

PATHOGENIC GRAM NEGATIVE COCCI AND BACILLI

rvsd 4 July 1993, 3 August 1994, 1 Aug 01, 28 Feb 02, 1 Mar 02, 22 July 02, 30 July 03, 28 July 04, 08-08-08, 4Aug09, 4Aug10, 3Aug11, 7Mar13
TFC, 2nd, p 275-299, also Jensen & Wright, *Medical Microbiology*, TFC's 7th, pp 304-314, 8th: 304-316, Bauman, 2nd, pp 565-
Bauman 3rd: 569-599, *Bergey's Manual of Systematic Bacteriology*, (1984) four volumes (See p. 756 for overview)



PROTEOBACTERIA: Gm-, chemoheterotrophic. Illustration: p 321, table: p 334

ALPHA PROTEOBACTERIA: aerobic, live on low levels of nutrients, many with prosthecae p 331

- Acetobacter aceti* (vinegar rod) on substrate of wood shavings, gravel, make acetic acid fr EtOH
Rhizobium spp. (root life) bacteriods symbiotic in legume root nodules, infect roots of legumes, form nodules, fix nitrogen with nitrogenase, convert N₂ to NH₃, etc.
Nitrobacter convert NH₃ to NO₃

BETA PROTEOBACTERIA: can use diffusible nutrients from decomposition

- Neisseria:* parasitic on human mucous membrane (fac. anaerobic, Gm- diplococci)
N. gonorrhoeae (p 570) STD, many are **PPNG**, diagnosis: gm- diplococci in PMN fr **purulent urethral exudate**
Can cause PID in females. Neonatal ocular infection leads to blindness
N. meningitidis (p 573) Contagious in close quarters. **PoE:** nasopharynx. In blood: meningococcemia to meningitis.
Sore throat, stiff neck, headache, etc. NOTE: ~40% pop. are carriers in nasopharynx

PATHOGENIC, GRAM NEGATIVE, FACULTATIVE ANAEROBIC

Enterobacteriaceae, active fermenters, **TSI, IMViC differentiates** (indole, methyl red, Voges-Proskauer = pink rxn in alkali, citrate). All release endotoxin, many produce bacteriocins, causing lysis of other bact. (See p. 275)

- Escherichia coli* p 580, 575 ubiquitous in colon. **opportunistic**, causes 80-90 % **UTI** in young ♀ (♀ 15 x as freq as ♂)
enterotoxigenic strains cause traveler's diarrhea (TD) (~50% TD due to *E. coli*)
enterohemorrhagic strain **O157:H7**, bloody diarrhea, Jack-in-the-Box, beef contaminat'n
Klebsiella pneumoniae 574 pediatric septicaemia, **pneumonia** (with bloody sputum) is **common nosocomial** (CRE)
prominent in alcoholics, compromised PTs, wound infections, now "CarbaPENem R. Entero."
Serratia marcescens p 579 red pigment in some, opportunistic, nosocomial in debilitated:
GU, resp., heart valves, meningitis, formerly used as test of germ warfare.
Enterobacter com. in soil, GU, nosocomial
Proteus vulgaris p 579 **highly motile**, norm in fecal flora, incr with antibiotics, **can cause UTI** (esp catheterized PTs) **burn & wound** infections, infant diarrhea, resistant to many antibiotics, **funky smell**
Salmonella p 581
S. typhi (584) differentiate by Kauffmann-White serological tests of O (LPS) and H (flagellar) antigens
(storm) fecal/oral, contaminated food, drink, esp drinking water, enters thru GI to lymph vessels, **shed in stool**, causes typhoid fever with **septicemia**. Carrier: Typhoid Mary.
S. typhimurium (storm mouse) **gastroenteritis** ("food poisoning"), 1-3 days after ingestion of contam. food (especially poultry, now some beef) no septicemia (cannot cross the intestinal wall).
Shigella dysenteriae (582) inhabits, inflms colon, bloody diarrhea, **2nd most com. in travelers = bacillary dysentery**
Yersinia pestis (583) **bubonic** (groin) **plague**, rapid invsn, overwhelming sepsis. endemic: SW ground squirrels.
Black Death killed 33% of Europe pop. in 14th century. Bubo: p 580 (pneumonic is worst)

Pasteurellaceae: very sm. bacilli & coccobacilli, fastidious, non-motile, most parasites, attack mucous membrane

- Hemophilus influenzae:* p 585 com inhab of upr rsp muc memb. children: otitis media, meningitis (6 mo to 2 yr), etc. (req. blood for growth, **need heme and NAD⁺**), 2° infctn p colds, **can cause pinkeye**.
[*Hemophilus ducreyi* p 586 STD, chancroid, often asymptomatic in women, more common in Africa]

PATHOGENIC, GRAM NEGATIVE, AEROBIC BACILLI

- Bartonella henselae* p 587 Cat scratch fever: bite or scratch, papular lesion, swollen lymph nodes for weeks. 40,000/yr
Brucella abortus p 587 mammal parasite, brucellosis (undulant fever), fr milk, animal fluids. contag abortn, 200/yr
Bordetella pertussis: p 588 (throughout cough) transmission: resp route, grows on surf trachea & bronchi. 12,000/yr
inhibit cilia: p585. Causes whooping cough, vaccine = **killed cells in DPT** shots

GAMMA PROTEOBACTERIA: Largest group of proteobacteria, great variety of physiological types

- Pseudomonas aeruginosa* (false, simple organism) psychrophilic, monotrichous, **pigments:** pyocyanin, fluorescein
p 591 infects burns, wounds, resists many antibiotics. Transmitted in H₂O, nosocomial.
Other species denitrify soil via anaerobic respiration, reduce NO₃⁻ releasing N₂ to the air.
Francisella tularensis: p 588 **zoonosis**, transmitted by flea, tick fr rodents, **rabbit fever**, tularemia, fever, **myalgia**
Legionella spp. p 594 inhabits warm-water supplies, causes Legionnaire's Disease: debilitated persons (29 died)
Bacteroides p 596 anaerobic: group of normal GI flora, 85% bact Glitis?, can cause **peritonitis** after surgery.