

## Bacteria - Gram Positive Cocci



Group A Strep (Strep pyogenes) - The Pie Genies' Bakery

1. Pie in glass Capsule - Group A Strep is encapsulated
2. Hot Apple - Capsule made out of Hyaluronic Acid
3. Heating Lamp w/ "B" Light - Beta Hemolytic
4. $1^{\text {st }}$ Baker
a. Baker Holding Honey Crusted Pie - Impetigo
b. Red Handkerchief - Strep throat, red inflamed throat
c. Red Mittens on Baker - Erysipelas, red lesion with well demarcated borders, S Pyogenes is the most common cause.
$2^{\text {nd }}$ Baker w/ Cape - represents Strep Toxins 3 issues
5. Scarlett Fever-
a. Strawberry Tongue
b. Red Handkerchief - Pharyngitis,
c. Red Gingerbread Man - widespread rash that spares the face.
6. Cape w/Bolt - Toxic Shock Like Syndrome mediated by a super antigen - SpeA, SpeC
7. Burnt Gingerbread man - Necrotizing Fasciitis -SpeB

Master Chef - M Protein in GAS well main virulence factor for Rheumatic Fever, will interfere with opsonization, antiphagocytic, M Protein will mimic antibodies in heart and cause issues with Mitral Valve in heart
8. Chef Swatting away other chef - Antiphagocytic action
9. Miter hat - Very antigenic and elicits a humoral response, creating an antibodies to myosin in cardiac muscle (Molecular mimicry), damages mitral valves
10. Red Handkerchief - Pharyngitis precipitates RF, NOT IMPETIGO
11. Cupcakes w/ JONES on them
a. J = Joints
b. "Heart" = Heart Problems
c. Nodules on extensor surfaces
d. Erythema marginatum
e. Sydenham's Chorea
12. Phone cord that looks like a glomerulus - Post Strep Glomerulonephritis, type III hypersensitivity reaction (deposition of antibodies in glomerulus)
a. Puffy Cheeks - Puffy Cheeks w/ nephritis
b. Bottle of Cola - Cola Colored Urine
c. Calendar - Occurs weeks after strep infection
d. Can occur after pharyngitis and impetigo
e. Pencil - TXT is penicillin
13. Baker on bottom Right 3 more virulence Factors
a. O Shaped Donuts - Streptolysin O, allows Strep to be Beta Hemolytic, we generate ASO antibodies to this
b. Phosphate Cupcakes - Streptokinase, converts plasminogen to plasmin.
c. Twists - DNA'ases, depolymerize DNA
14. Basset hound - Bacitracin sensitive
15. Lady checking a box of donuts - Tongs are antibodies, check ASO titers to see if there was a Group A Strep Infection.

## Bacteria - Gram Positive Bacilli



Corynebacterium Diphtheria - Corazon de la Corrida

1. Purple Hues - Gram Pos, non-spore forming
2. Guy playing Morocco's that are blue and red - Bacteria is club shaped and y or v shaped, Metachromatic granules that stain with aniline dyes, Metachromatic granules will stain red and the rest of the cell will stain blue.
3. Zig Zag shape in the morocco - V or $y$ shape the bacteria will form
4. 2 subunits $A$ and $B, A$ is active and $B$ is binding
5. Man playing an accordion wearing a bow tie - Toxin causes Ribosylation of elongation factor 2, this will inhibit ribosome function inhibiting protein synthesis leading to cell death
6. Kids in the stand eating grey cotton candy wrapped with a plastic wrap - This will lead to pseudomembranous exudate that will be found in the oral pharynx
7. Bull extending its neck with droplets coming out of the mouth and nose - Found in throat and tonsils because the infection is transmitted by respiratory droplets, Can cause airway obstruction and lymphopathy, this will cause bulls neck (thickening of the neck)
8. Cape in the shape of a heart - Can lead to myocarditis like arrhythmias and heart block. Lethal effect of diphtheria
9. Man eating the sausage links - Will damage the myelin of nerve fibers, the sausage man eating the myelin having a neuropathy.
10. Television and kid laughing - Lab diagnosis -plate on Tellurite and Loeflers media (tele like television and loughlers will be the kid laughing like enjoying a show)
11. Bulls tongue sticking out and licking the matador - Eleks test - in-vitro assay that has antitoxin on it,
12. Why it's in another language - Immigrants most likely to get this
13. Syringes in the bull - DTaP vaccine is used, given with tetanus and pertussis. Toxoid Vaccine


Haemophilus Influenza - "Phyllis's Chocolate Covered Cherries"

1. Red Hues - Gram Neg
2. Shape of the candy machine and candy on top of the machine - Coccobacillary Shape
3. Chocolate sign - Grown in chocolate agar
4. 10 cent sign - Needs Factor 10 "Hemodin"
5. 5 cent sign - Grown on chocolate agar needs factor 5 (NAD, nicotinamide) and factor 10 (Hemodin) "hemoTEN"
6. Child Coughing and aerosol spray - Infection primarily moved by aerosol transmission leading to droplets going to respiratory track calling pneumonia
7. Child sticking out the red tongue screaming - Disease Epiglottitis- symptoms Drooling, inflamed epiglottis, strider, drooling
8. Cherries - "cherry red epiglottis"
9. Child plugging his ears - Otitis Media
10. Meningitis helmet and Bee flying around - Meningitides - only caused by type B capsular form.
11. Sickles attached to belts - Sepsis and Septic arthritis in patients without a spleen, hemophilic infections, especially sickle cell disease
12. Syringe and Capsule with the Bee flying around it - Vaccine for only the type B capsule is conjugated with diphtheria toxoid and haemophilus type B capsule
13. Dipped for 2.18 - Vaccinate between 6 weeks - 18 months (bound to diphtheria) Dip=Diphtheria
14. Three Axes -Treatment Ceftriaxone
15. Rifle - Treatment for close contacts is rifampin

Bacteria - Gram Negative Rods


Bordetella Pertussis - Board and Care

1. Streamers to represent pili - Respiratory droplets are very infective using Pilus called filamentous hemagglutinin
2. Bow tie - Pertussis Toxin-Ribosylates Gi disabling it
3. GI uniform - Toxic inhibits GI, Disabled Gi (G inhibitor Protein)
4. Military Camp - Leads to a rise in CAMP
5. Popcorn, overabundance of white kernels - ADP Disables Chemokine receptors for lymphocytes leading to an overabundance of white blood cells in the blood stream, lymphocytosis
6. EF Shield - Adenylate cyclase toxin acts like the anthracis toxin edema factor, increases cAMP, Edema Factor, Most Virulent
7. Tractor on the middle road cutting the grass- Tracheal toxin damages ciliated cells in the epithelium, tractor cuts long cilia grass
8. Vet coughing vigorously - Catarrhal phase, limited symptoms nonspecific, most bugs, most contagious. 1-2 weeks
9. Whooping Horn - Paroxysmal - characteristic cough "Whoop"
10. 100 days war banner - Convalescence stage - final stage lasting 3 months with a cough, 100 day cough, most susceptible to secondary infections
11. Crow - Treatment Macrolides
12. Syringe with cell phone - DTaP - acellular vaccine using purified antigens
13. Red Hues - Gram Neg
14. Aerobic

Catarrhal stage lasts one to two weeks and is characterized by symptoms of an upper respiratory infection such as
15. Non motile
low-grade fever, nasal congestion, and rhinorrhea.
The paroxysmal stage lasts two to eight weeks and is characterized by paroxysms of coughing followed by an inspiratory whoop.

The last stage is the convalescent stage, which may last for weeks to months, and is characterized by a subsiding cough.
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Pseudomonas - The suiters of pseudo Mona

1. Red theme - Gram Negative rod
2. Bathtub - Thrives in aquatic environments, hot tub folliculitis
3. Blue Ring - Oxidase Positive
4. Cat-Catalase Positive -
5. Chronic Granulomatous Disease heightened risk
6. Blue Green on tub - Produces a blue green pigment when plated may even turn wounds blue. It's from Pyocyanin and pyoverdin
7. Grapes being eaten - Fruity grape like odor
8. Air bellow Billowing the flames - Obligate Aerobe
9. Nurse pouring chlorine to remind us of the dysfunctional channel of CF patients - Most common Gram Neg Nosocomial Pneumonia, respiratory failure in CF patients. Chlorine channels in CF
10. Nurse Coughing - Causes pneumonia
11. Mortar and pestle w/ Fish bones - Osteomyelitis in the IV drug users and Diabetics.
12. Glass Capsule - Encapsulated
13. Maid on fire - Burn patients are especially susceptible.
14. Chamber Pot - Indwelling catheter infections from UTI's, chamber pot, nosocomial UIT's
15. Pruritic folliculitis (Hot tub folliculitis)
16. Dalmatian Dog - Can lead to ecthyma gangrenosom (black spots on the Dalmatian)
17. ear trumpet maid listening - Otitis Externa ( swimmers ear)
18. $1^{\text {st }}$ suiter in green - Exotoxin A - Ribosolation of elongation factor 2 , leads to inhibition of protein synthesis and cell death
19. Piper suiter and Suiter with a Sai and flower - Treatment - Piperacillin (penicillin) , aminoglycosides and Fluoroquinolones


Strep Pneumonia "the alpha knight tournament"

1. Purple Background - G+
2. $\alpha$ knight tournament $-\alpha$ hemolytic, partial hemolysis where the surrounding zone is a green hue
3. Strep Pneumonia Knight
4. Armor - Polysaccharide Capsule is major virulence factor
5. Chin is exposed - Optochin sensitive, optochin inhibits the growth of strep pneumo
6. Double Lance - Lancet shaped diplococci
7. Mud on horses legs - Bile soluble, meaning it does not grow in Bile
8. Rust Colored single lobe on chest - Rust colored sputum and lobar pneumonia
9. Squire mopping up muddy mess MOPS - Meningitides, Otitis Media, Pneumonia, Sinusitis
10. Number 1 sign - number one cause of all these diseases.
11. Cracked Shield with the symbol of IgA dimer molecule Protease that cleaves IgA that allows invasion of mucosa reducing host defenses
12. Sickle - Removal of spleen leads to susceptibility of infection by encapsulated organisms like in sickle cell anemia.
13. Crows - azithromycin Macrolides
14. 3 Axes - Ceftriaxone
15. Adults in the Mezzanine, Children on the Ground - 2 pneumococcal vaccines, adult is a 23 valiant polysaccharide vaccine, children is 7 valent but conjugated to a protein. Adults will have a T -Cell independent response creating $\operatorname{lgM}$ that does not last long. Adding the protein adds a more robust antigen response leading to a production of $\operatorname{lgG}$ in children.

Strep Viridians

1. No Armor - Not encapsulated
2. Jesters mask protects face including the chin - optochin resistant
3. Donkey with bile resistant boots - Bile resistant
4. Foul Yellow teeth on donkey associated with dental carries
5. Deck of cards with plate shield Synthesizes Dextran's from glucose which allows strep viridians to adhere to any fibrin from platelets that has been damaged in the heart.
6. Strep Sanguineous adheres to fibrin platelet aggregates in damaged heart valves, most commonly occurs in mitral valve.


Klebsiella, Enterobacter, Serratia

1. Red theme-Gram Neg
2. Oxygen Mask - Pneumonia
3. Urinary Bag hanging off the bed - UTI
4. In the hospital - Nosocomial infections
5. Pills on the ground - Multi Drug Resistant Carbopenam for treatment or Clindamycin
6. Milk Carton - Ferment lactose - turns it pink - along with E Coli - on MacConkey's agar
7. Enterobacter
a. Very motile since pterodactyl is flying
8. Serratia
a. Triceratops - very motile
b. Red pigment when cultured like a pink ring around shower or bright red
c. Catalase Positive
9. Kleibsiella - Ankylosaurs with club shaped tail - Immotile
a. Three A's in the spikes -Alcoholics, Abscesses, Aspiration
b. Thick shell like scales is like a polysaccharide capsule
c. Knocked over jar of currant jelly, that is sticking him to the table - Current jelly like sputum that is a red color
d. Jelly sticking klebsiella to the table - Kliebsiella is immotile
e. X-Ray - Cavatary lesion on patients right lobe "tb like"
f. Ammonia spray bottle - Urease positive

Treat 3rd gen $\Rightarrow$ ceftriaxone, cefotaxime

Bacteria - Gram Positive Bacilli


Bacillus Anthracis and Bacillus cereus - King Anthra's Axe

1. Vikings standing around red hot flames and black in the middle - Black Eschar with erythematous ring.
2. Viking ships lined up in the background - Large gram pos rods in chains
3. Leather armor - encapsulated, this one is made of a protein
4. D Belt Buckles - Capsulated with Poly -D glutamate
5. Air Bellow - Obligate Aerobe
6. walnuts - Bacillus anthracis is a spore forming bacteria allowing them to survive in very poor environments
7. Viking Camp Test - EF Toxin increases cAMP intercellularily this will cause fluid to go extracellular space leading to edema inhibiting host defenses and preventing phagocytosis
8. MAP with Lethal Factor Viking Burning it - LF (lethal Factor), exotoxin that acts as a protease and cleaves MAP Kinase, this is a signal transduction protein that is responsible for cell growth. This factor will lead to necrosis and black eschar
9. Sheep - pulmonary anthrax, wool sorters disease. Spores can get into wool and hide of animals and persist there. People will inhale the spores when the animal is handled.
10. Axe that is dripping blood - represent pulmonary anthrax that can move to mediastinal lymph nodes progressing to hemorrhagic mediastianitis
11. Viking ship with a mast supposed to look like a chest xray - widened mediastinum
12. Flower and Bicycle wheel on the ship - txt is fluoroquinolone or doxycycline
13. Bacillus cereus
14. Aerobic and spore forming
15. Viking reheating rice and vomiting Associated with food poisoning - reheated fried rice


Mycobacterium tuberculosis - Shoot out at the TB Corral

1. Pink Gun leaving a pink finish - Acid fast is represented by the mycolic acids (carbol fuschien stain), ie the 2 branched tassels representing mycolic acids.
2. Lowenstein General Store - Lowenstein Medium
3. Billows - Obligate Aerobe
4. Cart - Transmission - Human to Human respiratory droplets and proliferates in macrophages
5. Cart - Macrophage Cage
6. Glycolipid are responsible for Clumping of bacteria into a serpentine formation - Virulence factor - called cord factor
7. Lasso wrapping up the driver of the macrophage cart Cord factor will Increases granuloma formation by increasing TNF-a activating other macrophages walling itself off in a granuloma - this will protect the bacteria
8. Spurs kicking up Dust clouds behind cowboy - Sulfatides prevent phagolysosome fusion. Allow TB to survive in macrophages by creating incompetent secondary lysosomes preventing fusion to hydrolyzes
9. Cactus with holes in the middle lobe and red cactus fruit near hilum, Gun complex - Primary infection - healed infection, Affects lungs and will form a GHON complex, visual calcification, right middle lobular, Hilar lymph node involvement.
10. Carts that are broken down - Caseation Granulomas tubers - tuberculosis resides in broken down necrotic macrophages (Langerhans giant cells)
11. Sick Child in burlap sack- Primary infection symptoms, long fever and in children, resolves by fibrosis (burlap sack)
12. Shovel with Dirt - Test for TB with PPD, BCG vaccine will always show positive skin test
13. Millet seed pouring out of the cart and cow skull- Milliary TB - Multi-organ failure - Millet seeds from the macrophage cart - Lethal
14. Guy strapped to barrels of TNF - Latent Infection Associated with immunosuppression through downregulation of TNF-a release
Immune system is defenseless if TNF is inhibited. Always screen for PPD before using a TNF inhibitor like infliximab
15. Right Cactus with holes in upper lung scene takes place at night- Reactivation is on the upper lungs, look for cough, night sweats, Bloody cough hemoptysis
16. Prisoner in the $М \Phi$ cage - Reactivation occurs in macrophages
17. Coughing out blood on handkerchief - Promotes body wasting
18. Broken Pots - Pots disease is demineralization of the bone, spinal weakness,
19. Bullet hole going through the hat-CNS involvement is also seen as meningitis or tuberculoma. "Hat being shot off"
20. Treatment - combination of RIPE, rifampin, isoniazid, Pyrazinamide, ethambutol
21. Prophylaxis - Rifampin or isoniazid - 9 months
