Midterm exam #2 Take-home questions

MB 451 Microbial Diversity

The rules: You are free to use any notes, books, or online material while taking this take-home exam. You are NOT allowed to get (or give) help of any kind from (or to) anybody. If you have questions about the exam, send an email to Dr. Brown at james_brown@ncsu.edu. You MUST turn this completed take-home portion of the exam in with the rest of the exam when you take it either in class or at DELTA. By signing this exam, you pledge that "*I have neither given nor received unauthorized aid on this test.*"

Signed : _____ Date : _____

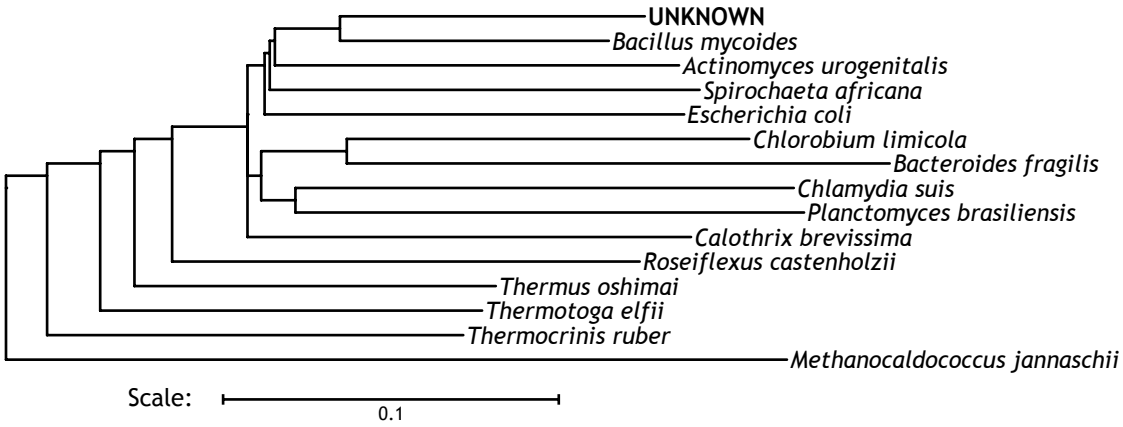
Name : _____

1. For each of the genera listed, provide the name of the phylogenetic group (phylum) of that genus, and something interesting about that specific genus. (½ point each, 20 points total):

Genus	Phylogenetic group (Phylum)	Something interesting about it
Sulfolobus		
Rhodotorula		
Chlamydia		
Gemmata		
Burkholderia		
Peptostreptococcus		
Helicobacter		
Micrococcus		

Genus	Phylogenetic group (Phylum)	Something interesting about it
Cristispira		
Thermosipho		
Thermoplasma		
Flavobacterium		
Deinococcus		
Crithidia		
Stylosphaera		
Oscillatoria		
Methylobacterium		
Roseiflexus		
Azorhizophilus		
Allochromatium		

2. You have isolated an unknown organism in lab. You've misplaced your notes and your plates, so you don't know anything about it. But your ssu-rRNA PCR was successful, and you have good sequence data. From this sequence, you generate the following tree:

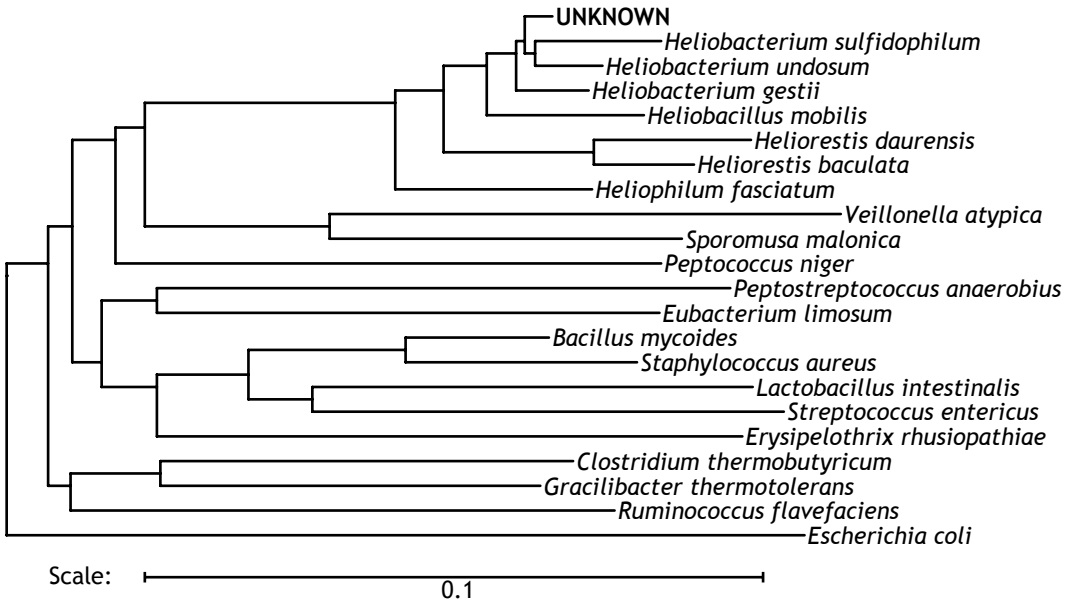


List 5 things you *can* or *can't* predict with reasonable confidence about this organism (2 points each, 10 points total). Common features of Bacteria, or life in general, will not accepted, e.g. "it has DNA", "it doesn't have Golgi", or "don't know what country it comes from". You are allowed to include taxonomic identification only once, e.g. "it's a mammal".

Hint : If it tree'ed out as a mammal, you could predict it had a bony skeleton, mammary glands (if female), and hair, but unless it tree'ed specifically within a particular group, you couldn't predict it whether it was a carnivore or herbivore, or how big it is.

2.1.
2.2.
2.3.
2.4.
2.5.

3. Based on the placement of this organism in the previous tree, you create a more detailed tree:



List 5 ***new*** things you *can* or *can't* predict about this organism with reasonable confidence (2 points each, 10 points total). Once again, common features of Bacteria, or life in general, will not accepted. You are allowed to include taxonomic identification only once. These have to be ***new*** - something you could not have stated based on the prior tree.

3.1.
3.2.
3.3.
3.4.
3.5.

4. Both Chloroflexi and Chlorobi use electrons from sulfide or hydrogen for reducing power for carbon fixation. Compare and contrast the mechanisms by which these two kinds of organisms do this. What are the advantages and disadvantages of each? Use your own words to demonstrate that you actually understand this. (10 points)