Bacteria

Resident Population



	Infective Bacteria					
BACTERIA	ISOLATION SITE	RELATIVE INCIDENCE				
S. aureus	Surgical wound infection	Hi				
Enterococci	Ibid	Hi				
Enterococci	Invasive; UTI 2° internalization of equipment	Very Hi				
P. aeruginosa		Hi				
S. aureus	1° bacteremia	Very Hi				
E. coli		Hi				
Bacteroides	2° bacteremia	Hi				
S. aureus		Hi				
Serratia		Hi				
P. aeruginosa	Infected burn	Very Hi				
S. aureus		Very Hi				
E. coli		Moderate				
P. aeruginosa	Nosocomial LRI	Very Hi				
S. aureus		Hi				
Klebsiella		Hi				

Incubation Periods of Some Important Communicable/Infectious Diseases			
Adenovirus	5-6 days		
Ascariasis	8-10 weeks		
Cat-scratch Fever	3-10 days		
Chicken Pox	14-16 days		
Coxsackie virus	2-14 days		
Diphtheria	2-6 days		
Gas Gangrene	1-5 days		
Gonorrhea	3-5 days		
Impetigo contagiosa	2-5 days		
Measles (rubeola)	10-12 days		
Mumps	2-3 weeks		
Mycoplasma pneumonia	1-3 weeks		
Pertussis	5 days - 3 weeks		
Rabies (Humans)	2-6 weeks (to 1 year)		
Rabies (dogs)	21-60 days		
Rubella	2-3 weeks		
Smallpox	12 days		
Syphilis (1° chancre)	10-90 days		
Tetanus	3 days to 3 weeks		
Tuberculosis (1° lesion)	2-10 weeks		

Bacterial Separation





Gram Positive Bacteria

Bacteria: staphylococcus aureus Gram Reaction: Positive Morphology:

Type of Bacteria: Food borne/waterborne/contact Primary Disease[s]:

Impetigo contagiosum	Scalded skin syndrome	Staphylococcal food poisoning	Toxic shock syndrome
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Staphylococcal food poisoning	Toxic shock syndrome
Diarrhea, N/V, brief incubation period (1-8°)	Fever, watery diarrhea, sore throat, Sun burn- like rash, especially in menstruating women

Bacteria: Streptococcus pyogenes Gram Reaction: Positive Morphology:

Type of Bacteria: Airborne of upper respiratory tract Primary Disease[s]: Strep throat; scarlet fever Brief Description[s]: Sore throat; skin rash; septicemia; β-hemolytic strains; complication: rheumatic fever; affects skin and upper respiratory tract (URT) Bacteria: streptococcus pneumoniae Gram Reaction: Positive Morphology:

Type of Bacteria: Airborne to lower respiratory tract (LRT) Primary Disease[s]: Pneumococcal pneumonia (vaccine to 23 of 80 strains available) Brief Description[s]: Affects lungs; rust colored sputum; deterioration of alveoli ASIDE:

Antibody is added to a suspected bacterium, mixed and incubated, then examined under a microscope. If the antibody recognizes the microbe, it binds to the surface of the microbe (or its capsule), causing the methylene blue to move farther away from the bacteria. This appears as a swelling around the bacteria. Hemolytic Patterns: Generally sheep RBC destruction by many streptococci

 α = 1-3 mm greenish zone around colonies β = complete lysis without color around colonies γ = no hemolysis -- for Streptococci ONLY

Image Source: http://faculty.ccbcmd.edu/courses/bio141/labmanua/lab14/abg_asm.html

*Christie, Atkins, Munch-Peterson test

A single line of β-hemolytic S. aureus is streaked in one line on blood agar. At 90° to that, the presumptive Group B Strep is streaked across it in one line. If an arrowhead shaped zone of hemolysis occurs around it, this is positive for Group B Strep.¹²

To identify Group A, b -hemolytic Strep, a Bacitracin disc and a Sulfamethoxazole/trimethoprim (SXT) disc are placed upon blood agar after the microbe is streaked on it. If there is a growth inhibition zone around the Bacitracin and not the SXT disc, this is consistent with Group A, b -hemolytic Strep.

Lancefield Group	Hemolytic pattern	Reference Bacterium	Lab test	Hypertonic salt growth?	Bile growth ?	Bacitracin	Diseases
Α	β	S. pyogenes		N	N	Sens	Impetigo, rheumatic fever, strep throat
В	β	S. agalactiae	Inhibited by bacitracin	N	N	Sens	Neonatal meningitis; bovine mastitis; neonatal sepsis
C	?	S. equi	CAMP* positive	Ν	N	Sens	tonsillitis; pneumonia; meningitis; cellulitis; bacteremia; UTI and puerperal infections (42 days after childbirth = puerperium); IVDU with 2° immunocompromisation → arthralgia /itis
D	0, α	S. faecalis	?	Y	Y	Usually resistant	GUTI; abdominal abscesses; endocarditis; wound infections
G	?	S. anginosus	?	?	?	?	endovascular infections; septic arthritis
Not typed	0, α, β	S. viridans	Resistant to optochin	N	±	Sens	Dental caries (S. mutans); strep throat
None	α	S. pneumoniae	Susceptible to optochin; Quellung reaction positive	N	N	?	Pneumonia, meningitis, endocarditis 14

RE: Bovine Mastitis

- Detecting Mastitis Secondary to Streptococcal infection
- Hotis Test: incubate fresh milk with 0.025% bromocresol purple for 24 hours at 37°C.
- Positive Reaction: yellow flakes on side of tube (dependent on Strep and agglutinins – yellow due to lactose fermentation
- Negative Reaction: Purple no flakes or yellow color

 α -hemolysis is incomplete hemolysis of RBC in blood agar, leaving a greenish, yellowish, pukish color around the colonies;

 β -hemolysis is complete hemolysis, leaving clear zones around colonies;

 γ -hemolysis is used ONLY with Strep -- it is non-hemolysis.

Growth on hypertonic salt means that the organisms are more than likely enteric-types; non-enteric-types don't grow on salt since where they are has no salt.

Bile growth examines the growth of the organisms in the presence of bile. If they grow, they're more than likely enteric; if they don't, they're not.

Characteristic/ Components	Staphylococcus	Streptococcus
Catalase	Y	N
Cytochromes	Y	N
Facultative Anaerobes	Y	Y

Bacteria: Bacillus anthracis Gram Reaction: Positive Morphology:

Type of Bacteria: Aerobic spore formers; soil borne Primary Disease[S]: Anthrax (wool sorter's disease; malignant pustule) Brief Description[S]: Boil-like lesions; hemorrhage; rare in humans EXCEPT in regions of sheep raising (still not very common, but more so than in other regions of the world) Bacteria: clostridium tetani Gram Reaction: Positive Morphology:

Type of Bacteria: Anaerobic spore former; soil borne Primary Disease[s]: Tetanus Brief Description[s]: Spasms, tetanus (NMJ "misfire") inhibits Ach'ase activity; second most toxic toxin known to man Bacteria: Clostridium difficile Gram Reaction: Positive Morphology:

Type of Bacteria: Nosocomial Primary Disease[s]: Colitis Brief Description[S]: Diarrhea; ? incubation period (new comer on the scene: expressed following long term antibiotic therapy) Bacteria: Clostridium perfringens Gram Reaction: Positive Morphology:

Type of Bacteria: As above in box Primary Disease[s]:

Clostridial food poisoning		Gas gangrene (Clostridial myonecrosis)
Brief	Description[s]:

Clostridial food poisoning	Gas gangrene (Clostridial myonecrosis)
Diarrhea/cramping; common in protein rich	Swollen tissues; gangrene; gas blocks blood
foods (8-16° incubation)	flow into and out of tissues

One side of the bi-plate has antibody to lecithinase added to it and the other doesn't.

The one without Ab shows growth that looks like a fried egg: colony (yolk) in the center of a zone (egg white) that lecithin has been removed from, i.e., catabolized.

The side with Ab shows ONLY colonial growth as the lecithinase has been inhibited.

Bacteria: Clostridium botulinum Gram Reaction: Positive Morphology:

Type of Bacteria: Food borne; water borne Primary Disease[s]: Botulism Brief Description[s]: Paralysis at NMJ;

6 oz bottle enough to decimate the world's population; most poisonous toxin known to man; 24-96° incubation; requires polyvalent antitoxin to treat Bacteria: Clostridium sporogenes Gram Reaction: Positive Morphology:

Type of Bacteria: Anaerobic sporeformer Primary Disease[s]: Works with C. perfringens (see above); mixed gangrenous infections Brief Description[s]: See C. perfringens

Clostridium	Nitrate reduction	Cooked meat (growth)	Litmus reaction	Hemolysis	Fermentation		n
					Glucose	Lactose	Sucrose
tetani	Ν	Gas; blackening	Soft cloth	Y	Ν	Ν	Ν
perfringens	Y	Gas	Stormy fermenta- tion	Y	Y	Y	Y
botulinum	N	Gas; blackening	Acid	Y/N	Y	Ν	N

Litmus Milk Reactions		
Pink	Ferments lactose with acid products	
Blue	No proteolysis	
White	litmus became an electron acceptor	
Curd	Acid from lactose or rennin	
Soft cloth	curd digestion due to casein hydrolysis	

Bacteria: corynebacterium diphtheriae Gram Reaction: Positive Morphology:

Type of Bacteria: Airborne of URT Primary Disease[s]: Diphtheriae Brief Description[s]: Heart, nerve fibers;

pseudomembrane (false membrane on any mucous surface [occasionally on the skin]; yellow-white to gray on tonsils or fauces; pyrexia to 100° or 101°F)

Bacteria: Mycobacterium leprae

Gram Reaction: + when takes stain; - when does not take stain Morphology:

Type of Bacteria: AFB; contact Primary Disease[s]: Leprosy Brief Description[s]: tumor like growths; skin disfigurement; "claw hand"; long incubation period Bacteria: Mycobacterium tuberculosis

Gram Reaction: Positive when take stain (as with M. leprae, above) Morphology:

Type of Bacteria: AFB; Inhaled, ingested, injected -- airborne to LRT Primary Disease[S]: Tuberculosis; affects lungs, bones, organs; diagnosed by CXR and/or skin test; MDRMT 2° non-compliance and AIDS Brief Description[S]: inflammatory infiltrations, abscesses, fibrosis, calcification and necrosis of tissues; cavitations

http://www.cdc.gov/nchhstp/stateprofiles/Nevada/Nevada_Profiles.htm

In 2005, Nevada reported:

The 120th highest rate of TB among states in the U.S. (4.0 per 100,000 persons – down from 2005).

62.7% of TB cases occurred in foreign-born persons – down from 2005.

MOTT = <u>Mycobacteria</u> <u>Other</u> <u>Than M. tuberculosis</u>

Runyon Method of MOTT [*] Classification					
Category	Color	Mycobacterium	Disease		
Group 1: Photochromogens	Bright yellow to orange β-carotene pigment when exposed to visible light, but are unpigmented when grown in the dark	M. kansasii	pulmonary disease in older-aged white men with underlying COPD		
		M. marinum	<pre>small skin papules after traumatized skin is in contact with contaminated nonchlorinated fresh or salt water often self-resolving</pre>		

Runyon Method of MOTT [*] Classification					
Category	Color	Mycobacterium	Disease		
Group 2: Scotochromogens	Pigmented in the dark, usually a deep yellow to orange; pigmentation usually darkens on exposure to light	M. scrofulaceum	Associated with cervical granulomatous lymphadenitis in children between 1- 5, which is unilateral and typically submandibular. Excision of nodes is curative		
		M. szulgai	Chronic cavitary pulmonary infection in middle aged men; at 37°C, scotochromogenic; at 25°C, photochromogenic		

Runyon Method of MOTT* Classification					
Category	Color	Mycobacterium	Disease		
Group 3: Nonphotochromogen	Unpigmented or light yellow and are not affected by light	M. avium- intracellulare (MAC)	Pulmonary disease with COPD similar to TB; prominent in AIDS; ubiquitous; second most frequently isolated mycobacterium in USA; naturally MDR (1° characteristic)		
Group 4: Rapid growers	Unpigmented species which produce colonies in less than 7 days when isolated by subculture	M. fortuitum M. chelonae	Present in water, soil and dust; patients present with failure of wound to heal: either nosocomial or trauma; pus-filled wounds which may progress to chronic ulceration		

A Multi-Characteristic Bacteria				
	1st: Mycobacteri			
	2nd: Staphylocod			
	3rd: Rhodococc			
Grows as cocci, short rods, branching filaments	rough colonies; orange to red to rose colored on nutrient agar and Dorsett Egg slant		Partially acid-fast; found in soil and herbivore dung	
	Typically cause pneumonia in foals and mice; one report observed infection in a house cat			
	In man, numerous reports of pneumonia, chronic corneal ulcer and ulcerated skin lesions reported in immunocompromised patients			
Tests	Results	Tests	Results	
Catalase	+	Motility	-	
Nitrate reduction	+	Modified Ziehl-Neelson	Acid-fast	
Urea	+	Ziehl-Neelson	Negative	
Oxidase	-	Anaerobic growth	Negative	
Gelatin (48 hours)	+	Gram stain	Gram-positive	

Tuberculin Skin Tests			
Mantoux	Intradermal injection of PPD		
Tine	Multiple punctures with PPD or OT (old tuberculin); if positive, requires a Mantoux		
Mono-Vacc			
Aplitest			

Normal Results for Tests				
Mantoux	≤ 5 mm diameter induration; Borderline normal = 5-9 mm induration ; > 9 mm = positive test	after 48-72°		
Tine and Aplitest	no vesicle; ≤ 2 mm diameter induration	after 48-72°		
Mono-Vacc	no induration	after 48-96°		

The emphasis, here, is on the Mantoux test. It is the gold standard. Why the others are even still mentioned in the literature, I don't even know. They are mentioned only because they are still around.
Bacteria: Nocardia asteroides

Gram Reaction: Positive; also AFB (may confuse with mycobacterium) Morphology:



Type of Bacteria: soil borne Primary Disease[s]: Mycetoma (bacterial) Brief Description[s]: swelling of SQ; sinus tract formation; granules present in draining pus

Bacteria: Actinomyces israelii

Gram Reaction: Positive; may also appear AFB (may also confuse with mycobacterium) Morphology:



Type of Bacteria: Zoonotic, soil borne

Primary Disease[s]: Mycetoma (e.g., lumpy jaw)

Brief Description [S]: As with Nocardia; sulfur granules (minute yellowish granules) in pus Both bacterial mycetomas respond to antibiotic therapy: Nocardia to sulfa type drugs and Actinomyces to PCN or TET – FUNGAL MYCETOMA DOES NOT HAVE ANY SPECIFIC THERAPY, I.E., NO SPECIFIC ANTIFUNGAL AGENTS WORK

GRAM NEGATIVE BACTERIA

Bacteria: Gardnerella (formerly Haemophilus) vaginalis Gram Reaction: Negative Morphology:



Type of Bacteria: stD Primary Disease[s]: Vaginitis Brief Description[s]: Foul-smelling discharge; commensal to vagina; "clue cells": wet prep of vaginal epithelium shows stipling with bacteria; mixing 10% KOH with discharge will give a fishy odor Bacteria: Neisseria gonorrhoeae Gram Reaction: Negative Morphology:



Brief Description[s]: Pain on urination; discharge; salpingitis;

PPNG possible; complication in women = PID



Most current data from CDC.

http://www.cdc.gov/nchhstp/stateprofiles/Nevada/Nevada_Profiles.htm

Note rise in Chlamidiae.

Bacteria: Neisseria meningitidis Gram Reaction: Negative Morphology:



Type of Bacteria: Airborne to URT Primary Disease[s]: Meningococcal meningitis Brief Description[s]: URT, blood, meninges, paralysis, fatality common

Fermentation/Identifying Patterns of Neisseria							
	Fermentation of:				Oxidase activity	Habitat	
Neisseria	Glucose	Lactose	Maltose	Fructose	Sucrose		
gonorrhoeae	Y	Ν	Ν	Ν	Ν	Y	Genital infections of humans
meningiditis	Y	N	Y	N	Ν	Y	Nasopharynx of humans

Bacteria: Escherichia coli Gram Reaction: Negative Morphology:



Type of Bacteria: Food borne; water borne Primary Disease[s]: Diarrhea (traveler's, too) Brief Description[s]: Diarrhea due to enterotoxin (24-72° incubation)

	Identi	fica	atic	on of S	elected	Gram	Negative	Bacteria	
Name	Indole	MR	VP	H ₂ S prod	Simmon's citrate	Urease	Gas with glucose fermentation	Lactose fermenta- tion	Mannitol fermenta- tion
E. coli	Y	Y	N	Ν	Ν	Ν	Y	Y	Y
Klebsiella spp.	N	Ν	Y	N	Y	Y	Y	Y	Y
S. marcescens	N	Ν	Y	N	Y	М	Y	SLOW	Y
P. vulgaris	Y	Y	N	Y	Maybe (M)	Y	Y	N	Ν

Bacteria: Salmonella typhi Gram Reaction: Negative Morphology:



Type of Bacteria: food borne; water borne Primary Disease[S]: Typhoid fever Brief Description[S]: Ulcers, fever maxes out at 104-105°F by 7 days, rose spots particularly on abdomen (will blanch with pressure); spread from carriers; incubation 8-48°; epistaxis; proteinuria; urine retention common; splenomegaly Bacteria: Vibrio cholerae Gram Reaction: Negative Morphology:

Curved rods:		
	A Martin	

Type of Bacteria: Food borne; water borne Primary Disease[s]: Cholera Brief Description[s]: rice-water stools; shock; extreme diarrhea; 24-72° incubation Bacteria: Klebsiella pneumoniae Gram Reaction: Negative Morphology:



Type of Bacteria: Airborne to LRT Primary Disease[S]: Lungs: pneumonia; common due to nosocomial acquisition; UTI, also Brief Description[S]: UTI dx'd by C and S; pneumonia, ditto -- also greenish phlegm Bacteria: Francisella tularensis Gram Reaction: Negative Morphology:



Type of Bacteria: arthropod borne (dog bite, too) Primary Disease[s]: Tularemia Brief Description[s]: eye lesions; ulcerated skin; pneumonia; multiple modes of transmission (fleas and ticks)

Bacteria: Yersinia pestis Gram Reaction: Negative Morphology:



Type of Bacteria: arthropod borne Primary Disease[s]: Bubonic plague Brief Description[s]: Buboes, pneumonia, septicemia, from infected rodents (fleas); also pneumonic form Bacteria: Brucella abortus Gram Reaction: Negative Morphology:

rods:	

Type of Bacteria: zoonotic Primary Disease[s]: Brucellosis, aka Malta fever Brief Description[s]: febrile disease; depending on the author, causes (or not) infectious abortions in humans Bacteria: Haemophilus influenzae Gram Reaction: Negative Morphology:



Type of Bacteria: air borne to URT Primary Disease[S]: Meningitis; Type III causes bacterial conjunctivitis Brief Description[S]: Meningitis: affects URT, meninges, 6 different types known; Type III: pink eye, photophobia, CONTAGIOUS, copious discharge



Some bacteria grow better when they are grown in the presence of an energy donor and when they are grown in close proximity to that donor.

Factor X seems to be iron and Factor V seems to be NADH.

Bacteria: Bordatella pertussis Gram Reaction: Negative Morphology:



Type of Bacteria: Air borne to URT Primary Disease[s]: Whooping cough Brief Description[s]: mucous plugs; cough with "whoop" on end of it; coughing spasms Bacteria: Serratia marcescens Gram Reaction: Negative Morphology:



Type of Bacteria: Airborne to LRT; UTI also Primary Disease[s]:

Pneumonia	UTI
Brief Description	[s]:

pneumonia	UTI
common due to nosocomial infection; watch	in nurseries: red pigment in diaper indicative
hydration (CXR)	of S. marcescens UTI

Bacteria: Legionella pneumophila Gram Reaction: Negative Morphology:



Type of Bacteria: Air borne in water droplets to LRT Primary Disease[S]: Legionnaire's disease, pneumonia Brief Description[S]: pneumonia, dry cough, person-to-person transmission does not occur, occasionally GI symptoms Bacteria: Moraxella (formerly Branhamella) catarrhalis Gram Reaction: Negative Morphology:



Type of Bacteria: URT Primary Disease[S]: Otitis media Brief Description[S]: inflamed TM; erythematic TM; fluid in middle ear; may be confused with meningococci Erythema nodosum: red and painful nodules on the lower extremities; associated with rheumatism; various drugs and enteric poisoning induce

Erythema multiforme: macular eruptions with erythematic papules/tubercles; on extremities, generally; no itching; no burning; no rheumatic pains; may appear in pleomorphic rings

Brief Dental Microbiology



Tooth Number[s]	Tooth Name	Tooth Number[s]	Tooth Name
1, 32	Wisdom Tooth	9, 24	Central Incisor
2, 31	Second Molar	10, 23	Lateral incisor
3, 30	First Molar	11, 22	Canine
4, 29	Second Pre-molar	12, 21	First Pre-molar
5, 28	First Pre-molar	13, 20	Second Pre-molar
6, 27	Canine	14, 19	First Molar
7, 26	Lateral Incisor	15, 18	Second Molar
8, 25	Central Incisor	16, 17	Wisdom Tooth

Tooth Number[s]	Tooth Name	Tooth Number[s]	Tooth Name
Α, Τ	Second Pre-molar	F, O	Central Incisor
B, S	First Pre-molar	G, N	Lateral incisor
C, R	Canine	H, M	Canine
D, Q	Lateral Incisor	I, L	First Pre-molar
E, P	Central Incisor	J, K	Second Pre-molar





S. mutans

- S. mutans LOVES carbohydrates -- so much that it stores its own carbohydrates in its cells for time when you don't feed it carbohydrates and when it becomes "buried" in plaque and is unable to easily get its own carbohydrates from your diet.
- S. mutans catabolizes the carbohydrates into acidic end products. These end products react with the enamel in your teeth (the hardest surface in the human body) to dissolve the enamel. That causes dental caries.
- S. mutans also makes plaque from the carbohydrates that help adhere S. mutans to the surface of the tooth. This furthers the caries and as it progresses, a cavity develops. The cavity develops due to proteolysis of the dentin and cementum by bacterial enzymes.

- Everything illustrated will happen without adequate dental hygiene. Daily brushing, flossing, rinsing, irrigating will greatly reduce the number of bacteria in your mouth that help form plaque.
- BTW: animals that are kept in a sterile environment will NOT develop caries if they are fed sugar. Once S. mutans is introduced with sugar, they will rapidly develop caries and cavities.
- Regular visits to your dental hygienist will prevent carious lesions from forming, or will allow them to be caught at an earlier stage and dealt with in a simple manner.

- Over time, normal oral tissue will pick up S. mutans. This microorganism's presence causes the migration of macrophages, lymphocytes and B-cells to the effected tissues.
- They infiltrate the tissues (diapedesis). It is thought that via complement fixation that high levels of IgG/complement opsonize the tissue-derived antigens which leads to a reduction in bone mineral content (BMC) and periodontal disease.
- It is also thought that increased levels of IL-1 causes PG levels to be increased that turns on the release of collagenase from bone that also leads to reduced BMC.

- Remember to floss your patient's teeth, too, if they are unable. Many dentists believe that there is no longer any reason for us to lose our natural teeth as we age.
- If we go into a health care facility with our teeth, be it a hospital, rehabilitative institution or nursing home, there is no excuse for not making certain your patients
- (the ones who pay
 - A) to be there and
 - B) your salary)
- still have their own teeth in good condition when they leave -- alive or dead.

Caries Regulation		
Floss	Physical removal of plaque	
Eat Healthy	Restrict sucrose intake	
Brush	Frequent cleaning	
Healthy Dental Hygiene	Frequent hygiene; calculus removal	
Rinse	Irrigating helps reduce numbers of anaerobes in pockets	



Oxidation-Reduction Voltages for Regions of the Body			
Most oxidizing	About 0.25 volts	Human cells	
	About 0.2 volts	Venous blood	
	About -0.05 volts	Gingival pocket	
Most reducing	About -0.2 volts	Dental plaque and gingival pockets	

Definitions

Smooth surface Caries:	primarily on interproximal tooth surfaces near point of contact with other tooth/teeth
Pit and Fissure Caries:	occlusal surfaces, which are more frequently affected, and can't be brushed
Root Surface Caries:	develops in the elderly due to root exposure from loss of periodontal tissue, e.g., it is receding
Carious lesions NOT seen with great frequency on other smooth surfaces which are easily cleaned by lip, tongue or cheek movements and/or by salivary flow.

Adherence of plaque/bacteria to hard, smooth enamel surface might be due to salivary IgA to S. mutans. May be a double-edged sword, saliva, that is.

When caries is present, 1st and 2d molars are generally involved consistently.

Caries seen with low frequency in cuspids and mandibular incisors.

Periodontal pockets:

migration of junctional and sulcular epithelium toward apex of root; formed between cementum and surrounding tissue

Pockets collect anaerobes. While this is a problem, the BIGGEE is bacteremia which may, of course, lead to endocarditis, etc.

Periodontitis:

Inflammatory process that involves gingiva, periodontal ligament and alveolar bone; destroys periodontal ligament and alveolar bone is continuously resorbed which leads to a loss of teeth (if not stopped).

"Normal" Flora of the Gingival Groove		
Streptococcus	Gram positive cocci; have capsules; produce glucans by which bacteria bind to teeth; S. mutans: loves sucrose; also metabolically active at pH 5; stores own carbohydrates for when dietary carbohydrates are not available; α -hemolytic	
Actinomyces	Gram positive rods; anaerobes; involved in lumpy jaw (see mycetoma); pleomorphic; filamentous; MAY be AFB; susceptible to PCN-G, erythromycin	
Veillonella	Small, anaerobic; Gram negative cocci; rarely the lone cause of infection	

Flora of the Gingival Groove in Gingivitis		
Actinomyces	Gram positive rods; anaerobes; involved in lumpy jaw (see mycetoma); pleomorphic; filamentous; MAY be AFB; susceptible to PCN-G, erythromycin	
Fusobacterium	Pleomorphic; Gram negative rods; butyric acid producers and use threonine to produce propionic acid; produce bacterial-origin PMN chemotactic factors	
Bacteroides	 Gram negative rods; slender rods or coccobacilli; foul smelling pus; may cause endocarditis; capsular polysaccharides which cause abscesses; have LPS, but do not have endotoxin activity (in classical G(-) sense), hence no fever or shock due to infection as with other G (-) organisms; produces SOD and can live with oxygen for days; produce bacterial-origin PMN chemotactic factors; inhibits (due to capsule) complement activity; Ab + C3b is the BEST PMN phage conditions (opsonization); black pigmented on blood agar: B. intermedius, endodontalis, gingivalis; B. melaninogenicus is anaerobic (about 70% are β-lactamase producers); also treat anything anaerobic EXCEPT Bacteroides with PCN; isolated in pockets 	

Flora of the Gingival Groove in Advanced Periodontitis			
Bacteroides	Gram negative rods; slender rods or coccobacilli; foul smelling pus; may cause endocarditis; capsular polysaccharides which cause abscesses; have LPS, but do not have endotoxin activity (in classical G(-) sense), hence no fever or shock due to infection as with other G (-) organisms; produces SOD and can live with oxygen for days; produce bacterial-origin PMN chemotactic factors; inhibits (due to capsule) complement activity; Ab + C3b is the BEST PMN phage conditions (opsonization); black pigmented on blood agar: B. intermedius, endodontalis, gingivalis; B. melaninogenicus is anaerobic (about 70% are β -lactamase producers); also treat anything anaerobic EXCEPT Bacteroides with PCN; isolated in pockets		
Fusobacterium	Anaerobes; pleomorphic Gram negative rods; butyric acid producers and use threonine to produce propionic acid; produce bacterial-origin PMN chemotactic factors		

Wolinella	Gram negative rods; obligate anaerobes; isolated in pockets
Eikenella	Gram negative rod; oxidase positive; no carbohydrate fermentation; occurs with high frequency due to human bites; susceptible to AMP and newer PCN's and cephalosporins; isolated in pockets
Selenomonas	Gram negative rod; obligate anaerobe; isolated in pocket
Capnocytophaga	Fusiform gram negative; anaerobe; generally causes disease in immunocompromised patients; isolated in pockets
Actinobacillus	small Gram negative coccobacillus; cause periodontal disease in adolescents (particularly juvenile females); endocarditis; osteomyelitis; treat with TET, chloramphenicol; MAY use PCN- G, AMP or Erythromycin
Spirochetes: Treponema denticola	Very limited information on this microbe
Rothia	Pleomorphic; aerobes; Gram positive rods; filamentous; abscesses and endocarditis

Vincent's Infection	
Acute periodontal infection; aka "trench mouth", "acute necrotizing ulcerative gingivitis" and "Vincent's Angina"	
Characterized by: necrotic erosion of gingival papillae between teeth; grayish pseudomembrane covers margins of involved gingiva and extends in some cases over th tooth from the involved gingiva; bleeding, sore, painful gingiva; primarily in 18-30 YC group	
Predisposing Factors: emotional stress; fatigue; neglected oral hygiene, local trauma and malnutrition	

Add the following General Gram Stain Rules for Dental:

- All rods of Dental importance are Gram Negative except for Actinomyces, Rothia.
- All cocci of Dental importance are Gram Positive except for Veillonella.