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Service Report
Bacterial Identification By 16S rRNA Gene Sequencing

Date: 01 April 2012

No.	Sample ID	Comment	Remarks
01.	Lac	Bacterium "Lac" is closely related to ***Lactobacillus plantarum*** based on the 16S rRNA gene sequence similarity search and phylogenetic analysis.	Supplied data: 1. DNA Sequencing results 2. Assembled 16S rRNA gene sequence 3. Top 10 reported hits to the query 4. Multiple sequence alignment of 10 orthologous sequences and an outgroup 5. Phylogenetic tree

Prepared by
David Lee

*The chromatogram is saved as *ab1* files. The recommended trace viewer is Sequence Scanner 1.0 from http://www.appliedbiosystems.com/sequencescanner

Assembled 16S rRNA Gene Sequence

>Lac

GCCTAATACATGCAAGTCGAACGAACTCTGGTATTGATTGGTGCTTGCATCATGATTTACATTTGAGTGAGTGGCGAA
CTGGTGAGTAACACGTGGGAAACCTGCCCAGAAGCGGGGGATAACACCTGGAAACAGATGCTAATACCGCATAACAA
CTTGGACCGCATGGTCCGAGTTTGAAAGATGGCTTCGGCTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTAGATG
GTGGGGTAACGGCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAATCGGCCACATTGGGACTGAGACACG
GCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAAAGTCTGATGGAGCAACGCCGCGTGAG
TGAAGAAGGGTTTCGGCTCGTAAAACTCTGTTGTTAAAGAAGAACATATCTGAGAGTAACTGTTCAGGTATTGACGGT
ATTTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTAT
TGGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCTTCGGCTCAACCGAAGAAGTGCATCGGAA
ACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTGTAGCGGTGAAATGCGTAGATATATGGAAGAAC
ACCAGTGGCGAAGGCGGCTGTCTGGTCTGTAACTGACGCTGAGGCTCGAAAGTATGGGTAGCAAACAGGATTAGATA
CCCTGGTAGTCCATACCGTAAACGATGAATGCTAAGTGTTGGAGGGTTTCCGCCCTTCAGTGCTGCAGCTAACGCATT
AAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAG
CATGTGGTTTAATTCGAAGCTACGCGAAGAACCTTACCAGGTCTTGACATACTATGCAAATCTAAGAGATTAGACGTTC
CCTTCGGGGACATGGATACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAAC
GAGCGCAACCCTTATTATCAGTTGCCAGCATTAAGTTGGGCACTCTGGTGAGACTGCCGGTGACAAACCGGAGGAAG
GTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGGCTACACACGTGCTACAATGGATGGTACAACGAGTTGC
GAACTCGCGAGAGTAAGCTAATCTCTTAAAGCCATTCTCAGTTCGGATTGTAGGCTGCAACTCGCCTACATGAAGTCG
GAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGCCCGTCACACCATG
AGAGTTTGTAACACCCAAAGTCGGTGGGGTAACCTTTTAGGAACCAGCCGCCTAAG

The top 10 reported hits to the query 16S rRNA gene sequence

Accession	Description	Score	E Value
JQ340030.1	Lactobacillus plantarum strain R17 16S ribosomal RNA gene, partial sequence	2678 bits	0.0
AB690244.1	Lactobacillus plantarum gene for 16S rRNA, partial sequence, strain: JCM 1100	2678 bits	0.0
AL935263.2	Lactobacillus plantarum WCFS1 complete genome	2678 bits	0.0
FR775893.1	Lactobacillus plantarum subsp. plantarum partial 16S rRNA gene, type strain CIP 103151T	2678 bits	0.0
FR871789.1	Lactobacillus pentosus MP-10 draft genome, annotated contig00046	2678 bits	0.0
HQ384301.1	Lactobacillus pentosus strain 5-36 16S ribosomal RNA gene, partial sequence	2678 bits	0.0
GU552552.1	Lactobacillus plantarum strain KW30 16S ribosomal RNA gene, complete sequence; and 16S-23S ribosomal RNA intergenic spacer, partial sequence	2678 bits	0.0
AB603688.1	Lactobacillus plantarum subsp. plantarum gene for 16S rRNA, partial sequence, strain: UB9	2678 bits	0.0
AB603687.1	Lactobacillus plantarum subsp. plantarum gene for 16S rRNA, partial sequence, strain: UB8	2678 bits	0.0
AB603686.1	Lactobacillus plantarum subsp. plantarum gene for 16S rRNA, partial sequence, strain: UA6	2678 bits	0.0

Multiple Sequence Alignment of 10 Orthologous Sequences and an Outgroup

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CLUSTAL 2.1 multiple sequence alignment

Lac                 ----------------------------------------GCCTAATACATGCAAGTCGAA 21
L.plantarum         --------------------------ACGCTGGCGGCGTGCCTAATACATGCAAGTCGAA 34
L.panis             -----------------------------------GTGCCTAATACATGCAAGTCGAG 23
L.curvatus          ----------------------ACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAA 38
L.intestinalis      --------------------GGACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAG 40
L.crispatus         GAGAGTTTGATCCTGGCTCAGGACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAG 60
L.casei             ----------------------GATGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAA 39
L.kunkeei           ----------------------GACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAA 39
L.zeae              ----------------------GATGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAA 39
L.salivarius        ----------------------GACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAA 39
Bacillus-lentus     -AGAGTTTGATCCTGGCTCAGGACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAG 59
                                                      ********************

Lac                 CGAA-CTCTGGTA--TTGATTG-G--TGCTTGCATCA-TGAT----TTAC--ATTTG-AG 67
L.plantarum         CGAA-CTCTGGTA--TTGATTG-G--TGCTTGCATCA-TGAT----TTAC--ATTTG-AG 80
L.panis             CGCA-CTGGCCCAA-CTGATATGACGTGCTTGCACT---GATTTGACGATGGATTACCAG 78
L.curvatus          CGCA-CT---CTCGTTAGATTGAAGAAGCTTGCTTCT--GATT-GATAACATTTGA---G 88
L.intestinalis      CGAG-CTGAACCAG-CAGATTCA-----CTTCGGT----GAT--GACGCTGGGA-AC--G 84
L.crispatus         CGAG-CTTGCCTAGATGAATTTGG--TGCTTGCACCA--GAT--GAAACTAGAT-ACAAG 112
L.casei             CGAG-TT---TTGG-TCGATGAACGGTGCTTGCACTG-WGAT-------TCRACTTAAAA 86
L.kunkeei           CGAG-CTCTCCCAAATTGATTTTA--TGCTTGCATAAATGAT----TTTTGGATTCGGAG 92
L.zeae              CGAG-TT---TTGG-TCGATGAACGGTGCTTGCATCG-TGAT-------TCAACTTAAAA 86
L.salivarius        CGAAACTTTCTTACACCGA------ATGCTTGCATTC---ACC----------GTAAGAAG 81
Bacillus-lentus     CGAA-----------TGGATGGGA---GCTTGCTCCC------------------AGAAG 87
                    **               *         ***

Lac                 T-GAGTGGCGAACTGGTGAGTAACACGTGGGAAACCTGCCCAGAAGCGGGGGATAACACC 126
L.plantarum         T-GAGTGGCGAACTGGTGAGTAACACGTGGGAAACCTGCCCAGAAGCGGGGGATAACACC 139
L.panis             T-GAGCGGCGGACGGGTGAGTAACACGTGGGCAACCTGCCCTAAAGCGGGGGATAACATT 137
L.curvatus          T-GAGTGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCCTAAAGTGGGGGATAACATT 147
L.intestinalis      C-GAGCGGCGGATGGGTGAGTAACACGTGGGTAACCTGCCCTAAAGTCTGGGATACCACT 143
L.crispatus         C-GAGCGGCGGATGGGTGAGTAACACGTGGGGAACCTGCCCCATAGTCTGGGATACCACT 171
L.casei             C-GAGTGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATT 145
L.kunkeei           C-GAGTGGCGAACTGGTGAGTAACACGTGGGTAACCTGCCCCGAAGCGGGGGATAACATT 151
L.zeae              C-GAGTGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCCTTAAGTGGGGGATAACATT 145
L.salivarius        TTGAGTGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCTAAAAGAAGGGGATAACACT 141
Bacillus-lentus     T-TAGCGGCGGACGGGTGAGTAACACGTGGGCAACCTACCTGTAAGACTGGGATAACTTC 146
                       ** **** *  ***************** ***** **    **   ****** *

Lac                 TGGAAACAGATGCTAATACCGCATAACAACTTGGA-CCGCATGGTCCGAGTTTGAAAGAT 185
L.plantarum         TGGAAACAGATGCTAATACCGCATAACAACTTGGA-CCGCATGGTCCGAGTTTGAAAGAT 198
L.panis             TGGAAACAGGTGCTAATACCGCATAACTACGAAAACC-ACATGGTTTTCGTATAAAAGAT 196
L.curvatus          TGGAAACAGATGCTAATACCGCATAAAACCTAGCACC-GCATGGTGCAAGGTTGAAAGAT 206
L.intestinalis      TGGAAACAGGTGCTAATACCGGATAACAACAATAGCT-GCATGGCTATTGCTTAAAAGGC 202
L.crispatus         TGGAAACAGGTGCTAATACCGGATAAGAACACTAGATCGCATGATCAGCTTTTAAAAGGC 231
L.casei             TGGAAACAGATGCTAATACCGCATAAATCCAAGAACC-GCATGGTTCTTGGCTGAAAGAT 204
L.kunkeei           TGGAAACAAGTGCTAATACCGCATAATTAGTTGGAACCGCATGGTTCCAACTTGAAAGAT 211
L.zeae              TGGAAACAGATGCTAATACCGCATAAATCCAAGAACC-GCATGGTTCTTGGCTGAAAGAT 204
L.salivarius        TGGAAACAGGTGCTAATACCGTATATCTCTAAGGATC-GCATGATCCTTAGATGAAAGAT 200
Bacillus-lentus     GGGAAACCGGAGCTAATACCGGATAACTTCTTTCTTC-TCCTGGAGAAAGGTTGAAAGAC 205
                     ******    ********** ***             * **         * ****

Lac                 GGCTT-CGGCTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTAGATGGTGGGGTAACG 244
L.plantarum         GGCTT-CGGCTATCACTTTTGGATGGTCCCGCGGCGTATTAGCTAGATGGTGGGGTAACG 257
L.panis             GGTTT-CGGCTATCACTTTAGGATGGGCCCGCGGTGCATTAGCTAGTTGGTAGGGTAACG 255
L.curvatus          GGTTT-CGGCTATCACTTTAGGATGGACCCGCGGTGCATTAGTTAGTTGGTGAGGTAAAG 265
L.intestinalis      GGCGT-AAGCTGTCGCTAAAGGATGGACCCGCGGTGCATTAGCTAGTTGGTAAGGTAACG 261
L.crispatus         GGCGT-AAGCTGTCGCTATGGGATGGCCCCGCGGTGCATTAGCTAGTTGGTAAGGTAAAG 290
L.casei             GGCGTCAAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGGTGAGGTAACG 264
L.kunkeei           GGCTC-TG-CTATCACTTTGGGATGGACCCGCGCCGTATTAGTTAGTTGGTGAGATAAAA 269
L.zeae              GGCGT-AAGCTATCGCTTTTGGATGGACCCGCGGCGTATTAGCTAGTTGGTGAGGTAACG 263
L.salivarius        GGTTC--TGCTATCGCTTTTAGATGGACCCGCGGCGTATTAACTAGTTGGTGGGGTAACG 258
Bacillus-lentus     GGCTT-CGGCTGTCACTTACAGATGGGCCCGCGGCGCATTAGCTAGTTGGTGAGGTAACG 264
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Lac                 GCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAATCGGCCACATTGGGACTGA 304
L.plantarum         GCTCACCATGGCAATGATACGTAGCCGACCTGAGAGGGTAATCGGCCACATTGGGACTGA 317
L.panis             GCTTACCAAGGCAATGATGCATAGCCGAGTTGAGAGACTGATCGGCCACAATGGAACTGA 315
L.curvatus          GCTCACCAAGACCGTGATGCATAGCCGACCTGAGAGGGTAATCGGCCACACTGGGACTGA 325
L.intestinalis      GCTTACCAAGGCGACGATGCATAGCCGAGTTGAGAGACTGATCGGCCACATTGGGACTGA 321
L.crispatus         GCTTACCAAGGCGATGATGCATAGCCGAGTTGAGAGACTGATCGGCCACATTGGGACTGA 350
L.casei             GCTCACCAAGGCGATGATACGTAGCCGAACTGAGAGGTTGATCGGCCACATTGGGACTGA 324
L.kunkeei           GCCCACCAAGACGATGATACGTAGCCGACCTGAGAGGGTAATCGGCCACATTGGGACTGA 329
L.zeae              GCTCACCAAGGCGATGATACGTAGCCGAACTGAGAGGTTGATCGGCCACATTGGGACTGA 323
L.salivarius        GCCTACCAAGGTGATGATACGTAGCCGAACTGAGAGGTTGATCGGCCACATTGGGACTGA 318
Bacillus-lentus     GCTCACCAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTGA 324
                    **  **** *     *** * *******  ******  * ********** *** *****

Lac                 GACACGGCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAAAGT 364
L.plantarum         GACACGGCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAAAGT 377
L.panis             GACACGGTCCATACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGGCGCAAGC 375
L.curvatus          GACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAAAGT 385
L.intestinalis      GACACGGCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGGCGAAAGC 381
L.crispatus         GACACGGCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGCAAGT 410
L.casei             GACACGGCCCAAACTC-TACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGCAAGT 383
L.kunkeei           GACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGAAAGT 389
L.zeae              GACACGGCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGCAAGT 383
L.salivarius        GACACGGCCCAAACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCACAATGGACGCAAGT 378
Bacillus-lentus     GACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGCAATGGACGAAAGT 384
                    ******* *** **** ************************** ****** ** ***

Lac                 CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGGTTTCGGCTCGTAAAACTCTGTTGTTAA 424
L.plantarum         CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGGTTTCGGCTCGTAAAACTCTGTTGTTAA 437
L.panis             CTGATGGAGCAACACCGCGTGAGTGAAGAAGGGTTTCGGCTCGTAAAACTCTGTTGTTGA 435
L.curvatus          CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGTTTTCGGATCGTAAAACTCTGTTGTTGG 445
L.intestinalis      CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGTTTTCGGATCGTAAAGCTCTGTTGTTGG 441
L.crispatus         CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGT--TCGGCTCGTAAAGCTCTGTTGGTAG 468
L.casei             CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGCTTTCGGGTCGTAAAACTCTGTTGTTGG 443
L.kunkeei           CTGATGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGGATCGTAAAACTCTGTTGTTAA 449
L.zeae              CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGCTTTCGGGTCGTAAAACTCTGTTGTTGG 443
L.salivarius        CTGATGGAGCAACGCCGCGTGAGTGAAGAAGGTCTTCGGATCGTAAAACTCTGTTGTTAG 438
Bacillus-lentus     CTGACGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGGATCGTAAAACTCTGTTATCAG 444
                    **** ******** ************ *****   **** ******* *******

Lac                 AGAAGAACATATCTGAGAGTAACTGTTCAGGTATTGACGGTATTTAACCAGAAAGCCACG 484
L.plantarum         AGAAGAACATATCTGAGAGTAACTGTTCAGGTATTGACGGTATTTAACCAGAAAGCCACG 497
L.panis             AGAAGAACGTGCGTGAGAGTAACTGTTCATGCAGTGACGGTATTCAACCAGAAAGTCACG 495
L.curvatus          AGAAGAACGTATTTGATAGTAACTGATCAGGTAGTGACGGTATCCAACCAGAAAGCCACG 505
L.intestinalis      TGAAGAAGGATAGAGGTAGTAACTGGCCCCTATTTGACGGTAATCAACCAGAAAGTCACG 501
L.crispatus         TGAAGAAGGATAGAGGTAGTAACTGGCCTTTATTTGACGGTAATCAACCAGAAAGTCACG 528
L.casei             AGAAGAATGGTCGGCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCACG 503
L.kunkeei           AGAAGAACAAGTGTTAGAGTAACTGTTAACACTTTGACGGTATTTAACCAGAAAGCCACG 509
L.zeae              AGAAGAATGGTCGGCAGAGTAACTGTTGTCGGCGTGACGGTATCCAACCAGAAAGCCACG 503
L.salivarius        AGAAGAACACGAGTGAGAGTAACTGTTCATTCGATGACGGTATCTAACCAGCAAGTCACG 498
Bacillus-lentus     GGAAGAACAAGTATCGGAGTAACTGCCGGTACCTTGACGGTACCTGACCAGAAAGCCACG 504
                     ******          ********         ********    ***** *** ****

Lac                 GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 544
L.plantarum         GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 557
L.panis             GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGGATTTATT 555
L.curvatus          GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 565
L.intestinalis      GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 561
L.crispatus         GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 588
L.casei             GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGGATTTATT 563
L.kunkeei           GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 569
L.zeae              GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTATCCGGATTTATT 563
L.salivarius        GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGATTTATT 558
Bacillus-lentus     GCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGAATTATT 564
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Lac                 GGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCTTCGGCTCAACCG 604
L.plantarum         GGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCTTCGGCTCAACCG 617
L.panis             GGGCGTAAAGCGAGCGCAGGCGGTTGCTTAGGTCTGATGTGAAAGCCTTCGGCTTAACCG 615
L.curvatus          GGGCGTAAAGCGAGCGCAGGCGGTTTCTTAAGTCTGATGTGAAAGCCTTCGGCTCAACCG 625
L.intestinalis      GGGCGTAAAGCGAGCGCAGGCGGAAAGATAAGTCTGATGTGAAAGCCCCCGGCTTAACCG 621
L.crispatus         GGGCGTAAAGCGAGCGCAGGCGGTTCAATAAGTCTGATGTGAAAGCCCTCGGCTTAACCG 648
L.casei             GGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCCTCGGCTTAACCG 623
L.kunkeei           GGGCGTAAAGCGAGCGCAGGCGGTTTTGTAAGTCTGCTGTGAAAGCCCTCAGCTCAACTG 629
L.zeae              GGGCGTAAAGCGAGCGCAGGCGGTTTTTTAAGTCTGATGTGAAAGCCCTCGGCTTAACCG 623
L.salivarius        GGGCGTAAAGGGAACGCAGGCGGTCTTTTAAGTCTGATGTGAAAGCCTTCGGCTTAACCG 618
Bacillus-lentus     GGGCGTAAAGCGCGCGCAGGCGGTTTCTTAAGTCTGATGTGAAAGCCCACGGCTCAACCG 624
                    ********** *  *********     ** ***** **********  * *** *** *

Lac                 AAGAAGTGCATCGGAAACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTG 664
L.plantarum         AAGAAGTGCATCGGAAACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTG 677
L.panis             AAGAAGTGCATCGGAAACCGGGCGACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTG 675
L.curvatus          AAGAAGTGCATCGGAAACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTG 685
L.intestinalis      AGGAATTGCATCGGAAACTGTGTTTCTTGAGTGCAGAAGAGGAGAGTGGAACTCCATGTG 681
L.crispatus         GAGAATTGCATCAGAAACTGTTGAACTTGAGTGCAGAAGAGGAGAGTGGAACTCCATGTG 708
L.casei             AGGAAGCGCATCGGAAACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTG 683
L.kunkeei           AGGAAGTGCAGTGGAAACTACAAAACTTGAGTACAGAAGAGGAAAGTGGAACTCCATGTG 689
L.zeae              AGGAAGCGCATCGGAAACTGGGAAACTTGAGTGCAGAAGAGGACAGTGGAACTCCATGTG 683
L.salivarius        GAGTAGTGCATTGGAAACTGGAAGACTTGAGTGCAGAAGAGGAGAGTGGAACTCCATGTG 678
Bacillus-lentus     TGGAAGGTCATTGGAAACTGGGAGACTTGAGTGCAGAAGAGAAGAGCGGAATTCCACGTG 684
                      * *   **   *****       ******* ******** * ** **** **** ***

Lac                 TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCT 724
L.plantarum         TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCT 737
L.panis             TAGCGGTGGAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCT 735
L.curvatus          TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCT 745
L.intestinalis      TAGCGGTGGAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTCTCTGGTCT 741
L.crispatus         TAGCGGTGGAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTCTCTGGTCT 768
L.casei             TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCT 743
L.kunkeei           TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTTTCTGGTCT 749
L.zeae              TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAGGCGGCTGTCTGGTCT 743
L.salivarius        TAGCGGTGAAATGCGTAGATATATGGAAGAACACCAGTGGCGAAAGCGGCTCTCTGGTCT 738
Bacillus-lentus     TAGCGGTGAAATGCGTAGAGATGTGGAGGAACACCAGTGGCGAAGGCGGCTCTTTGGTCT 744
                    ******** ********** ** **** ********************** ****** * ******

Lac                 GTAACTGACGCTGAGGCTCGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGTAGTC 784
L.plantarum         GTAACTGACGCTGAGGCTCGAAAGTATGGGTAGCAAACAGGATTAGATACCCTGGTAGTC 797
L.panis             GCAACTGACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC 795
L.curvatus          GTAACTGACGCTGAGGCTCGAAAGCATGGGTAGCAAACAGGATTAGATACCCTGGTAGTC 805
L.intestinalis      GTAACTGACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC 801
L.crispatus         GCAACTGACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC 828
L.casei             GTAACTGACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC 803
L.kunkeei           GTTACTGACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC 809
L.zeae              GTAACTGACGCTGAGGCTCGAAAGCATGGGTAGCGAACAGGATTAGATACCCTGGTAGTC 803
L.salivarius        GTAACTGACGCTGAGGTTCGAAAGCGTGGGTAGCAAACAGGATTAGATACCCTGGTAGTC 798
Bacillus-lentus     GTAACTGACGCTGAGGCGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTC 804
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Lac                 CATACCGTAAACGATGAATGCTAAGTGTTGGAGGGTTTCCGCCCTTCAGTGCTGCAGCTA 844
L.plantarum         CATACCGTAAACGATGAATGCTAAGTGTTGGAGGGTTTCCGCCCTTCAGTGCTGCAGCTA 857
L.panis             CATGCCGTAAACGATGAGTGCTAGGTGTTGGAGGGTTTCCGCCCTTCAGTGCCGAAGCTA 855
L.curvatus          CATGCCGTAAACGATGAGTGCTAGGTGTTGGAGGGTTTCCGCCCTTCAGTGCCGCAGCTA 865
L.intestinalis      CATGCCGTAAACGATGAGTGCTAAGTGTTGGGAGGTTTCCGCCTCTCAGTGCTGCAGCTA 861
L.crispatus         CATGCCGTAAACGATGAGTGCTAAGTGTTGGGAGGTTTCCGCCTCTCAGTGCTGCAGCTA 888
L.casei             CATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCCCTTCAGTGCCGCAGCTA 863
L.kunkeei           CATGCCGTAAACGATGAATACTAGGTGTTGGAGGGTTTCCGCCCTTCAGTGCCGCAGCTA 869
L.zeae              CATGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCCCTTCAGTGCCGCAGCTA 863
L.salivarius        CACGCCGTAAACGATGAATGCTAGGTGTTGGAGGGTTTCCGCCCTTCAGTGCCGCAGCTA 858
Bacillus-lentus     CACGCCGTAAACGATGAGTGCTAAGTGTTAGAGGGTTTCCGCCCTTTAGTGCTGCAGTTA 864
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Lac                 ACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACTCAAAGGAATTGAC 904
L.plantarum         ACGCATTAAGCATTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACTCAAAGGAATTGAC 917
L.panis             ACGCATTAAGCACTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 915
L.curvatus          ACGCATTAAGCACTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 925
L.intestinalis      ACGCATTAAGCACTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 921
L.crispatus         ACGCATTAAGCACTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 948
L.casei             ACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 923
L.kunkeei           ACGCATTAAGTATTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 929
L.zeae              ACGCATTAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 923
L.salivarius        ACGCAATAAGCATTCCGCCTGGGGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGAC 918
Bacillus-lentus     ACGCATTAAGCACTCCGCCTGGGGAGTACGGCCGCAAGGCTGAAACTCAAAGGAATTGAC 924
                    ***** **** * ********************* ******** ********************

Lac                 GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCTACGCGAAGAACCTTAC 964
L.plantarum         GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCTACGCGAAGAACCTTAC 977
L.panis             GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCTACGCGAAGAACCTTAC 975
L.curvatus          GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 985
L.intestinalis      GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 981
L.crispatus         GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 1008
L.casei             GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 983
L.kunkeei           GGGGGCCCGCACAAGTGGTGGAGCATGTGGTTTAATTCGATGCTACGCGAAGAACCTTAC 989
L.zeae              GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 983
L.salivarius        GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 978
Bacillus-lentus     GGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTAC 984
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Lac                 CAGGTCTTGACATACTATGCAAATCTAAGAGATTAGA-CGTTCCCTTCGGGG-ACATGGA 1022
L.plantarum         CAGGTCTTGACATACTATGCAAATCTAAGAGATTAGA-CGTTCCCTTCGGGG-ACATGGA 1035
L.panis             CAGGTCTTGACATCTTGCGCTAACCTAAGAGATTAGG-CGTTCCCTTCGGGG-ACG-CAA 1032
L.curvatus          CAGGTCTTGACATCCTTTGACCACTCTAGAGATAGAG-CTTTCCCTTCGGGG-ACA-AAG 1042
L.intestinalis      CAGGTCTTGACATCTAGTGCCATCCTAAGAGATTAGG-AGTTCCCTTCGGGG-ACG-CTA 1038
L.crispatus         CAGGTCTTGACATCTAGTGCCATTTGTAGAGATACAA-AGTTCCCTTCGGGG-ACG-CTA 1065
L.casei             CAGGTCTTGACATCTTTGATCACCTGAGAGATCAGG-TTTCCCCTTCGGGG-GCA-AAA 1040
L.kunkeei           CAGCTCTTGACATCTTCTGCCAACCCAAGAGATTGGG-CGTTCCCTTCGGGG-ACA-GAA 1046
L.zeae              CAGGTCTTGACATCTTTTGATCACCTGAGAGATCAGG-TTTCCCCTTCGGGG-GCA-AAA 1040
L.salivarius        CAGGTCTTGACATCCTTTGACCACCTAAGAGATTAGG-CTTTCCCTTCGGGG-ACA-AAG 1035
Bacillus-lentus     CAGGTCTTGACATCCTCTGACCACCCTAGAGATAGGGACTTCCCCTTCGGGGGACA-GAG 1043
                    *** *********     *        ******       * **********  *

Lac                 T-ACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1081
L.plantarum         T-ACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1094
L.panis             TGACAGGTGGTGCATGGTCGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1092
L.curvatus          TGACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1102
L.intestinalis      AGACAGGTGGTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1098
L.crispatus         AGACAGGTGGTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1125
L.casei             TGACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1100
L.kunkeei           TGACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1106
L.zeae              TGACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1100
L.salivarius        TGACAGGTGGTGCATGGCTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1095
Bacillus-lentus     TGACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCA 1103
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Lac                 ACGAGCGCAACCCTTATTATCAGTTGCCAGCATTAAGTTGGGCACTCTGGTGAGACTGCC 1141
L.plantarum         ACGAGCGCAACCCTTATTATCAGTTGCCAGCATTAAGTTGGGCACTCTGGTGAGACTGCC 1154
L.panis             ACGAGCGCAACCCTTGTTACTAGTTGCCAGCATTCAGTTGGGCACTCTAGTGAGACTGCC 1152
L.curvatus          ACGAGCGCAACCCTTATTACTAGTTGCCAGCATTTAGTTGGGCACTCTAGTGAGACTGCC 1162
L.intestinalis      ACGAGCGCAACCCTTGTTATTAGTTGCCAGCATTAAGTTGGGCACTCTAATGAGACTGCC 1158
L.crispatus         ACGAGCGCAACCCTTGTTATTAGTTGCCAGCATTAAGTTGGGCACTCTAATGAGACTGCC 1185
L.casei             ACGAGCGCAACCCTTATGACTAGTTGCCAGCATTGAGTTGGGCACTCTAGTAAGACTGCC 1160
L.kunkeei           ACGAGCGCAACCCTTATTATTAGTTGCCAGCATTTAGTTGGGCACTCTAGTGAGACTGCC 1166
L.zeae              ACGAGCGCAACCCTTATGACTAGTTGCCAGCATTYAGTTGGGCACTCTAGTAAGACTGCC 1160
L.salivarius        ACGAGCGCAACCCTTGTTGTCAGTTGCCAGCATTAAGTTGGGCACTCTGGCGAGACTGCC 1155
Bacillus-lentus     ACGAGCGCAACCCTTAACCTTAGTTGCCAGCATTCAGTTGGGCACTCTAAGGTGACTGCC 1163
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Lac                 GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGG 1201
L.plantarum         GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGG 1214
L.panis             GGTGACAAACCGGAGGAAGGTGGGGACGACGTCAGATCATCATGCCCCTTATGACCTGGG 1212
L.curvatus          GGTGACAAACCGGAGGAAGGTGGGGACGACGTCAAATCATCATGCCCCTTATGACCTGGG 1222
L.intestinalis      GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGCCCCTTATGACCTGGG 1218
L.crispatus         GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGCCCCTTATGACCTGGG 1245
L.casei             GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGG 1220
L.kunkeei           GGTGATAAACCGGAGGAAGGTGGGGACGACGTCAAATCATCATGCCCCTTATGAGCTGGG 1226
L.zeae              GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGG 1220
L.salivarius        GGTGACAAACCGGAGGAAGGTGGGGACGACGTCAAGTCATCATGCCCCTTATGACCTGGG 1215
Bacillus-lentus     GGTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGG 1223
                    ***** ******************** *******  ****************** *****

Lac                 CTACACACGTGCTACAATGGATGGTACAACGAGTTGCGAACTCGCGAGAGTAAGCTAATC 1261
L.plantarum         CTACACACGTGCTACAATGGATGGTACAACGAGTTGCGAACTCGCGAGAGTAAGCTAATC 1274
L.panis             CTACACACGTGCTACAATGGCCGGTACAACGAGCAGCTAACCCGCGAGGGTGTGCAAATC 1272
L.curvatus          CTACACACGTGCTACAATGGATGGTACAAC------------------------------ 1252
L.intestinalis      CTACACACGTGCTACAATGGGCAGTACAACGAGAAGCGAGCCTGCGAAGGCAAGCGGATC 1278
L.crispatus         CTACACACGTGCTACAATGGGCAGTACAACGAGAAGCGAGCCTGCGAAGGCAAGCGAATC 1305
L.casei             CTACACACGTGCTACAATGGATGGTACAACGAGTTGCGAGACCGCGAGGTCAAGCTAATC 1280
L.kunkeei           CTACACACGTGCTACAATGGATGGTACAACGAGTCGCGAAACCGCGAGGTCAAGCTAATC 1286
L.zeae              CTACACACGTGCTACAATGGATGGTACAACGAGTTGCGAGACCGCGAGGTCAAGCTAATC 1280
L.salivarius        CTACACACGTGCTACAATGGACGGTACAACGAGTCGCGAGACCGCGAGGTTTAGCTAATC 1275
Bacillus-lentus     CTACACACGTGCTACAATGGATGGTACAAAGGGTTGCAAGACCGCGAGGTTTAGCTAATC 1283
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Lac                 TCTTAAAGCCATTCTCAGTTCGGATTGTAGGCTGCAACTCGCCTACATGAAGTCGGAATC 1321
L.plantarum         TCTTAAAGCCATTCTCAGTTCGGATTGTAGGCTGCAACTCGCCTACATGAAGTCGGAATC 1334
L.panis             TCTTAAAGCCGGTCTCAGTTCGGACTGCAGTCTGCAACTCGACTGCACGAAGTCGGAATC 1332
L.curvatus          ------------------------------------------------------------
L.intestinalis      TCTTAAAGCTGTTCTCAGTTCGGACTGCAGTCTGCAACTCGACTGTACGAAGCTGGAATC 1338
L.crispatus         TCTGAAAGCTGTTCTCAGTTCGGACTGCAGTCTGCAACTCGACTGCACGAAGCTGGAATC 1365
L.casei             TCTTAAAGCCATTCTCAGTTCGGACTGTAGGCTGCAACTCGCCTACACGAAGTCGGAATC 1340
L.kunkeei           TCTTAAAGCCATTCTCAGTTCGGATTGCAGGCTGCAACTCGCCTGCATGAAGTTGGAATC 1346
L.zeae              TCTTAAAGCCATTCTCAGTTCGGACTGTAGGCTGCAACTCGCCTACACGAAGTCGGAATC 1340
L.salivarius        TCTTAAAGCCGTTCTCAGTTCGGATTGTAGGCTGCAACTCGCCTACATGAAGTCGGAATC 1335
Bacillus-lentus     CCATAAAACCATTCTCAGTTCGGATTGCAGGCTGCAACTCGCCTGCATGAAGCCGGAATC 1343

Lac                 GCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1381
L.plantarum         GCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1394
L.panis             GCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1392
L.curvatus          ------------------------------------------------------------
L.intestinalis      GCTAGTAATCGCGGATCAGCACGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1398
L.crispatus         GCTAGTAATCGCGGATCAGCACGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1425
L.casei             GCTAGTAATCGCGGATCAGCACGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1400
L.kunkeei           ACTAGTAATCGTGGATCAGCATGCCACGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1406
L.zeae              GCTAGTAATCGCGGATCAGCACGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1400
L.salivarius        GCTAGTAATCGCGAATCAGCATGTCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1395
Bacillus-lentus     GCTAGTAATCGTGGATCAGCATGCCACGGTGAATACGTTCCCGGGCCTTGTACACACCGC 1403

Lac                 CCGTCACACCATGAGAGTTTGTAACACCCAAAGTCGGTGGGGTAACCTTTTA--GGAACC 1439
L.plantarum         CCGTCACACCATGAGAGTTTGTAACACCCAAAGTCGGTGGGGTAACCTTTTA--GGAACC 1452
L.panis             CCGTCACACCATGGAAGTTTGCAATGCCCAAAGTCAGTGGCCTAACCATTTG---GAGGG 1449
L.curvatus          ------------------------------------------------------------
L.intestinalis      CCGTCACACCATGGAAGTCTGCAATGCCCGAAGCCGGTGGCCTAACCACTTATGTGGAAG 1458
L.crispatus         CCGTCACACCATGGGAGTCTGCAATGCCCAAAGCCGGTGGGATAACC-TTTATAGGAGTC 1484
L.casei             CCGTCACACCATGAGAGTTTGTAACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCG 1460
L.kunkeei           CCGTCACACCATGAGAGTTTGTAACACCCAAAGACGATGGGGTAACCTTTTA--GGAGCT 1464
L.zeae              CCGTCACACCATGAGAGTTTGTAACACCCGAAGCCGGTGGCGTAACCCTTTTAGGGAGCG 1460
L.salivarius        CCGTCACACCATGAGAGTTTGTAACACCCAAAGCCGGTGGGGTAACCGC---AAGGAGCC 1452
Bacillus-lentus     CCGTCACACCACGAGAGTTTGTAACACCCGAAGTCGGTGGGGTAACC-CTTACGGGAGCC 1462
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Lac                 AGCCGCCTAAG---------------------------------------------------- 1450
L.plantarum         AGCCGCCTAAGG--------------------------------------------------- 1464
L.panis             AGCTGCCTAAGGCAGGACAGATGACTGGGGTGAAGTCGTAA---------------------- 1490
L.curvatus          ------------------------------------------------------------
L.intestinalis      AGCCGTCTAAGGCAGGGCAGATGACTGGGGTGAAGTCGTAACAAGGTAGCCGTAG------ 1513
L.crispatus         AGCCGTCTAAGGTAGGACAGATGATTAGGGTGAAGTCGTGACAAGGTAGCCGTAG------ 1539
L.casei             AGCCGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTAGGAGAA 1520
L.kunkeei           AGTCGTCTAAGGTGGGACAGATGATTAGGGTGAAGTCGTAACAAGGTAGCCGT-------- 1517
L.zeae              AGCCGTCTAAGGTGGGACAAATGATTAGGGTGAAGTCGTAACAAGGTAGCCGTAGGAGAA 1520
L.salivarius        AGCCGTCTAAGGTGGGACAGATGATTGGGGTGAAGTCGTAACAAGGTAGCCGTAGGAGAA 1512
Bacillus-lentus     AGCCGCCGAAGGTGGGACAGATGATTGGGGTGAAGTCGTAACAAGGTAGC-GTATCGGAA 1521


Lac                 ---------------
L.plantarum         ---------------
L.panis             ---------------
L.curvatus          ---------------
L.intestinalis      ---------------
L.crispatus         ---------------
L.casei             CC------------ 1522
L.kunkeei           ---------------
L.zeae              CC------------ 1522
L.salivarius        CCTGC---------- 1517
Bacillus-lentus     GGTGCGGTGGATCA 1535
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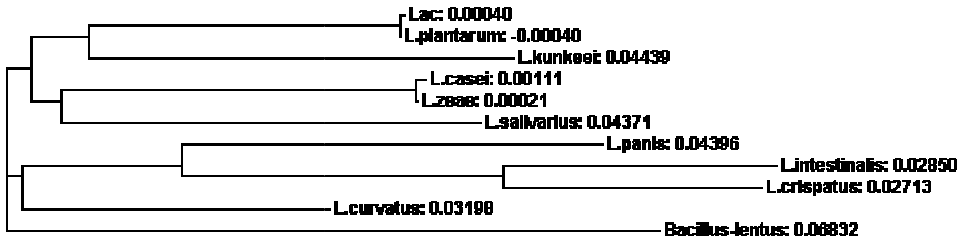
Phylogenetic Tree



Lineage:

Root; domain Bacteria; phylum Firmicutes; class Bacilli; order Lactobacillales; family Lactobacillaceae; genus Lactobacillus

Bacillus lentus (outgroup: AB021189); *Lactobacillus curvatus* (AJ270951); *Lactobacillus crispatus* (AJ242969); *Lactobacillus intestinalis* (AJ306299); *Lactobacillus panis* (X94230); *Lactobacillus salivarius* (AF335475); *Lactobacillus zeae* (D86516); *Lactobacillus casei* (D16551); *Lactobacillus kunkeei* (Y11374); *Lactobacillus plantarum* (JQ340030); Lac (query sequence).