**Molecular Signatures of *Janthinobacterium lividum* from Trinidad Support High Potential for Crude Oil Metabolism**

**Supplemental Material**

**Supplemental Method**

**Induction of violacein production in culture**

This method is based on the report by Natalia et al. [77]. Once the identity of the bacterial strains was confirmed, culture conditions were varied in an attempt to induce violacein production by the Trinidad *Janthinobacterium* strains, as indicated by formation of purple-pigmented colonies. All attempts were unsuccessful, however, an outline of the methods used for induction is given below:

1. 1% to 10% glycerol added to medium which was Luria Broth (LB) broth and R2A semi-solid media
2. LB culture with agitation and without agitation at different temperatures 25°C, 37°C, 42°C
3. Antibiotic susceptibility disc assays involving the following antibiotics and their respective concentrations: aztreonam 30mcg/disc, imipenem-EDTA 10/750, kanamycin 30 mcg/disc, chloramphenicol 30 mcg/disc, ciprofloxacin 30 mcg/disc, trimethoprim 10 mcg/disc, ampicillin 10 mcg/disc, streptomycin 10 mcg/disc, erythromycin 15 mcg/disc and oxytetracycline 30 mcg/disc.

**Supplemental Tables**

Table S1. List of reference sequences and GenBank accession numbers used in phylogenetic analyses of 16S rRNA gene region.

|  |  |  |  |
| --- | --- | --- | --- |
| **Accession No.**  | **Species** | **Strain**  | **Origin**  |
| MK757612  | *Janthinobacterium lividum* | SNU4 | South Korea |
| CP049828 | *Janthinobacterium lividum* | EIF2 | Germany |
| KF583727 | *Janthinobacterium lividum* | D-27 | China |
| LK391529  | *Janthinobacterium lividum* | isolate S8 | - |
| KR085902  | *Janthinobacterium lividum* | IHBB 11033 | India |
| KT923309 | *Janthinobacterium lividum* | IN230 | Austria |
| LT547844 | *Janthinobacterium lividum* | isolate 25\_JR12 | - |
| KX128921 | *Janthinobacterium lividum* | HS4-MRL | Pakistan |
| MF979544 | *Janthinobacterium lividum* | LMG 3918 | Italy |
| MF777041 | *Janthinobacterium lividum* | J13 | - |
| MK757612  | *Janthinobacterium lividum* | SNU4 | South Korea |
| MN334236 | *Janthinobacterium lividum* | EXB-L-1993 | - |
| KP762193 | *Janthinobacterium lividum* | A15CS2014 | USA |
| KR085802 | *Janthinobacterium lividum* | IHBB 9166 | India |
| KP762228 | *Janthinobacterium lividum* | 4S\_B2\_8CS2014 | USA |
| AY247410 | *Janthinobacterium lividum* | CM37 | Germany |
| KR088420 | *Janthinobacterium lividum* | Kl12 | Germany |
| KC920945 | *Janthinobacterium lividum* | DT63-3 | China |
| KR233788 | *Janthinobacterium lividum* | IHB B 6464 | India |
| EU642885 | *Janthinobacterium lividum* | XT1 | China |
| KC920976 | *Janthinobacterium lividum* | SQ66 | China |
| EF111127 | *Janthinobacterium lividum* | RBE1CD-85 | Colombia |
| KF993615 | *Janthinobacterium lividum* | HC-3 | China |
| KT767718 | *Janthinobacterium lividum* | C12 | China |
| AM748811 | *Janthinobacterium lividum* | CCUG 2513 | - |
| JF970593 | *Janthinobacterium lividum* | AIC2-15 | Antarctica |
| AB021388 | *Janthinobacterium lividum* | ATCC 33665 | - |
| LK391529 | *Janthinobacterium lividum* | isolate S8 | - |
| KR085902 | *Janthinobacterium lividum* | IHBB 11033 | India |
| KT923309 | *Janthinobacterium lividum* | IN230 | Austria |
| HQ824838 | *Janthinobacterium lividum* | KOPRI 25541 | Austria |
| DQ640007 | *Janthinobacterium lividum* | PR03 | Austria |
| AB680301 | *Janthinobacterium lividum* | NBRC 12613 | - |
| EU330449 | *Janthinobacterium lividum* | BP01 | Alaska |
| EU330448 | *Janthinobacterium lividum* | BR01 | Alaska |
| AF174648 | *Janthinobacterium lividum* | BD17-1 | Korea |
| KF712914 | *Janthinobacterium lividum* | IARI-RP3 | India |
| EU652474 | *Janthinobacterium lividum* | JPB-1.17a | - |
| Y08846 | *Janthinobacterium lividum* | DSM 1522T | - |
| NR\_132608  | *Janthinobacterium lividum* | JA-1 | Norway |
| KC855475 | *Janthinobacterium lividum* | CH1-13 | South Korea |
| EF523603 | *Janthinobacterium lividum* | OW6-RT-3 | Germany |
| KT766048 | *Janthinobacterium lividum* | ERGS5:01 | India |
| JF327475 | *Janthinobacterium lividum* | KB51 | Russia |
| JN662543 | *Janthinobacterium lividum* | B26.7 | Asia |
| JX429043 | *Janthinobacterium lividum* | IARI-R-50 | India |
| AB428446 | *Janthinobacterium lividum* | FVB1 | Japan |
| FN908445 | *Janthinobacterium lividum* | LE 95 | Spain |
| KT369907 | *Janthinobacterium lividum* | YF11-3(4) | China |
| MW633292 | *Janthinobacterium lividum* | F1TT7 | Trinidad and Tobago |
| JQ070957 | *Janthinobacterium lividum* | MTR | Chile |
| NR\_170540 | *Janthinobacterium rivuli* | FT68W | China |
| KP762181 | *Janthinobacterium lividum* | A1CS2014 | USA |
| EF111116 | *Janthinobacterium lividum* | RBE1CD-64 | Colombia |
| NR\_170541 | *Janthinobacterium violaceinigrum* | FT13W | China |
| NR\_170539 | *Janthinobacterium aquaticum* | FT58W | China |
| KJ509870 | *Janthinobacterium lividum* | MMPP4 | India |
| KF990995 | *Janthinobacterium lividum* | MMP4 | India |
| DQ473538 | *Janthinobacterium lividum* | GA01 | - |
| KF150395 | *Janthinobacterium lividum* | JN111 | China |
| LN890197 | *Janthinobacterium lividum* | B21 | China |
| EU275366 | *Janthinobacterium lividum* | Acam | Peru |
| KJ589455 | *Janthinobacterium lividum* | 2B1 | China |
| KT767666 | *Janthinobacterium lividum* | A31 | China |
| HQ003440 | *Janthinobacterium lividum* | NBGD31 | India |
| NR\_171529 | *Massilia atriviolacea* | SOD | China |
| NR\_158142 | *Massilia glaciei* | B448-2 | China |
| NR\_170535 | *Duganella levis* | CY42W | China |
| NR\_170536 | *Duganella pernnla* | FT109W | China |
| NR\_117042 | *Duganella phyllosphaerae* | T54  | - |
| NR\_170532  | *Duganella albus* | FT9W | China |
| NR\_159161  | *Massilia buxea*  | A9 | China |
| NR\_170542 | ‘*Massilia aquatica*’Lu et al. 2020 | FT127W | China |
| NR\_170534 | *Duganella fentianensis* | FT93W | China |
| NR\_170537 | *Duganella qianjiadongensis*  | CY13W  | China |
| NR\_026364 | *Janthinobacterium agaricidamnosum*  | W1r3  | England |
| NR\_114134 | *Janthinobacterium agaricidamnosum*  | NBRC 102515 | - |
| AB681849 (outgroup) | *Janthinobacterium agaricidamnosum*  | NBRC 102515 | - |
| KF318409 | *Janthinobacterium lividum* | P-20 | Kyrgyzstan |
| NR\_125502 | *Herminiimonas arsenicoxydans*  | ULPAs1 | - |
| NR\_044508 | *Herminiimonas glaciei*  | UMB49 | Greenland |
| NR\_114175 | *Oxalicibacterium solurbis* | NBRC 102665 | - |
| NR\_113595 | *Chromobacterium violaceum* | NBRC 12614 | - |
| NR\_113239 | *Chromobacterium violaceum* | JCM 1249 | - |
| NR\_114954 | *Chromobacterium violaceum* | LMG 3953 | unclear |
| NR\_074222 | *Chromobacterium violaceum* | ATCC 12472 | Brazil |
| LT844653 (outgroup) | *Burkholderia cepacia* | PRS | Pakistan |
| **Trinidad strains** |  |  |
|  | *Janthinobacterium lividum* | F2TT4 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT10 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | PTT1 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F1TT11 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | MTT38 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | V4TT3 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | V5TT2 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F1TT8  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F1TT10  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT9 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F1TT12 | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT8  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT3  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT6  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT2  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT1  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | V4TT2  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | V1TT1  | Trinidad and Tobago |
|  | *Janthinobacterium lividum* | F2TT5  | Trinidad and Tobago |

Table S2. List of reference protein sequences and GenBank and UniProt accession numbers used in *VioA* protein tree.

|  |  |  |
| --- | --- | --- |
| **Accession No.** | **Product** | **Source** |
| WP\_152281413 | FAD-dependent oxidoreductase | *Janthinobacterium violaceinigrum* |
| WP\_152256499 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. FT14W |
| WP\_051958649 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. RA13 |
| WP\_152253439 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. FT68W |
| WP\_099667720 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. 13 |
| WP\_150130959 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. LM6 |
| ABK64067 | putative tryptophan 2-monooxygenase VioA | *Janthinobacterium* lividum |
| WP\_070310760 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. HH107 |
| WP\_070288375 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. HH106 |
| PJC99852 | tryptophan oxidase | *Janthinobacterium* sp. BJB1 |
| WP\_086146260 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. GW458P |
| WP\_176375807 | FAD-dependent oxidoreductase | *Janthinobacterium lividum* |
| WP\_092605133 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. YR213 |
| WP\_034786442 | FAD-dependent oxidoreductase | *Janthinobacterium lividum* |
| A0A377RX57 | Probable L-tryptophan oxidase VioA | *Janthinobacterium lividum* |
| WP\_139089351 | FAD-dependent oxidoreductase | *Janthinobacterium lividum* |
| WP\_139143342 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. HH104 |
| WP\_166447245 | FAD-dependent oxidoreductase | *Janthinobacterium lividum* |
| WP\_058050994 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. Ant5-2-1 |
| WP\_046682913 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. KBS0711 |
| WP\_072453412 | FAD-dependent oxidoreductase | *Janthinobacterium lividum* |
| WP\_051991686 | FAD-dependent oxidoreductase | *Janthinobacterium lividum* |
| WP\_206088569 | FAD-dependent oxidoreductase | *Massilia* sp. CCM 8941 |
| WP\_167088732 | FAD-dependent oxidoreductase | *Massilia frigida* |
| WP\_054262842 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. CG23\_2 |
| ADU90703 | putative tryptophan 2-monooxygenase | *Collimonas* sp. MPS11E8 |
| WP\_176344979 | FAD-dependent oxidoreductase | *Massilia* sp. BJB1822 |
| WP\_183439266 | FAD-dependent oxidoreductase | *Massilia violacea* |
| WP\_050410482 | FAD-dependent oxidoreductase | *Massilia* sp. NR 4-1 |
| W0V275 | putative L-tryptophan oxidase VioA | *Janthinobacterium agaricidamnosum* NBRC 102515 = DSM 9628 |
| WP\_051780336 | FAD-dependent oxidoreductase | *Janthinobacterium agaricidamnosum* |
| WP\_199760445 | FAD-dependent oxidoreductase | *Rugamonas* sp. CCM 8940 |
| A0A1E7X409 | L-tryptophan oxidase VioA | *Duganella* sp. HH101 |
| WP\_070267003 | FAD-dependent oxidoreductase | unclassified *Duganella* |
| ELX08822 | L-tryptophan oxidase VioA | *Janthinobacterium* sp. HH01 |
| L9PB98 | L-tryptophan oxidase VioA | *Janthinobacterium* sp. HH01 |
| WP\_051077271 | FAD-dependent oxidoreductase | *Janthinobacterium* sp. HH01 |
| WP\_116988333 | FAD-dependent oxidoreductase | unclassified *Duganella* |
| Q9S3V1 | Flavin-dependent L-tryptophan oxidase VioA | *Chromobacterium violaceum* ATCC 12472 |

Table S3. List of reference protein sequences, GenBank and UniProt accession numbers used in construction of the *EstA*/*B* protein tree.

|  |  |  |
| --- | --- | --- |
| **Accession No.**  | **Product** | **Source** |
| A0A2N0I026  | triacylglycerol esterase/lipase *EstA* (alpha/beta hydrolase family) | *Janthinobacterium* sp.64 |
| WP\_166447145  | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_072456528 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_034758785 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_071078587  | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_141172395 | alpha/beta fold hydrolase | *Janthinobacterium tructae* |
| A0A2M8YM74 | triacylglycerol esterase/lipase *EstA* (alpha/beta hydrolase family) | *Janthinobacterium* sp.67 |
| A0A2G6RKE0 | triacylglycerol esterase/lipase *EstA* (alpha/beta hydrolase family) | *Janthinobacterium* sp*.* 13 |
| WP\_070254985 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_128139973 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_139090954 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_034786221 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| A0A1N7BPZ2 | triacylglycerol esterase/lipase *EstA* (alpha/beta hydrolase family) | *Janthinobacterium* sp.TND4EL3 |
| WP\_121668937 | alpha/beta fold hydrolase | *Janthinobacterium agaricidamnosum* |
| A0A1I1CCU8  | triacylglycerol esterase/lipase *EstA* (alpha/beta hydrolase family) | *Janthinobacterium* sp.344 |
| WP\_099393015 | alpha/beta fold hydrolase | *Janthinobacterium* sp.BJB446 |
| WP\_010396502 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| WP\_196856450 | alpha/beta fold hydrolase | *Janthinobacterium* sp.CAN\_S1 |
| WP\_070345427 | alpha/beta fold hydrolase | *Janthinobacterium lividum* |
| A0A1A7C523 | triacylglycerol esterase/lipase *EstA* (alpha/beta hydrolase family) | *Janthinobacterium psychrotolerans* |
| WP\_101480407 | alpha/beta fold hydrolase | unclassified *Janthinobacterium* |
| WP\_155467068 | alpha/beta fold hydrolase | *Duganella radicis* |