

BACTERIAL TAXONOMY

23 July 2003, 28 July 2004, 25 July 07, 27 July 09, 25 July 11
 TFC 7th: 276-302, 7th: 276-298, Black, 6th: 232-244, Bauman
 2nd: 315-342

Remind Linnaeus system of seven levels: KPCOFGs
Arrangement,

Spore formers: central or terminally located p 320

Means of classification Three domains: (p 321)

Means of identification

Morphology cocci, bacilli, spirilli p 316, 319:
 diplo, strepto-, tetrad, sarcina,
 staphylo-, palisade

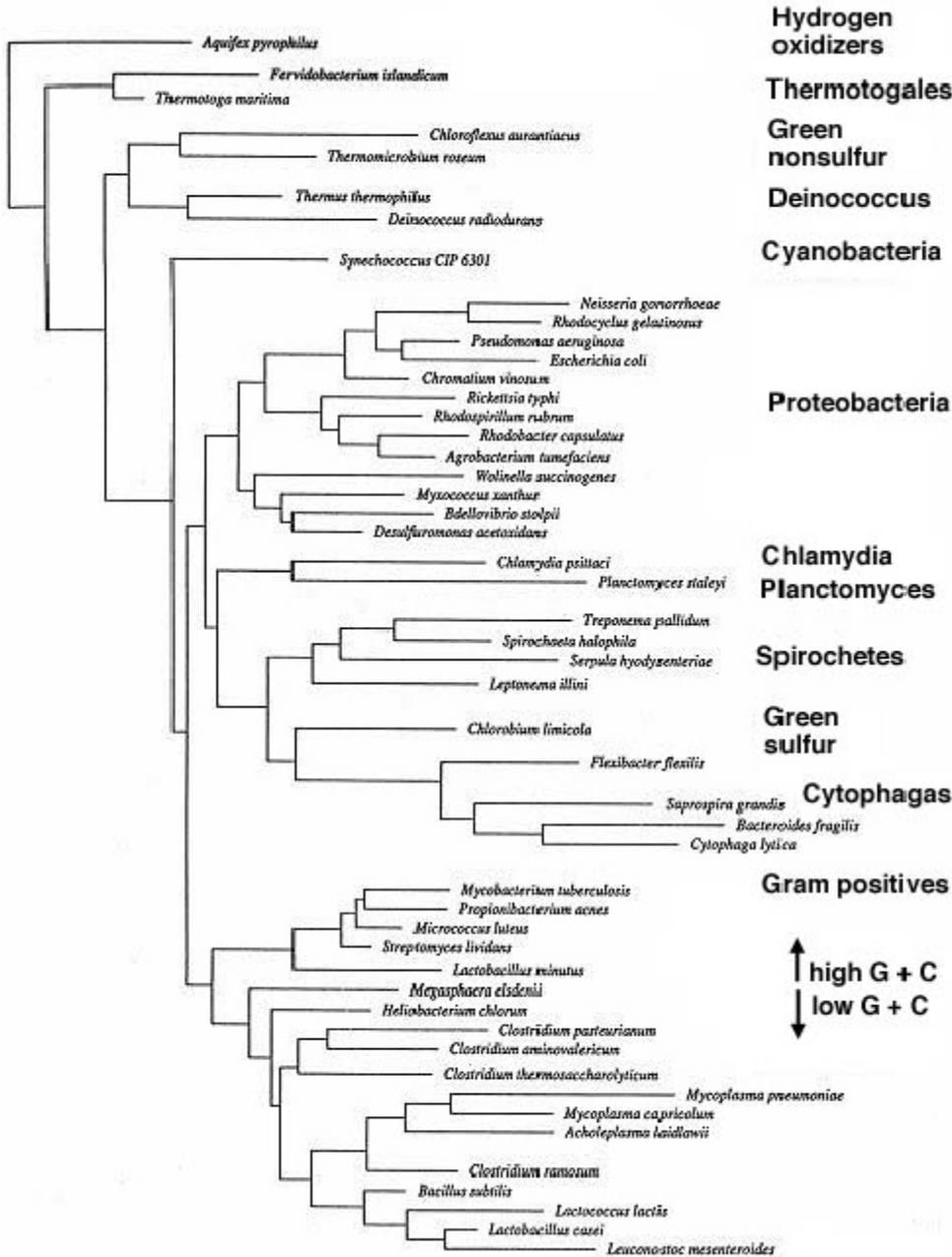
biochemistry ability to grow on various C sources,
 produce various products

Serology presence of characteristic antigens on
 cell surface (p 291)

Phage typing ability of phage to grow on bacteria
 (related to surface proteins) (p 293)

PCR detect specific DNA sequences
 characteristic of species

	Archaea	Bacteria	Eukaryotes
cell type	prokaryote	prokaryote	eukaryote
cell wall	varied, no peptidoglycan	peptidoglycan	varied, with CH ₂ O
membrane lipids	branched	straight chain	straight chain
start to translation	methionine	formylmethionine	methionine
sens to Ab:	no	yes	no
common arm on tRNA	lacking	present	present
examples	methanogens extreme halophiles hyperthermophiles	Gm + Gm- cyanobacteria	plants fungi animals



TAXONOMY OF PROKARYOTES

25 July 2007, 30 July 2008

Bauman 2nd: pp320-339

See diagram of prokaryotes, p 321

ARCHEA:

probably the earliest group, includes

Extremophiles	thermophiles >45 C, source of Taq DNA polymerase (PCR) P 322
Halophiles	require >9% NaCl. Optimum 17-23% NaCl (P 323)
Methanogens	make methane in intestinal gas, hydrothermal vents, sewage, swamps

BACTERIA:

Phototrophic

cyanobacteria	blue green algae
Proteobacteria	purple sulfur bacteria

Gram positive, low GC bacteria (below 50% GC)

Clostridia	“spindle” shaped obligate anaerobes, spore forming
Mycoplasma	lack cell wall, (“Gm+” due to DNA sequence, stain pink in Gm stain)

Gram positive bacilli and cocci

Bacillus	endospore-forming aerobes
Listeria	no endospores, can grow in fridge.
Lactobacillus	no endospores, ferment to produce lactic acid
Streptococcus	plian chains, some non-pathogenic, but etiology of many diseases
Enterococcus	usually diplococci, common in gut
Staphylococcus	grows in grape like clusters. Common on skin

Gram positive high GC bacteria (greater than 50% GC)

Corynebacterium	palisades and V shapes, formed by “snapping” fission. Diphtheria
Mycobacterium	mycolic acid (a wax), pleomorphic, acid fast, TB and leprosy
Actinomycetes	branching filaments, especially in soil, source of many antibiotics

PROTEOBACTERIA (table p 334)

Gram negative proteobacteria

alpha proteobacteria **can grow on low nutrient levels, possess prosthecae**, extensions of the cell

Nitrogen Fixers	Rhizobium, symbiotic with legumes; Nitrobacter
Richettsia	Gm- aerobic rod, obligate intracellular microbes, RMSF
Brucella	coccobacillus, survives phagocytosis, causes brucellosis
Acetobacter	

beta proteobacteria **can grow on low nutrient levels, have different RNA sequences**

Neisseria
Bordetella
Spirillum

gamma proteobacteria

Legionella
Pseudomonas

Glycolytic facultative anaerobes (table p 336)

Escherichia
Serratia
Salmonella
Proteus
Shigella
Yersina
Klebsiella
Vibrio
Haemophilus

epsilon proteobacteria

Campylobacter
Helicobacter

“Other” gram negative bacteria

Chlamydia
Spirochete
Bacteroids