

*Sketchy for
Microbiology
Gastrointestinal system
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Lec 1: Vibrios, Campylobacters, Helicobacter



Vibrio Cholera - Colonel Cholera's Base Camp

1. Mustache - COMMA SHAPED Gram Negative Curved rod Enteric Tract Bacilli
2. BASE in BASE cAMP – Prefers to grow in alkaline media
3. Blue Ring - Oxidase Positive - Grows on TCBS agar
4. Lemon - Grows in alkaline environments, ACID LABILE - Dies with acid
5. Rice Patties - Causes Profuse watery diarrhea "**Rice Water**" stool
6. Outhouse dumping directly into the river - Cholera is transmitted fecal oral due to poor sanitation that gets into food and is not an invasive infection
7. River walls are mucosal wall and the water is the intestinal lumen - Found in the intestines and is found in the intestinal mucosae
8. Raft that is attached to the shore - Attaches to the mucosa by fimbriae that attach to ganglioside receptors in the intestinal wall.
9. Then releases **cholera toxin - Main Virulence Factor AB type toxin**
 - a. BASE cAMP map - Upregulates production of Gas cAMP by binding to and increasing activating adenylate cyclase.
 - b. GS grenade - Then it will activate the GS pathway. Activates GS, upregulates cAMP, Produces watery diarrhea through an efflux of Cl and H₂O
10. Treatment
 - a. Drinking some water - Oral rehydration therapy with electrolytes
11. Vibrio Vulnificus and paralyticus
 - a. Oysters - Can contaminate seafood, especially oysters.
 - b. Vibrio V. causes Acute Gastroenteritis
 - c. Vibrio P. Causes fulminating septicemia leading to death. Marked edema and necrosis



Campylobacter Jejuni - Camping Guy and the bears – guy and bears = Guillen Barre

1. Mustache is curved or comma shaped - Gram Negative Spiral / Curved Rod Bacilli - Enteric
2. Campy medium or **Skirrow Agar**
3. Microaerophilic
4. Camp Fire - Prefers warm environments around 42 deg Celsius, thermophile (Special Incubator)
5. Chicken being cooked - Main reservoir is intestinal tract of poultry and transmission is fecal oral / also contaminated water supplies or ingestion of raw milk
6. Red Stools - Bloody Stools and diarrhea
7. Blue Ring - Oxidase Positive
8. Bear cub invading the cooler - Can get Bacteremia, INVASIVE
 - a. Laughing and slapping his knee - Reactive arthritis, riders syndrome
9. Bears being tripped by the sausage links on his ankle - Can cause Guillen barre syndrome due to an autoimmune response damaging myelin of peripheral nerves leading to an ascending paralysis will start at the feet then ascend.
10. Pathogenesis
 - a. Bacteria Colonize intestinal Mucosa and attach to epithelial cells then replicate intracellularly causing an acute PMN response, edema of the mucosa and ulcerations. Presenting with acute enteritis and diarrhea
11. Treatment
 - a. Supportive Care



Helicobacter Pylori: The helicopter Pilot

1. Red Helicopter - Curved Gram Negative rod
2. Mustache that is comma shaped - Helical slender curved rod Shape found in pylorus of the stomach
3. Not a rare infection.
4. Helicopters are motile - Motile by way of flagella
5. **Ammonia bottle - Urease positive - MAJOR VIRULENCE FACTOR** - allows to reduce the acidity of the stomach and allows Helicobacter to survive there.
6. Can be tested with Urea breath test, radioactive urea that is broken down and exhaled as CO₂ and NH₃ by urease positive organisms.
7. Blue ring - Oxidase Positive – all curved rods are oxidase positive
8. Bullet holes in helicopter, Gas pump w/ duodenum - Causes 95% of all duodenal ulcers
9. Crab - Mechanism of Chronic infection causes increased acid infection. At risk of developing gastric adenocarcinoma
10. Tissues that are thrown in garbage - Patient can develop lymphoma of mucous associated lymphoid tissue.
11. Treatment
 - a. Gas Pump with duodenum and H⁺ Bomb - Proton Pump Inhibitor
 - b. Amoxicillin - ammo
 - c. Crow w/ Keep Clear - Macrolide - Clarithromycin
12. Transmission
 - a. Fecal Oral or Oral

Lec 2 : Brucellae , Leptospira



Leptospirosis: The Surfers Oasis

1. Question mark on the board - Spirochetes may be question marked shaped
2. Surfing in the water - Water sports,
3. Yellow tide - water contaminated with animal urine'
4. Surfer rubbing his eyes, rose colored sunglasses and dripping wet - Fever and conjunctival suffusion redness around the eyes without the puss
5. Hawaii - Tropical regions
6. Water
7. Whale – Weil's disease
8. Inner tubes that look like RBC's – travels in blood stream
9. Rubber dingy shaped like a kidney - Renal dysfunction
10. Yellow suit - jaundice from live damage



Bruce Farms - Brucella

1. Bruce farms - red to remember it is Gram neg
2. Farm animal is the reservoir - cows and pigs, goats, veterinarian, slaughterhouse worker, or rancher.
3. Milk Bucket on the ground - Indirect contact with milk or cheese products that unpasteurized
4. Open Cage on Barn house - Facultative intracellular can live inside or outside of host cells
5. Symptoms - fever, chills, and anorexia initially.
6. Undulating hills - Undulant fever
7. Markings on the cow - Can travel through multiple endothelial organs leading to enlargement of spleen, liver and lymph nodes.
8. Fish Bones - Osteomyelitis - chronic infection
9. Wheel -Treatment - tetracycline, doxycycline
10. Rifle - Along with rifampin for primary treatment blocks oxidative bursts
11. Cage in the background - Infect macrophages
12. Large amounts of catalase and superoxide dismutase to protect from respiratory burst
13. Urease and H₂S positive
14. Require cO₂ to grow

Lec 3 + 4 Viral hepatitis



Hep A – Hungry Hungry Hep A hippos

1. Sun w/ pos sign and orange hue – Pos SS RNA virus
2. Statue of David – Naked RNA virus
3. Hepatitis – hippotitus
4. Hippo w/ A tag – Hepatitis A
5. Baby Hippo – Pico
6. Brown liver spot – affects liver
7. Feces and bubbling acid - Acid stable, allowed to be transmitted fecal oral
8. Giant purification machine – how to eliminate HEP A
9. Sign – what is needed to kill HEP A during the purification process
10. Contaminated water is a source in DEVELOPING countries
11. Shellfish snack bar - can be transmitted from shellfish in contaminated sources. Pulled from poop contaminated pond
12. Large backpack- common in travelers in endemic areas
13. Clinically silent w/o jaundice usually
14. Tables where everyone is puking
 - a. **Bright yellow outfit – jaundice**
 - b. **Puking – vomiting**
 - c. **Child w/o yellow – less likely to have jaundice**
 - d. Extinguishing cigarette – smoking aversion
15. Sign on shellfish stand – treatment – one month duration, self-limiting, no carrier state or chronic state
16. Tranquilizer gun – inactivated vaccine because tranquilizers inactivate animals



Hepatitis C – the Hep Sea

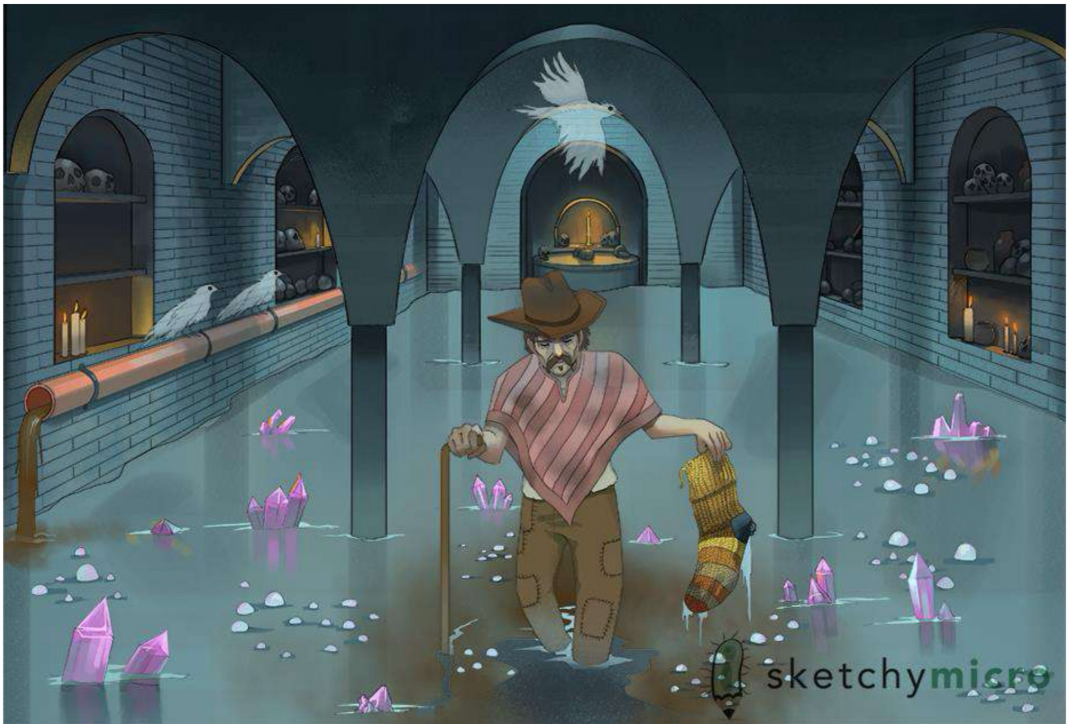
1. Sun w/ pos sign and orange hue – POS sense RNA Virus
2. Togas – Enveloped
3. Flavorful Hep C Fruit punch – Hep C
4. Yellow hippo – jaundice hippo w/ ear tag
5. Common mode of transmission
 - a. Blood water - Exposure to infected blood
 - i. Blood transfusions in 70's – 90's,
 - ii. Needle in ear – IV Drug use
 - iii. Placental, sex, and breast feeding transmission
6. Multicolor tent - Variation of antigenic structure
7. Sign that is misspelled and no viewing 3-5 - Virion coated exonuclease lacks proofreading capacity in the 3'-5' so the RNA is prone to frequent mutations
8. Liver shaped mud patch – inflammation of the liver
9. Yellow hippo – jaundice
10. 60-80 sign - 60-80% of HEP C will become chronic
11. Washed up piece of dead coral - Lymphocytes infiltrate portal tract killing hepatocytes, leading to fibrosis and cirrhosis,
12. Crab - Or liver can go into a frenzy and become malignant leading to hepatocellular carcinoma
13. ALT in the Sea - Acute infection RNA is in serum in the 1st 6 months, ALT is up rising and falling
14. Salt precipitating on shore – 5 sided like IgM molecules - HEP C is associated with cryoglobulins that precipitate out in colder temp that contain IgM
15. Hippo ribs and walkie talkie alpha antenna - Treated with ribavirin w/ interferon Alpha
16. Meat cleaver - Polymerase inhibitor – protease inhibitor used for treatment

Lec 5 common protozoal infection



Giardia Lambia – Giardia Jungle Ride

1. Poop in water and bubbles - Amongst travelers or campers drinking unfiltered or unpurified water that contains cysts of giardia from feces
2. Backpacking backpacks – remind of backpackers and campers
3. Campers holding noses - Bloating, flatulence, and foul smelling diarrhea
4. Yellow stool - Steatorrhea (fatty diarrhea) due to excessive mucus production that impairs absorption of intestine (A,D,E,K will be deficient)
5. Shields on the boat - Trophozoite form that is flagellated
6. Shields in the water and OP guy pointing at the water - Attach but do not invade intestinal wall, so only cause diarrhea. If found in stool they are diagnostic
7. Elisa stool antigen to detect
8. Metra – Treat with metronidazole



Cryptosporidium – Tales from the Crypt

1. Brown water - Aids patients Cryptosporidium causes profound diarrhea
2. Immunocompromised cane – HIV Population
3. Red poncho and cowboy hat - Unicellular partially **acid fast** creating oocytes released fecally and absorbed orally
4. Bubbles – infectious cysts that get passed through watery stool
5. Gems scattered in water (amethyst) – acid fast and under staining looks like amethyst in water
6. Small Broken pipe in background - Cysts contain 4 motile sporozoites that will attach to small intestinal wall and cause damage.
7. Knitted sock – nitazoxanide treatment in immunocompetent
8. Water dripping out of sock – oocysts can be removed via filtration
9. Spirit crow – spiriromycin txt (not FDA approved in US)



Entamoeba histolytica – Entering the Historical Dig

1. Red stool - Bloody Diarrhea
2. Do not **enter** historical site – Entamoeba Histolytica
3. Liver shape –
4. 2 main life cycle stages
 - a. Bubbles in a puddle – Cyst form ingested from contaminated water
 - i. Men drinking water holding hands – gay men get disease from anal oral transmission
 - b. Liver shape dig site and hole in right side of liver – Right lobe is most common involved site of amoebic liver abscess
 - i. Map is a ct scan of liver and a man holding his right upper quadrant – RUQ pain w/ enlarged and tender liver
 - ii. Anchovy paste truck - Abscess described as having “anchovy” paste consistency
5. Sewer pipe w/ out pouches like haustra to represent the colon - Causes intestinal amebiasis
6. Rust spots - Can cause ulcerations along the colon
7. Erlenmeyer flasks - Flask shaped ulcers
8. Red stools – bloody stool
9. Puddle w/ floating red cups - Stool O&P looking for cysts or trophozoites, stool will contain **trophozoites that contain endocytosed RBC's**
10. Flask in colon - An elisa antigen test or serology
11. Metra – Metronidazole
12. Drugs that work in lumen of intestine
 - a. Pair of mice near metro - Paramycin
 - b. Sign labeled queen iodos tomb – Iodoquinol