Frankia casuarinae (TA-Like pair: WP 011435335.1 & WP 011435334.1) Gloeothece citriformis PCC 7424 (TA-Like pair: WP 012598849.1 & WP 012598850.1) Paenibacillus solani (TA-Like pair: WP 054404156.1 & WP 054404158.1) Phenylobacterium haematophilum (TA-Like pair: WP 183770672.1 & WP 183770674.1) Dechloromonas agitata is5 (TA-Like pair: WP 027458779.1 & WP 084019783.1) Catenuloplanes japonicus (TA-Like pair: WP 198154179.1 & WP 033345755.1) Geobacter uraniireducens Rf4 (TA-Like pair: WP 011939097.1 & WP 011939096.1) Solimonas flava DSM 18980 (TA-Like pair: WP_028009100.1 & WP_084615958.1) Ruegeria marisrubri (TA-Like pair: WP_068347758.1 & WP_157770166.1) Candidatus Koribacter versatilis Ellin345 (TA-Like pair: WP 187148917.1 & WP 011521033.1) Orrella dioscoreae (TA-Like pair: WP_007182527.1 & WP_074046855.1) Rhodospirillum centenum SW (TA-Like pair: WP 012565280.1 & WP 041785018.1) Marimonas lutisali (TA-Like pair: WP 036175300.1 & WP 137703152.1) Nocardioides agariphilus (TA-Like pair: WP_194696749.1 & WP_194696814.1) Hahella ganghwensis DSM 17046 (TA-Like pair: WP 020406580.1 & WP 033415992.1) Afipia birgiae 34632 (TA-Like pair: WP 019199001.1 & WP 019199000.1) Gudongella oleilytica (TA-Like pair: WP 128425466.1 & WP 128425467.1) Heliorestis convoluta (TA-Like pair: WP 153724727.1 & WP 153724726.1) Massilia mucilaginosa (TA-Like pair: WP_166878403.1 & WP_166878406.1) Xanthobacter autotrophicus Py2 (TA-Like pair: WP 012112576.1 & WP 012112575.1) Loktanella ponticola (TA-Like pair: WP 183530480.1 & WP 183530481.1) Agathobacter ruminis (TA-Like pair: WP 099385597.1 & WP 099385598.1) Saccharomonospora viridis DSM 43017 (TA-Like pair: WP 012795690.1 & WP 012795689.1) Oscillibacter ruminantium GH1 (TA-Like pair: WP_040660314.1 & WP_040660312.1) Faecalibacterium prausnitzii (TA-Like pair: WP 002576372.1 & WP 035393362.1) Candidatus Frackibacter sp WG11 (TA-Like pair: WP 089748547.1 & WP 089748548.1) Fimbriiglobus ruber (TA-Like pair: WP_088255941.1 & WP_161967551.1) Xylanivirga thermophila (TA-Like pair: WP 129724687.1 & WP 129724689.1) Paracoccus aestuarii (TA-Like pair: WP 119884701.1 & WP 119884700.1) Anaerococcus octavius (TA-Like pair: WP_101540350.1 & WP_101540351.1) Heliorestis convoluta (TA-Like pair: WP 153724772.1 & WP 153724773.1) Agrobacterium vitis (TA-Like pair: WP 071205474.1 & WP 071205475.1) Clostridium saudiense (TA-Like pair: WP_195952238.1 & WP_195952237.1) Ruegeria arenilitoris (TA-Like pair: WP 170326775.1 & WP 170326776.1) Streptococcus koreensis (TA-Like pair: WP 120701568.1 & WP 120701567.1) Komagataeibacter cocois (TA-Like pair: WP_113597030.1 & WP_113597022.1) Idiomarina fontislapidosi (TA-Like pair: WP 110574019.1 & WP 110574017.1) Enterococcus faecalis V583 (TA-Like pair: WP 002379958.1 & WP 010714168.1) Haloimpatiens massiliensis (TA-Like pair: WP 102399037.1 & WP 102399214.1) Mesorhizobium hawassense (TA-Like pair: WP 112101706.1 & WP 112101707.1) Thermoanaerosceptrum fracticalcis (TA-Like pair: WP_187142725.1 & WP_051966324.1) Staphylococcus virus 187 (TA-Like pair: YP_239524.1 & YP_239523.1) Peptoniphilus vaginalis (TA-Like pair: WP 019117878.1 & WP 085875964.1) Alteraurantiacibacter buctensis (TA-Like pair: WP_160769987.1 & WP_160769986.1) Moorella humiferrea (TA-Like pair: WP 170066284.1 & WP 106005552.1) Ruminococcus albus 7 DSM 20455 (TA-Like pair: WP 013483861.1 & WP 013483862.1) Paraburkholderia phosphatilytica (TA-Like pair: WP_118184861.1 & WP_118184859.1) Croceicoccus ponticola (TA-Like pair: WP 127613807.1 & WP 127613808.1) Streptococcus macedonicus (TA-Like pair: WP 195185174.1 & WP 195185175.1) Gemella palaticanis (TA-Like pair: WP 179940209.1 & WP 179940207.1) Lactobacillus nodensis DSM 19682 JCM 14932 NBRC 107160 (TA-Like pair: WP 010019226.1 & WP 025024404.1) Clostridium aminophilum (TA-Like pair: WP 031474669.1 & WP 051684820.1) Halanaerobium hydrogeniformans (TA-Like pair: WP 013405152.1 & WP 013405153.1) Schaedlerella arabinosiphila (TA-Like pair: WP 004071893.1 & WP 004071897.1) Tahibacter aquaticus (TA-Like pair: WP 133818056.1 & WP 133818055.1) Arthrobacter psychrochitiniphilus (TA-Like pair: WP_170121014.1 & WP_110107467.1) Puteibacter caeruleilacunae (TA-Like pair: WP 137086992.1 & WP 137086990.1) Enterococcus faecalis V583 (TA-Like pair: WP 002387267.1 & WP 002387266.1) Nakamurella multipartita DSM 44233 (TA-Like pair: WP 083785789.1 & WP 015747333.1) Consotaella salsifontis (TA-Like pair: WP 078707517.1 & WP 078707157.1) Romboutsia ilealis (TA-Like pair: WP 180701680.1 & WP 180701681.1) Clostridium drakei (TA-Like pair: WP 032078999.1 & WP 032078998.1) Butyricicoccus faecihominis (TA-Like pair: WP 188886379.1 & WP 188886378.1) Lactococcus reticulitermitis (TA-Like pair: WP 094783872.1 & WP 167373208.1) Pseudomonas cissicola (TA-Like pair: WP 078591293.1 & WP 078591294.1) Desulfovirgula thermocuniculi DSM 16036 (TA-Like pair: WP_051275803.1 & WP_156896636.1) Bacillus idriensis (TA-Like pair: WP 070877044.1 & WP 191557484.1) Cytobacillus firmus (TA-Like pair: WP 061794355.1 & WP 197174451.1) Lactonifactor longoviformis (TA-Like pair: WP_084067722.1 & WP_072850227.1) Streptococcus ovis DSM 16829 (TA-Like pair: WP_018377271.1 & WP_018377270.1) Acidiphilium multivorum AlU301 (TA-Like pair: WP 013635151.1 & WP 013635152.1) Natronincola peptidivorans (TA-Like pair: WP 090441696.1 & WP 170834730.1) Sporanaerobacter acetigenes DSM 13106 (TA-Like pair: WP_072744841.1 & WP_072744840.1) Lactococcus garvieae (TA-Like pair: WP_040086688.1 & WP_040086690.1) Natranaerovirga pectinivora (TA-Like pair: WP_132252207.1 & WP_132252205.1) Herbiconiux ginsengi (TA-Like pair: WP_092555045.1 & WP_092555047.1) Desulfuribacillus alkaliarsenatis (TA-Like pair: WP_084019437.1 & WP_069644029.1) Streptococcus phage SpSL1 (TA-Like pair: YP_009153001.1 & YP_009153000.1) Brachyspira murdochii DSM 12563 (TA-Like pair: WP 013114354.1 & WP 013114355.1) Afipia felis (TA-Like pair: WP 002718172.1 & WP 002718173.1) Orenia metallireducens (TA-Like pair: WP 097018805.1 & WP 097018806.1) Acinetobacter rudis CIP 110305 (TA-Like pair: WP 016657773.1 & WP 040331424.1) Enterocloster lavalensis (TA-Like pair: WP 118756453.1 & WP 118756519.1) Antrihabitans stalactiti (TA-Like pair: WP 169592809.1 & WP 169592807.1) Nocardioides aromaticivorans (TA-Like pair: WP 179647875.1 & WP 179647876.1) Listeria phage vB LmoS 188 (TA-Like pair: YP_009204875.1 & YP_009204874.1) Fodinicola acaciae (TA-Like pair: WP_163513548.1 & WP_163513547.1) Eubacterium barkeri (TA-Like pair: WP 176770906.1 & WP 090246131.1) Urinicoccus massiliensis (TA-Like pair: WP_002834913.1 & WP_002834912.1) Sulfurirhabdus autotrophica (TA-Like pair: WP 124946584.1 & WP 124946583.1) Lachnotalea glycerini (TA-Like pair: WP_094377645.1 & WP_110291919.1) Lysobacter ruishenii (TA-Like pair: WP_144817028.1 & WP_144817030.1) Peptoclostridium acidaminophilum DSM 3953 (TA-Like pair: WP 025434852.1 & WP 025434851.1) Helcococcus massiliensis (TA-Like pair: WP 103981107.1 & WP 103981108.1) Pseudoruminococcus massiliensis (TA-Like pair: WP 022264815.1 & WP 106762637.1) Rhizobium wenxiniae (TA-Like pair: WP 183997203.1 & WP 183997201.1) Paenibacillus hemerocallicola (TA-Like pair: WP 139607087.1 & WP 139607086.1) Intestinibacter bartlettii (TA-Like pair: WP_147617338.1 & WP_147617337.1) Paracoccus zhejiangensis (TA-Like pair: WP 101752185.1 & WP 157935880.1) Enterococcus massiliensis (TA-Like pair: WP 082147255.1 & WP 187115918.1) Pelolinea submarina (TA-Like pair: WP_116225957.1 & WP_116225956.1) Actinomyces timonensis DSM 23838 (TA-Like pair: WP 051000508.1 & WP 051000507.1) Halobacteroides halobius DSM 5150 (TA-Like pair: WP_015327772.1 & WP_015327773.1) Plantactinospora veratri (TA-Like pair: WP 123010908.1 & WP 123010907.1) Ruficoccus amylovorans (TA-Like pair: WP 185673875.1 & WP 185673876.1) Desulfotomaculum putei DSM 12395 (TA-Like pair: WP_073239186.1 & WP_073239188.1) Clostridium chromiireducens (TA-Like pair: WP 079440626.1 & WP 119366946.1) Candidatus Methanodesulfokores washburnensis (TA-Like pair: WP 125670869.1 & WP 125670868.1) Aneurinibacillus terranovensis DSM 18919 (TA-Like pair: WP 051331021.1 & WP 051331020.1) Streptococcus phage phiARI0468 2 (TA-Like pair: YP 009322710.1 & YP 009322711.1) Enterococcus pallens (TA-Like pair: WP 010756055.1 & WP 010756054.1) Acidaminobacter hydrogenoformans DSM 2784 (TA-Like pair: WP 092591597.1 & WP 170829424.1) Lactobacillus saniviri (TA-Like pair: WP 054777398.1 & WP 147660962.1) Gordonia oryzae (TA-Like pair: WP 123925935.1 & WP 123925937.1) Aminicella lysinilytica (TA-Like pair: WP_166635433.1 & WP_166635434.1)

Anaeromassilibacillus senegalensis (TA-Like pair: WP 050698289.1 & WP 050698290.1)

Desulfofundulus salinum (TA-Like pair: WP 121452532.1 & WP 165859325.1)

endosymbiont of Bathymodiolus septemdierum str Myojin knoll (TA-Like pair: WP 066044490.1 & WP 066044491.1)

Longilinea arvoryzae (TA-Like pair: WP 075072886.1 & WP 075072885.1)

Desulfosporosinus acidiphilus SJ4 (TA-Like pair: WP 014828991.1 & WP 014828992.1)

Methanobrevibacter ruminantium M1 (TA-Like pair: WP 048812439.1 & WP 012955959.1)

Candidatus Roslinia caecavium (TA-Like pair: WP 191512207.1 & WP 191512206.1)

Pygmaiobacter massiliensis (TA-Like pair: WP_102049591.1 & WP_102049592.1)

Criibacterium bergeronii (TA-Like pair: WP 068912966.1 & WP 144398295.1)

Listeria valentina (TA-Like pair: WP_167628971.1 & WP_167628970.1)
Thermosediminibacter litoriperuensis (TA-Like pair: WP_148866658.1 & WP_148866657.1)

Clostridium jeddahense (TA-Like pair: WP 195199144.1 & WP 195199145.1)

Metallibacterium scheffleri (TA-Like pair: WP 081130208.1 & WP 168708847.1)

** For the description of flanking genes, please check this link: http://130.235.240.53/NetFlax/T8_pdfs/D41.txt

Predicted Antitoxin (Blue Pentagon) Domain ID: D25

-- HHpred(PDB) Annotation: IRRE PROTEIN (99.28%)

-- NCBI-CDD Annotation: Peptidase M78

-- TADB Annotation: No Hit

-- RefSeg Protein Description: ImmA/IrrE family metallo-endopeptidase

-- HHpred(Pfam) Annotation: Peptidase_M78; IrrE N-terminal-like domain (99.11%)

Predicted Toxin (Red Pentagon) Domain ID: D41
-- RefSeq Protein Description: helix-turn-helix transcriptional regulator
-- TADB Annotation: No Hit

-- NCBI-CDD Annotation: CxxCG_CxxCG_HTH superfamily
-- HHpred(Pfam) Annotation: MqsA_antitoxin; Antitoxin component of bacterial toxin-antitoxin system, MqsA (98.42%)

-- HHpred(PDB) Annotation: Uncharacterized HTH-type transcriptional regulator ygiT (98.36%)

83 284

3 281

1 10

15 1