <i>fepD</i> | 7924228333 227365 | ESA_00793 769606 768626 | CTU_30500 3180826 3181833 |
| <i>fepG</i> | 7924 227290 226376 | ESA_00792 768629 767637 | CTU_30510 3181830 3182822 |
| <i>fepC</i> | 7924 226373 225588 | ESA_00791 767640 766849 | CTU_30520 3182711 3183610 |
| <i>fhuA</i> | 7925 1839229 1837037 | ESA_03190 3109219 3107027 | CTU_07810 843379 845550 |

| | | | |
|-------------|----------------------|-----------------------------|------------------------------|
| <i>fhuC</i> | 7925 1836989 1836192 | ESA_03189 3107081 3106182 | CTU_07820 845478 846395 |
| <i>fhuD</i> | 7925 1836192 1835296 | ESA_03188 3106182 3105286 | CTU_07830 846389 847291 |
| <i>fhuB</i> | 7925 1835299 1833314 | ESA_03187 3105289 3103304 | CTU_07840 847354 849273 |
| <i>eitC</i> | 7917 9316 8558 | ESA_pESA3p05516 75701 74943 | Ctu_1p00600 46366 45608 |
| <i>eitB</i> | 7917 10353 9313 | ESA_pESA3p05517 76738 75698 | Ctu_1p00610 47403 46363 |
| <i>eitA</i> | 7917 11360 10353 | ESA_pESA3p05518 77751 76738 | Ctu_1p00620 48410 47403 |
| <i>eitD</i> | 7917 11600 12835 | ESA_pESA3p05519 77985 79220 | Ctu_1p00630 48651 49886 |
| <i>fecl</i> | 7922 60136 60657 | Not present | Not present |
| <i>fecR</i> | 7922 60654 61607 | Not present | Not present |
| <i>fecA</i> | 7922 61694 64018 | Not present | Not present |
| <i>fecB</i> | 7922 64063 64965 | Not present | Not present |
| <i>fecC</i> | 7922 64962 65960 | Not present | Not present |
| <i>fecD</i> | 7922 65957 66913 | Not present | Not present |
| <i>fecE</i> | 7922 66914 67681 | Not present | Not present |
| <i>feoA</i> | 7923 251808 251584 | ESA_04330 4299210 4298986 | CTU_39180 4065804 4066028 |
| <i>feoB</i> | 7923 251557 249242 | ESA_04329 4298959 4296644 | CTU_39190 4066025 4068370 |
| <i>feoC</i> | 7923 249242 249006 | ESA_04328 4296644 4296408 | CTU_39200 4068370 4068606 |
| <i>efeU</i> | 7925 1061555 1060725 | ESA_02352 2287885 2287055 | CTU_16020 1697222 1698052 |
| <i>efeO</i> | 7925 1060669 1059542 | ESA_02351 2287005 2285872 | CTU_16030 1698201 1699235 |
| <i>efeB</i> | 7925 1059536 1058253 | ESA_02350 2285866 2284583 | CTU_16040 1699310 1700524 |
| <i>fhuF</i> | 7925 2053255 2054043 | ESA_03387 3324542 3325252 | CTU_05820 627567 626863 |
| <i>fcuA</i> | Not present | Not present | Not present |
| <i>fcT</i> | Not present | Not present | Not present |
| <i>yncD</i> | 7925 599832 601496 | ESA_01885 1817265 1819382 | CTU_21030 2209313 2207196 |
| <i>btuB</i> | 7920 4550 2697 | ESA_03800 3747030 3745165 | CTU_02010 212846 214894 |
| <i>foxA</i> | 7925 255840 253723 | ESA_01478 1422382 1420205 | CTU_24470 2568322 2570388 |
| <i>fhuE</i> | 7925 986886 989033 | ESA_02242 2177871 2180072 | CTU_16810 1776220 1774145 |
| <i>pfeA</i> | 7925 337462 335273 | ESA_01552 1504217 1502028 | CTU_23670 2477163 2479238 |
| <i>yfeX</i> | 7924 253775 254677 | ESA_00821 795033 795935 | CTU_30220 3155704 3154823 |