

A. Aerobic/Facultative Bacteria

1. Gram-Positive Cocci

a. Staphylococci

- i. *S. aureus*
- ii. Coagulase-negative staphylococci
 1. *S. epidermidis*
 2. *S. saprophyticus*
 3. CNS (other): *S. haemolyticus*, *S. hominis*, *S. capitis*, *S. schleiferi*, *S. warneri*, *S. lugdenensis*

b. Streptococci-Enterococci-Abiotrophia-Granulicatella – Chains, catalase negative

1. Beta-hemolytic
 - a. *S. pyogenes* (gr. A)
 - b. *S. agalactiae* (gr. B)
 - c. Other Beta-hemolytic Streptococci (Gr. C, F, G)
2. Enterococci
 - a. *E. faecalis*
 - b. *E. faecium*
 - c. Enterococci (other)
3. Pneumococcus
 - a. *S. pneumoniae*
4. Viridans group streptococci
 - a. *S. mutans* group
 - b. *S. salivarius* group
 - c. *S. sanguis* group
 - d. *S. mitis* group
 - e. *S. anginosus* group
5. Nutritionally variant streptococci- “satelliting” strep
 - a. *Abiotrophia defectiva*
Granulicatella adiacens
G. elegans
6. *S. milleri*
 - a. *S. anginosus* group (includes *S. intermedius* and *S. constellatus*)
 - b. Group F
 - c. Minute colony A, C, G
7. *S. bovis* (Gr. D non-enterococcus)

2. Gram-Negative Cocci

Neisseria and *Moraxella* – Oxidase positive, Gram – diplococci

- a. *N. gonorrhoeae*
- b. *N. meningitidis*
- c. *M. catarrhalis* – formerly *Branhamella*

3. Gram-Positive bacilli

- a. *Corynebacterium* species – catalase positive, aerobic diphtheroid
 - i. *C. diphtheriae*
 - ii. *C. jeikeium*

- iii. *C. urealyticum*
- b. *Lactobacillus* sp. – catalase negative
- c. *Bacillus* sp.
 - i. *B. anthracis*
 - ii. *B. cereus*
- d. *Listeria monocytogenes* – Catalase positive, beta-hemolytic, umbrella/tumbling motility
- e. *Erysipelothrix rhusiopathiae*
- f. *Arcanobacterium haemolyticum*

4. Gram-Negative bacilli

- a. Glucose fermenters / Oxidase negative
 - 1) Enterobacteriaceae
 - a) Lactose fermenters
 - i. *E. coli* – indole positive
 - ii. *Klebsiella* – mucoid colony
 - b) Non-lactose fermenters
 - i. *Proteus* – swarming colony
 - ii. *Morganella*
 - iii. *Providencia*
 - iv. *Salmonella enterica* – H₂S positive
 - a. *S. boydii* (serogroup C)
 - b. *S. dysenteriae* (serogroup A)
 - c. *S. flexneri* (serogroup B)
 - d. *S. sonnei* (serogroup D)
 - v. *Shigella* – non motile
 - c) Lactose or non-lactose fermenters
 - i. *Citrobacter*
 - a. *C. freundii*
 - b. *C. koseri*
 - ii. *Enterobacter*
 - a. *E. cloacae*
 - b. *E. aerogenes*
 - iii. *Serratia*
 - a. *S. marcescens*

Add *Yersinia pestis* and enterocolitica

- b. Glucose fermenters / Oxidase positive
 - 2) *Vibrio*-*Aeromonas*-*Plesiomonas*
 - a) *Vibrio* – Halophilic (grow in 6% salt)
 - i. *V. cholerae*
 - ii. *V. parahaemolyticus*
 - iii. *V. vulnificus*
 - b) *Aeromonas hydrophila*
 - c) *Plesiomonas shigelloides*
- c. Glucose Non-Fermenters / Oxidase-Negative
 - 1) *Acinetobacter*
 - a) *A. baumannii* – glucose oxidizer

- b) *A. lowffii* – glucose non-oxidizer
 - 2) *Stenotrophomonas maltophilia* – glucose oxidizer, rapid maltose oxidizer, rapid maltose oxidizer
 - d. Glucose Non-Fermenters / Oxidase-Positive
 - 1) *Pseudomonas* sp
 - 2) *Pseudomonas fluorescens* group
 - a) *P. aeruginosa* – growth at 42 C
 - b) *P. fluorescens* – no growth at 42 C
 - c) *P. putida* - no growth at 42
 - 3) *Burkholderia cepacia* – dry, yellow colony on iron-containing media (add *B. mallei* and *B. pseudomallei*)
 - 4) *Alcaligenes* – sweet odor
5. Fastidious Gram-Negative Bacilli/Coccobacilli
- a. *Haemophilus*
 - i. *H. influenzae* – requires X and V
 - ii. *H. parainfluenzae* – requires V
 - iii. *H. ducreyi* – requires X
 - iv. *H. aphrophilus* – No X or V requirement
 - b. HACEK group
 - i. *Haemophilus aphrophilus*
 - ii. *Actinobacillus actinomycetemcomitans*
 - iii. *Cardiobacterium hominis*
 - iv. *Eikenella corrodens*
 - v. *Kingella kingae*
 - c. *Bordetella pertussis*
 - d. *Pasteurella multocida*
 - e. *Brucella* sp.
 - f. *Campylobacter* – small, curved bacilli (sea gulls)
 - 1) *C. jejuni* – growth at 42 C
 - 2) *C. coli* - growth at 42 C
 - 3) *C. fetus*- no growth at 42 C
 - g. *Capnocytophaga*
 - h. *Francisella tularensis*
 - i. *Helicobacter pylori*
 - j. *Legionella*, requires cysteine for growth
6. Bacteria without cell walls
- a. *Mycoplasma* and *Ureaplasma*
 - 1) *M. pneumoniae*
 - 2) *M. hominis*
 - 3) *U. urealyticum*
7. Uncultivable, very difficult to cultivate or requires cell culture/Animal inoculation for growth
- a. *Afipia*
 - b. *Bartonella* – freshly prepared blood agar for growth
 - c. *Chlamydia* – intracellular pathogen
 - i. *C. trachomatis*

- ii. *C. pneumoniae*
- iii. *C. psittaci*
- d. *Coxiella burnetii*
- e. *Ehrlichia*
- f. *Rickettsia*
- g. *Spirochetes*
 - a. *Borrelia burgdorferi*
 - b. *B. recurrentis*
 - c. *Leptospira interrogans*
 - d. *Treponema pallidum*
- h. *Tropheryma whippelii*

B. Anaerobic Bacteria

1. Anaerobic Gram-Negative Bacilli
 - a. *Bacteroides fragilis* group
 1. *B. fragilis*
 2. *B. distasonis*
 3. *B. thetaiotaomicron*
 4. *B. uniformis*
 5. *B. vulgaris*
 6. *B. ovatus*
 7. *B. uniformis*
 - b. *Bacteroides* sp, not *B. fragilis* group
 1. *B. ureolyticus* – usually sensitive to bile.
 2. *Bilophila wadsworthia*
 3. *Porphyromonas*
 4. *Prevotella*
 5. *Fusobacterium*
2. Anaerobic Gram-Positive Bacilli that form Spores
 - a. *Clostridium*
 1. *C. perfringens*
 2. *C. botulinum*
 3. *C. tetani*
 4. *C. septicum*
 5. *C. difficile*
3. Anaerobic Gram-Positive Bacilli that do not form spores
 - a. *Actinomyces israelii* – sulfur granules
 - b. *Propionibacterium acnes*
 - c. *Eubacterium*
 - d. *Lactobacillus*
 - e. *Bifidobacterium*
4. Anaerobic Cocci
 - a. *Veillonella*
 - b. *Peptostreptococcus*
 - c. *Peptococcus* (now contains only one species-*P. niger*)