ID: LIST204 Microbiology II 2009. 11. 4
Name:

1 What is nitrification? How do nitrifying bacteria contribute to the nitrogen cycle? (environmental effects) (10 points)

Nitification - conversion of ammonia to nitrate (ammonia -> nitrite -> nitrate) (5 points)
Fate of nitrate: 1) easily used by plants 2) lost from soil through leaching or denitrification -> causes of infertile soil (5 points)

2 List ecological and practical importance of methanogens (6 points)

1) important in wastewater treatment
2) CH_4 can be used as clean burning fuel and energy source; CH_4 is greenhouse gas and may contribute to global warming
3) can oxidize iron -> contributes significantly to corrosion of iron pipes

3 What is MRSA? (4 points)

Methicillin-Resistant Staphylococcus aureus (2 points); resistant to vancomycin and casuing secondary infection in the hospital (2 points)

4 What does make Mycobactria acid-fast? (5 points)

the cell wall contains waxes with 60 to 90 carbon mycolic acids
so, basic fuchsin dye cannot be removed from cell by acid alcohol treatment

5 *Deinococcus radiodurans* is extremely resistant to radiation. What could be its defence system for the radiation? Suggest any hypothesis (5 points).

Radition breaks DNA backbone; many DNA repair enzymes are found in its genome
Any reasonable hypothesis (3 points)

Pseudomonas, Aquifex pyrophilus, Myxococcus, Desulfovibrio, Methanococcus jannaschii, Borrelia burgdoferi, Sulfolobus, Treponema palladium, Nisseria gonorrhoeae, Burkholderia mallai, Bacillus subtilis, Green bacteria, Rickettia, Archaeoglobus, Cyanobacteria, Halobacterium, Methanopyrus kandleri, Camylobacter, Streptococcus pyogenes, Esherichia coli, Vibrio cholerae, Vibrio fisheri, Helicobacter pylori, Staphylococcus aureus, Thiobacillus ferroxidans, Nitrobacter, Methanopyrus,Chlorobium, Chloroflexus, Rhizobium, Methylococcus, Hyphomicrobium, Corynebacterium glutamicum, Clostridium, Streptomycetes, Salmonella typhimurium, Thermoplasma, Thermotoga, Thermococcus, Nanoarchaeum equitans, Mycobacterium tuberculosis, Mycoplasma pneumoniae, Pyrococcus furiosus, Leuconostoc, Streptococcus mutans, Hyphomicrobium

**** Pick any related Taxonomic term from above list (3 points each + α)***

6	Methanogenic archaea	*Methanococcus janaschii*
7	Hyperthermophilic So metabolizer	*Pyrococcus furiosus, Sulfolobus, Thermococcus*
8	Microaerophilic	*Aquifex pyrophilus, Helicobacter pylori*
9	Pleomorphic	*Thermoplasma, Rhizobium, Mycoplasma pneumoniae*
10	Green sulfur bacteria	*Chlorobium*
11	Green nonsulfur bacteria	*Chloroflexus*
12	Kimchi (김치)	*Leuconotoc*
13	Coagulase	*Staphylococcus aureus*
14	Dental caries	*Streptococcus mutans*
15	Parasporal body	*Bacillus thuringiensis (6 points for the correct answer)*
16	Microbial leaching	*Thiobacillus*
17	A fruiting body	*Myxococcus xanthus*
18	Budding bacteria	*Hyphomicrobium*
19	Mitochondria	*Rickettia*
20	Sulfate reducing archaea	*Archaeoglobus*
21	Stomach ulcer	*Helicobacter pylori*
22	Bioiluminescence	*Vibrio fisheri*
23	1 to 20% of culturable soil microbiota	*Streptomycetes*
24	Stickland reaction	*Clostridium*
25	Oxygenic photosyntheis	*Cyanobacteria*
26	Hyperthermophilic bacteria	*Aquifex pyrophilus, Thermotoga*