

BIOL 1310 Concepts in Biology

As an exercise in understanding how DNA sequence is used to relate organisms, please go through this and identify the bases that are DIFFERENT between the identified groups.

Example:

Bacillus	-TTTATGGAGAGTTTGATCCTGGCTCAGGACGAACGCTGGCGGCGTGCCTAATACATGCA	59
Staphylococcus	TTTTATGGAGAGTTTGATCCTGGCTCAGGATGAACGCTGGCGGCGTGCCTAATACATGCA	60
E.	-AAATTGAAGAGTTTGATCATGGCTCAGATTGAACGCTGGCGGCAGGCCTAACACATGCA	59
E vs Bacillus	**** * * **** ** *	12
E vs Staphyloc	**** * * ** ** *	11

Bacillus	AGTCGAGCGG-ACCAAAGGGA-GCTTGCTCCTG-GAGGTT-AGCGGCGAACGGGTGAGTA	115
Staphylococcus	AGTCGAGCGA-ACGGATGAGAAGCTTGCTTCTCTGATGTT-AGCGGCGGACGGGTGAGTA	118
E.	AGTCGAACGGTAACAGGAAGAAGCTTGCTTCTTTGCTGACGAGTGCGGACGGGTGAGTA	119
E vs Bacillus		
E vs Staphyloc		

Bacillus	ACACGTGGGCAACCTGCCTGTAAGACTGGGATAACATCGAGAAATCGGTGCTAATACCGG	175
Staphylococcus	ACACGTGGATAACCTACCTATAAGACTGGGATAACTTCGGGAAACCGGAGCTAATACCGG	178
E.	ATGTCTGGGAAAC-TGCCTGATGGAGGGGATAACTACTGGAAACGGTAGCTAATACCGC	178
E vs Bacillus		
E vs Staphyloc		

Bacillus	ATAATAAAAAGAAGACTGCATGGTTCTTTTTTGAAGATGGTTTTCGGCTATCACTTACAGAT	235
Staphylococcus	ATAATATTTTGAACCGCATGGTTCAAAAGTGAAAGACGGTCTTG-CTGTCACTTATAGAT	237
E.	ATAACGT-----CGCAAGA--CCAAAGAGGGGGACCTTCGGGCCTCTTGCCATCGGAT	229
E vs Bacillus		
E vs Staphyloc		

Class Report:

How many differences between:

E vs Bacillus?

E vs Staphyloc?

Which organism is closer to E?

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E.               -AAATTGAAGAGTTTGATCATGGCTCAGATTGAACGCTGGCGGCGAGGCCTAACACATGCA 59

E vs Bacillus    **** *           *           ***           **           *           12
E vs Staphyloc   **** *           *           **           **           *           11
```

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Bacillus          GGGCCCGCGGCGCATTAGCTAGTTGGTGGGGTAACGGCTCACCAAGGCGACGATGCGTAG 295
Staphylococcus   GGATCCGCGCTGCATTAGCTAGTTGGTAAGGTAACGGCTTACCAAGGCAACGATGCATAG 297
E.               GTGCCAGATGGGATTAGCTTGTGGTGGGGTAACGGCTCACCAAGGCGACGATCCCTAG 289

E vs Bacillus
E vs Staphyloc
```

```
Bacillus          CCGACCTGAGAGGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGGA 355
Staphylococcus   CCGACCTGAGAGGGTGATCGGCCACACTGGAAGTACGAGACACGGTCCAGACTCCTACGGGA 357
E.               CTGGTCTGAGAGGATGACCAGCCACACTGGAAGTACGAGACACGGTCCAGACTCCTACGGGA 349

E vs Bacillus
E vs Staphyloc
```

```
Bacillus          GGCAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGT 415
Staphylococcus   GGCAGCAGTAGGGAATCTTCCGCAATGGGCGAAAGCCTGACGGAGCAACGCCGCGTGAGT 417
E.               GGCAGCAGTAGGGAATATTGCACAATGGGCGCAAGCCTGATGCAGCCATGCCGCGTGAT 409

E vs Bacillus
E vs Staphyloc
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E vs Bacillus	**** * * **** ** *	12
E vs Staphyloc	**** * * ** ** *	11

Bacillus	GGGCG-GCACCTTGACGGTACCTAACGAGAAAGCCACGGCTAACTACGTGCCAGCAGCCG	533
Staphylococcus	CTGTGCACATCTTGACGGTACCTAATCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCG	535
E.	CTTTG--CTCATTGACGTTACCCGAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCG	527

E vs Bacillus
E vs Staphyloc

Bacillus	CGGTAATACGTAGGTGGCAAGCGTTGTCCGGAATTATTGGGCGTAAAGCGCGCAGGCG	593
Staphylococcus	CGGTAATACGTAGGTGGCAAGCGTTATCCGGAATTATTGGGCGTAAAGCGCGCTAGGCG	595
E.	CGGTAATACGGAGGGTGAAGCGTTAATCGGAATTACTGGGCGTAAAGCGCACGAGGCG	587

E vs Bacillus
E vs Staphyloc

Bacillus	GATGAAGGTTTTTCGGATCGTAAACTCTGTTGTTAGGGAAGAACA-AGTGCCGTTGAAA	474
Staphylococcus	GATGAAGGTCTTCGGATCGTAAACTCTGTTATTAGGGAAGAACA-TATGT-GTAAGTAA	475
E.	GAAGAAGGCCTTCGGGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGAGTAAAGTTAATAC	469

E vs Bacillus
E vs Staphyloc

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E vs Bacillus	**** * * **** ** *	12
E vs Staphyloc	**** * * ** ** *	11

Bacillus	GTCTCTTAAGTCTGATGTGAAAGCCCCGGCTCAACCGGGGAGGGTCATTGGAAACTGGG	653
Staphylococcus	GTTTTTAAAGTCTGATGTGAAAGCCCACGGCTCAACCGTGGAGGGTCATTGGAAACTGGA	655
E.	GTTTGTAAAGTCAGATGTGAAATCCCCGGGCTCAACCTGGGAACTGCATCTGATACTGGC	647
E vs Bacillus		
E vs Staphyloc		

Bacillus	AGACTTGAGTACAGAAGAGGAGAGTGGAATTCACGTGTAGCGGTGAAATGCGTAGAGAT	713
Staphylococcus	AACTTGAGTGCAGAAGAGGAAAGTGAATTCATGTGTAGCGGTGAAATGCGCAGAGAT	715
E.	AAGCTTGAGTCTCGTAGAGGGGGGTAGAATTCAGGTGTAGCGGTGAAATGCGTAGAGAT	707
E vs Bacillus		
E vs Staphyloc		

Bacillus	GTGGAGGAACACCAGTGGCGAAGGCGACTCTCTGGTCTGTAACCTGACGCTGAGGCGCGAA	773
Staphylococcus	ATGGAGGAACACCAGTGGCGAAGGCGACTTTCTGGTCTGTAACCTGACGCTGATGTGCGAA	775
E.	CTGGAGGAATACCGTGGCGAAGGCGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAA	767
E vs Bacillus		
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E.	-AAATTGAAGAGTTTGATCATGGCTCAGATTGAACGCTGGCGGCAGGCCTAACACATGCA	59
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Bacillus	AGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAGTGCT	833
Staphylococcus	AGCGTGGGGATCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAGTGCT	835
E.	AGCGTGGGGAGCAAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGTCGACT	827
E vs Bacillus		
E vs Staphyloc		

Bacillus	AGGTGTTAGGGGTTTCGACGCCCTTAGTGCCGAAGTTAACACATTAAGCACTCCGCCTGG	893
Staphylococcus	AAGTGTTAGGGGTTTCGCCCTTAGTGCTGCAGCTAACGCATTAAGCACTCCGCCTGG	895
E.	TGGAGGTTGTGCCCTTGAGGCG-TGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGG	886
E vs Bacillus		
E vs Staphyloc		

Bacillus	GGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGACGGGGCCCGCACAAAGCAGTGGA	953
Staphylococcus	GGAGTACGACCGCAAGGTTGAAACTCAAAGGAATTGACGGGGACCCGCACAAGCGGTGGA	955
E.	GGAGTACGGCCGCAAGGTTAAAAC TCAAATGAATTGACGGGGCCCGCACAAAGCGGTGGA	946
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E.	-AAATTGAAGAGTTTGATCATGGCTCAGATTGAACGCTGGCGGCAGGCCTAACACATGCA	59
E vs Bacillus	**** *	12
E vs Staphyloc	**** *	11

Bacillus	GCATGTGGTTTAAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCCTTTGACC	1013
Staphylococcus	GCATGTGGTTTAAATTCGAAGCAACGCGAAGAACCTTACCAAATCTTGACATCCTTTGACA	1015
E.	GCATGTGGTTTAAATTCGATGCAACGCGAAGAACCTTACCTGGTCTTGACATCCACAGAAC	1006
E vs Bacillus		
E vs Staphyloc		

Bacillus	ACCCTAGAGATAGGGCTTCCCTTCGGGGGACAAAGTGACAGGTGGTGCATGGTTGTGCG	1073
Staphylococcus	ACTCTAGAGATAGAGCCTTCCCTTCGGGGGACAAAGTGACAGGTGGTGCATGGTTGTGCG	1075
E.	TTTCCAGAGATGGATTGGTGCCTTC--GGAACTGTGAGACAGGTGCTGCATGGCTGTGCG	1064
E vs Bacillus		
E vs Staphyloc		

Bacillus	TCAGCTCGTGTGCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTGACCTTAG	1133
Staphylococcus	TCAGCTCGTGTGCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTAAGCTTAG	1135
E.	TCAGCTCGTGTGTTGAAATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTG	1124
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E vs Bacillus	**** * * **** ** *	12
E vs Staphyloc	**** * * ** ** *	11

Bacillus	GGGATGACGTCAAATCATCATGCCCTTATGACCTGGGCTACACACGTGCTACAATGGAT	1252
Staphylococcus	GGGATGACGTCAAATCATCATGCCCTTATGATTTGGGCTACACACGTGCTACAATGGAC	1254
E.	GGGATGACGTCAAGTCATCATGGCCCTTACGACCAGGGCTACACACGTGCTACAATGGCG	1244
E vs Bacillus		
E vs Staphyloc		

Bacillus	GGTACAAAGGGTTGCGAAGCCGCGAGGTGAAGCCAATCCCAGAAAGCCATTCTCAGTTTCG	1312
Staphylococcus	AATACAAAGGGCAGCGAAACCGCGAGGTCAAGCAAATCCCATAAAGTTGTTCTCAGTTTCG	1314
E.	CATACAAAGAGAAGCGACCTCGCGAGAGCAAGCGGACCTCATAAAGTGCGTCGTAGTCCG	1304
E vs Bacillus		
E vs Staphyloc		

Bacillus	TTGCCAGCA-TTCAGTTGGGCACTCTAAGGTGACTGCCGGTGACAAACCGGAGGAAGGTG	1192
Staphylococcus	TTGCCATCA-TTAAGTTGGGCACTCTAAGTTGACTGCCGGTGACAAACCGGAGGAAGGTG	1194
E.	TTGCCAGCGGTCCGGCCGGAACTCAAAGGAGACTGCCAGTGATAAACTGGAGGAAGGTG	1184
E vs Bacillus		
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E.	-AAATTGAAGAGTTTGATCATGGCTCAGATTGAACGCTGGCGGCAGGCCTAACACATGCA	59
E vs Bacillus	**** * * **** ** *	12
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Bacillus	GATTGCAGGCTGCAACTCGCCTGCATGAAGCCGGAATTGCTAGTAATCGCGGATCAGCAT	1372
Staphylococcus	GATTGTAGTCTGCAACTCGACTACATGAAGCTGGAATCGCTAGTAATCGTAGATCAGCAT	1374
E.	GATTGGAGTCTGCAACTCGACTCCATGAAGTCGGAATCGCTAGTAATCGTGGATCAGAAT	1364
E vs Bacillus		
E vs Staphyloc		

Bacillus	GCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCCGCCGTCACACCACGAGAGTTTGT	1432
Staphylococcus	GCTACGGTGAATACGTTCCCGGGTCTTGTACACACCCGCCGTCACACCACGAGAGTTTGT	1434
E.	GCCACGGTGAATACGTTCCCGGGCCTTGTACACACCCGCCGTCACACCATGGGAGTGGGT	1424
E vs Bacillus		
E vs Staphyloc		

Bacillus	AACACCCGAAGTCGGTGGGGTAACCTTTT-GGAGCCAGCCGCCAAGGTGGGACAGATGA	1491
Staphylococcus	AACACCCGAAGCCGGTGGAGTAACCTTTTAGGAGCTAGCCGTCGAAGGTGGGACAAATGA	1494
E.	TGCAAAAGAAGTAGGTAGCTTAACCTTCG-GGAGGGCGCTTACCACTTTGTGATTCATGA	1483
E vs Bacillus		
E vs Staphyloc		

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Which organism is closer to E?

