

Microbiology labs assignment



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MBK Lab 01 ??? Lab Report Name: _____ Section:

_____ EXPERIMENT 1 TITLE: Observing Bacteria and Blood

OBJECTIVE: To gain functional knowledge of microscope operations through practical applications of a microscope in the observation of bacteria and

blood. PROCEDURES: Using the microscope, an oil immersion lens and

observing Bacteria Cultures in Yogurt . Preparing a Blood Slide and observing

Blood: After reviewing the section of the manual as instructed I cleaned the

ocular lenses and prepared the slides. I made required adjustments to the

microscope and ocular distances for view during experiment.

I practiced using six prepared slides that were in the kit to ensure I was

viewing the slides accordingly. I placed a drop of oil onto the slide and

rotated it until bringing it to fine focus on the microscope. I then observed

the same slides in part 1 but I added the oil immersion to view the

differences. The difference was in the magnification and the ability to see

more of the substances in finer view. I then made my own sample of yogurt, I

left it undisturbed for 24 hours and observed it under the microscope. The

sample was not was the right consistency. I viewed the specimen under the

microscope.

I pricked my finger with the sterilized pin and placed my blood on a slide with

a slip cover. I observed the specimen under the microscope. I placed the

prepared slide with my blood on the microscope stage, and brought it into

focus on low power. I saw a lot of tiny particles that appeared to be blood

cells through the microscope. QUESTIONS: Compare your observations from

the fresh yogurt slide and the prepared yogurt slide. Are there differences?

Why or why not? The fresh yogurt appeared to have less growth than the

prepared slide of yogurt. This is because the prepared yogurt was no longer gestating and showed an increase in bacterial numbers. Were you able to identify specific bacterial morphologies? Which types? Could not be absolutely certain about any of the identities but to the best of my knowledge about yogurt and using an educated guess, Lactobacillus and Streptococcus were present. Describe the cells you were able to see in the blood smear. Are they different than the bacterial cells you have observed? Why or why not? I saw mostly red blood cells and white blood cells which were the most abundant within the sample. The red blood cells appeared a reddish purplish color with an oblong and symmetrical appearance and the white blood cells had a light blue appearance.

There individual structures showed much variation from the bacteria and the group formations were different. 4. What is the purpose of immersion oil? Why does it work? The purpose is to increase the microscope's resolution by submerging the objective lens and the sample in the oil with a high refractory index, this increases the actual applicable value of the numerical aperture. CONCLUSION: I have used and understand the value of the oil immersion lens. I was able to observe slides both with and without the lens to compare the differences. The oils immersion lens allows you to see what you might not have been able to see without it.

MBK Lab 02 ??? Lab Report Name: _____ Section:

_____ EXPERIMENT 2 TITLE: Bacterial Morphology OBJECTIVES:

To learn and employ bleach sterilizing techniques, observe bacterial morphologies using different preparation techniques, and learn and employ direct and indirect staining techniques PROCEDURES: Viewing Prepared

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Slides of Common Bacterial Shapes, Disinfecting Your Area to Use Live Organisms, Viewing Live Organisms ??? Wet Mount Preparation, Direct Staining, Indirect Staining, Generating Microbial Cultures

I set up the microscope and viewed the prepared slides of bacterial morphology. I disinfected the area using bleach and gloves. After placing 1 teaspoon of warm water into a sample cup I prepared a sample of *S. cerviciae*. I made a dime-sized circle on each of the 3 slides I was going to use. I added water onto the first slide and then used the cotton swab to scrape the inside of my mouth. I observed it under the microscope. Then I used a toothpick to scrape a sample of plaque from my teeth which I placed on the second slide already prepared with a droplet of water. I viewed that as well.

On the third slide I placed the yeast mixture onto it and observed it under the microscope. Once completed I washed all the slides and disinfected the area. I put on an apron for this part of the experiment and used a marker to make a dime-sized circle in the middle of each of 3 slides and I labeled all three slides 1, 2, and 3, respectively. Then I placed a small drop of the yeast culture prepared in Part 3 onto slide 1. Then I scraped the inside of my mouth and gums and smeared the swab onto the second slide and finally I used another toothpick to scrape plaque from my teeth onto the third slide.

I waited until the samples were completely dry and I heat-fixed running them through the flame 4 times. I placed a drop of crystal violet on the slides and quickly ran them under water for approximately 30 seconds. I blotted them with a paper towel and viewed the specimens under the microscope. Once

completed, I cleaned the slides for further use and disinfected the area. I labeled 3 slides and placed a small drop of Congo Red on each of the slides that contained the yeast culture, sample plaque from my teeth and the swab from the inside of my mouth.

I examined all three slides under the microscope. After observing the slides I flushed the specimens down the drain and disinfected the area with bleach solution. After 42-72 hours I assessed the growth patterns of the tube and noted that the tube that contained the swab became yellow stained and the tube that contained the agar and tablet dissolved a little and some of the content drifted to the surface of the tube and created a film. QUESTIONS: 1. There was no change from the fresh yogurt and the cultured yogurt. After 24 hours of sitting in a dark environment it became fermented and liquidy.

Mouth Swab – looks like coccobacillus; plaque: looks like single bacillus; Thick multi-layered ??? positive gram stain; colorless moving particles that resemble droplets clustered together Yeast: looks like tetrad; moving particles, no stain; colorless moving particles Plaque: thick multi-layered clusters ??? gram positive stain; solid stable particles, non moving Were you able to identify specific bacterial morphologies? Yes I was able to identify some examples as I have previously stated. What is the difference between direct and indirect staining? Did the smears appear different in each type of staining?

Why or why not? Direct Staining involves crystal violet and staining bacterial cells causing a negative reaction; Indirect staining involves staining but results are positive with pink solutions allowing bacteria to be viewed more

accurately. These reactions are the result of complex chemical reactions involving proteins and various elements of the samples and the medias involved. What are the differences between the cells in the plaque and yeast smears? The similarities? Plaque cells seemed more solid/multi-layered yeast cells seemed free flowing and constantly moving.

There were no real similarities between the two, this is an accurate assumption being that a yeast cell is a totally independently living organism and doesn't require colonization to successfully thrive. How many types of cells were you able to see in the smear from your mouth? What do you think each was? I saw a lot from the mouth specimen which probably consisted of acid, fat and plasma membrane. OBSERVATIONS/ DATA TABLES:

Activity	Yeast	Mouth Swab	Plaque	Prepared slides (doesn't correspond to yeast/mouth swab/plaque categories)
				The appearance of gas bubbles on slide
N/A	N/A	N/A	N/A	N/A

Wet Mount Preparation	Resemble tetrad (as described in the textbook)	Looked like Coccobacillus (as described in the textbook)	Looked like single bacillus (as described in the textbook)	Direct Staining	Gram-positive; single layered moving particles	Thick multi layered rings in the body; gram positive	Gram positive; thick multi layered	Indirect Staining	Colorless moving particles	Colorless moving droplets	Pink stained; solid particles
CONCLUSION:											
In conclusion, I learned that bacteria that contain millions of organisms after observing them under the microscope. MBK Lab 03 ??? Lab Report Name:											

Section: _____ EXPERIMENT 3 TITLE: Aseptic Technique & Culturing Microbes OBJECTIVE: To learn and employ aseptic technique, become familiar with basic requirements of microbial growth, learn the basic forms of culture media, and become familiar with methods used to control microbial growth. PROCEDURES: Setting up incubation sites, determining media type, generating microbial cultures. I first protected myself by putting on my latex gloves and masks I established some incubation sites in different sections of the house that were to be considered to be room temperature by use of a thermometer and free from draft.

Some of the sites I identified were the top of the refrigerator, the top of the dining room table the corner of my living room facing the dining room. I constructed an incubator by using a Styrofoam cooler. I cut a hole in the lid of the box and placed the lamp bulb through the hole and monitored the temperature inside of the cooler periodically. After going through the kit I removed the nutrient media and MRS media, to grow our microbial specimens. I labeled the tubes accordingly. After disinfecting my area using the bleach solution I used a sterile swab of my skin (inside my arm) as the source of *S. pidermidis* in nutrient broth and a half tablet of *L. acidophilis* in MRS broth to generate the cultures. After carefully removing the lid and running the tube through heat, I transferred the bacterial samples to the media tubes and set them aside in the Styrofoam cooler ensuring that correct temperature. After 24 hours there was no assessment to make. After 48-72 hours I made my assessments and discarded the cultures immediately after observation. Finally, I disinfecting the area with the prepared bleach

solution. QUESTIONS: What is the difference between an obligate and facultative aerobe?

An obligate aerobe requires oxygen for aerobic respiration. Facultative aerobe is capable of producing energy through aerobic respiration and anaerobic respiration. What temperature requirements did the organisms in this lab have? What type of organisms are they? The temperature was room temperature and 35-37 degrees Celsius. The organisms were *S. epidermidis* used from the inside of my elbow and *Lactobacillus Acidophilus* tablet provided in the kit. Under what conditions would you want to control the growth of microbes? What type of control would you employ in each circumstance?

Excessive heat would control the growth of microbes. This method does not kill all microorganisms and requires additional sterilization techniques specifically for plastic and rubber items. What are the basic forms of culture media? What is each used for? Broth Tubes – that contain a liquid medium used for microbial growth; Agar Tubes – contain a nutrient medium used to get a flat inoculating surface; Stab Tubes contain hardened agar medium that is used to inoculate into the agar; Agar dishes – sterile petri dishes that are aseptically filled with sterile agar used in culturing, separating and counting microorganisms.

Did you see growth in your tubes after 24 hours? 48 hours? Why or why not? The properly paired and prepared culture samples showed growth, those that were not correctly prepared did not show growth. Media, sample, ambient conditions, growth environment, tube, and several other factors

must all be considered before preparing a culture. DATA TABLES/

OBSERVATIONS: Bacteria Growth pattern after 24 hours Growth pattern after 48-72 hours L. acidophilus in liquid MRS broth Sediment- NO

GROWTH Increased sediment at the top of the tube S. epidermis in liquid nutrient broth

Possibly growth ??? not quite visible Growth exhibited- increased concentration of growth around the swab CONCLUSION: I learned the

different ways bacteria can be grown. MBK Lab 04 ??? Lab Report Name:

_____ Section: _____ EXPERIMENT 4: TITLE:

Isolation of Individual Colonies OBJECTIVE: To become familiar with subtypes of culture media and the uses for each, learn and employ the streak and pour dish techniques, and be able to generate a pure culture of a specific organism. PROCEDURES: Preparation of Solid Media, Isolation by the Pour Plate Method, Isolation by the Streak Plate Method.

After disinfecting my work area with the bleach solution, I melted the agar tubes as described in the “ preparation of solid media” section of the lab manual. Leaving one tube of MRS agar and one of nutrient agar in hot water (50?? C), I used a pencil to label Petri dishes as S. epidermidis and L. acidophilus. Then I covered the plates and allow them to cool and solidify. My original culture was transferred to a tube of liquid agar and mixed. Then I transferred the liquid agar into the second tube and the third tube. I poured the tubes of liquid agar, into a separate petri plate.

While keeping the test tubes in hot water I quickly removed them and watched them solidify. I tried to work as quickly as possible to ensure that I

was able to get the same results as indicated in the manual. I disinfected my area and labeled the bottom surface of three sterile petri plates with “ L. acidopholis” and 1, 2, and 3 and labeled the remaining three petri plates “ S. epidermidis” and 1, 2, and 3 ??? setting them aside. I sterilized six test tubes and made sure not to contaminate them by touching the top and I labeled them accordingly. Then I divided the the liquid MRS agar into the three test tubes marked L. cidopholis. I placed the 3 test tubes of agar into the hot water to prevent them from hardening, gently mixed them and returned them into the pan of hot water. I poured the contents of each tube into the petri dishes placing a lid on them immediately after pouring. I incubated the plates 48 hours and disinfected my area. After labeling the the bottom of the MRS agar plate (L. acidopholis) and the bottom of the nutrient agar plate (S. epidermidis). I used the inoculum and streaked streaked it several times. Inverted the dishes and incubated for 48 hours and disinfected the area with bleach solution. QUESTIONS:

Compare enriched, complex, and synthetic (defined) media. List a use for each. Enriched contains important growth factors necessary for the growth of fastidious organisms such as vitamins, blood components and amino acids; complex composed of a mixture of proteins and extracts in which the exact amount of a particular amino acid is unknown; synthetic the exact amount of pure chemicals used to formulate the medium is known. Define selective and differential media and describe what each is used for. Selective media allows for the selection of particular microorganisms that may be present in a mixed culture.

It can be used in the form of an antibiotic like ampicillin or tetracycline.

Differential media allows for the separation of organisms based on observable changes in appearance of the media. It can be used in the form of eosin methylene blue (EMB), which is differential for lactose and sucrose fermentation. Why is it necessary to use solid media to obtain a pure culture? Solid medium has physical structure and this allows bacteria to grow in useful ways therefore allowing a true pure culture to be captured and observed during an experiment.

Compare your results using the streak and pour plate methods of isolation.

Did one work better in isolating individual colonies than the other? The streak method seemed to work much better than the pour plate method. The reasoning behind this is that the streak method allows for the sample to be diluted repeatedly, this after several randomized samplings and subsequent streakings usually will result in the isolation of enough individual organisms to perform accurate counts and identifications. Describe the colonies that grew from your *S. pidermidis* After 24 hours of observation there was no change. After 48 hours there was still no change to the naked eye but when placed under the microscope there seemed to be clusters of white colonies grouped together. This particular species can take up to 72-96 hours to show any noticeable growth, this has to do with the specific genetic makeup of the organisms and the gestation period of the organism. MBK Lab 05 ??? Lab

Report Name: _____ Section: _____ EXPERIMENT

5 TITLE: Differential Staining

OBJECTIVE: To understand and employ differential staining techniques, describe the differences between gram-negative and gram-positive bacteria.

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PROCEDURES: Preparation of Bacterial Cultures, Differential Staining.

I prepared a nutrient agar dish as previously described and I prepared a *S. epidermidis* culture and an *E. coli* culture. I also used the MRS broth media and a sample cup to prepare an *S. cerevisiae* culture. After disinfecting my work area with bleach solution, I made a slide (smear and heat-fix) for each organism as described in Experiment 2, labeled the slide and place them in the staining tray.

I flooded the slide with crystal violet and then drain the dye into the sink and gently rinsed off with tap water. I decolorized with drops of alcohol and applied safranin for 60 seconds. I observed my findings under a microscope.

QUESTIONS: Describe the differences between gram-positive and gram-negative cell walls. Gram Positive cell walls have thick mesh like walls made of peptidoglycan. GramNegative cell walls have an additional outer membrane made of lipids. What causes gram-negative bacteria to stain pink? Gram-positive to be purple?

In gram-positive bacteria, the crystal violet and iodine combine to form a larger molecule that precipitates out within the cell. The alcohol/acetone mixture then causes dehydration of the multilayered peptidoglycan, thus decreasing the space between the molecules and causing the cell wall to trap the crystal violet-iodine complex within the cell. In the case of gram-negative bacteria, the alcohol/acetone mixture, being a lipid solvent, dissolves the outer membrane of the cell wall and may also damage the cytoplasmic membrane to which the peptidoglycan is attached.

The single thin layer of peptidoglycan is unable to retain the crystal violet-iodine complex and the cell is decolorized. What is the purpose of iodine in the Gram's stain procedure? (What is a mordant?) The purpose of the iodine is to be a color indicator, and a mordant acts to combine with this in order to form an insoluble solution. What is the purpose of acetone-alcohol in the Gram's stain procedure? Dissolves the outer membrane. Which organism stained gram-positive? Gram-negative? Gram Negative: Cyanobacteria, spirochetes, green sulfur and non-sulfur bacteria.

Gram Positive: Bacillus, Staphylococcus, Enterococcus, Diplococcus, Clostridium
OBSERVATIONS/ DATA TABLES: Bacteria Gram positive (purple) Gram negative (pink) S. epidermis appears as white colonies on blood agar plates No visible changes E. coli short gram-negative bacterium appear pink, the color of safranin L. acidophilus rod-shaped and non-motile No visible change S. cerevisiae No visible change present They are unicellular, globose, and elongate in shape
CONCLUSION: I have learned how to determine different organisms through stain testing. MBK Lab 06 ??? Lab Report Name: _____

Section: _____ EXPERIMENT 6 TITLE: Methyl Red Voges-Proskauer Test
OBJECTIVES: To become familiar with and perform the MR-VP biochemical test, and To learn some variations in how different organisms metabolize glucose. PROCEDURES: After disinfecting my area I used the cultures from experiment 5. I labeled the tubes of MR-VP broth E. coli and S. epidermidis and inoculated each tube with the appropriate organism. I incubated for approximately 48 hours and then allowed the tube to warm at

room temperature. After sterilizing the test tubes I divided the broth into the labeled test tube.

I added 8 drops of methyl red to each of the tubes and saw a reaction. I used the remaining tube for each organism for the Voges-Proskauer, to each tube, I added 12 drops of Barritt's A Reagent and mixed gently. Then I added 4 drops of Barritt's B Reagent to each tube QUESTIONS: What does the methyl red test determine? To Identify bacteria that produce acids by mechanisms of acid fermentation of glucose. What does the Voges-Proskauer test determine? The ability of a bacteria to convert pyruvate to acetoin. Which of your organisms, if any, fermented glucose? E. Coli

Which of your organisms, if any, produced measurable acidic byproducts?

Serratia Why would organisms have different biochemical pathways to metabolize glucose? The bioproducts of these chemical pathways may actually be just as important as the end product of the pathway. MBK Lab 07 ??? Lab Report Name: _____ Section: _____

EXPERIMENT 7: TITLE: Motility Testing OBJECTIVES: To learn flagellar structure and arrangements common in microbes, use direct observation and testing to determine if a given microbe is motile PROCEDURES: Direct Observation of Motility, Motility Tubes, Direct Observation of Motility

I disinfected the work area with prepared bleach solution and made a wet-mount of *S. epidermidis* and set aside my cultures. I labeled each of the motility tubes with *E. coli* and *S. epidermidis* and then I inserted the inoculating needle directly into the *E. coli* culture and then straight down the center of the agar tube. I incubated the tubes for approximately 48 hours.

After incubation I recorded my observations of motility and discarded the contents. QUESTIONS: Describe the four classes of flagellar arrangement common in microbes. Monotrichous, Amphitrichious, Lophotrichious, Peritrichous

What is the purpose of inoculating with a needle instead a loop in the motility test? To maintain the integrity of the sample. Which of your microbes, if any, were positive for motility in the motility tube? Spirochetes had extreme motility. Were you able to directly observe motility in the wet-mount preparations? If so, which organisms? Yes, with the spirochetes.

CONCLUSION: I was able to observe motility which can be a bit time consuming. MBK Lab 08 ??? Lab Report Name: _____ Section: _____ EXPERIMENT 8: TITLE: Carbohydrate Fermentation

Testing

OBJECTIVES: To be able to generate a fermentation profile for a specified organism, and learn how biochemical tests are used and employ a chemical indicator. PROCEDURES: Preparation of Bacterial Cultures I used the nutrient agar plate saved from Experiment 5, I prepared a *S. epidermidis* culture and a *S. cerevisiae* culture. I labeled the first three phenol red tubes *S. cerevisiae* 1, 2 and 3 and the other three *S. epidermidis* 1, 2 and 3. I divided the glucose powder between the two 1 tubes, fructose powder into both tubes labeled 2, and the mannitol powder into both of tubes labeled 3.

I then sterilized six Durham tubes and placed one into each tube of phenol red/sugar broth. I tilted the phenol red/sugar broth containing the Durham tubes so that the Durham tube fills with broth as shown in the lab picture. I

placed the broth tube into the test tube rack and incubated the tubes for approximately 12 hours. I discarded the contents and disinfected my area and its tubes for future use. QUESTIONS: What is the carbohydrate profile for each of the organisms you tested? Some had low amounts of the compound and some more intense amounts. Why is it important not to incubate the fermentation tubes beyond 24 hours?

In order to prevent the denaturing of various proteins and compounds and destroy the samples. What is phenol red added to the fermentation tubes? How does it work? It is a reverse indicator, it works by turning yellow if the presences of acid or acid gases are present with indicate that the sample does in fact undergo fermentation. Why would bacteria have differences in the carbohydrates they can ferment? In order to adapt to their environments over millions of years, an organism would evolve to be able to survive with the given elements of its immediate environment. CONCLUSION:

I have learned that sugar is the primary nutrient used in this experiment but when the microbe runs out of it, protein or other nutrients will be attacked.

MBK Lab 09 ??? Lab Report Name: _____ Section:

_____ EXPERIMENT 9 TITLE: Osmosis OBJECTIVES: To learn the basic principles of osmosis and test for the effects osmotic changes have on microbes. PROCEDURES: Preparation of Bacterial Cultures, Effects of Salt Concentration on Bacterial Growth, Effects of Sucrose Concentration on Bacterial Growth, Effects of Salt Concentration on Bacterial Growth, Effects of Sucrose Concentration on Bacterial Growth

I prepared a *S. epidermidis* culture and a *S. cerevisiae* culture. I labeled the NaCl broth tubes *S. cerevisiae* 1, 2, and 3 and *S. epidermidis* 1, 2 and 3 after disinfecting my work area. I inoculated each tube with the appropriate organism and incubated them for approximately 48 hours. After observation I discarded the contents and cleaned the tubes using the bleach solution. I labeled the Sucrose media tubes *S. cerevisiae* 1, 2, and 3 and *S. epidermidis* 1, 2 and 3 and inoculated each tube with the appropriate organism and incubated for approximately 48 hours ??? following the same disinfectant techniques as used in Part 1.

QUESTIONS: A. Define the following in terms of their relationship to microbial growth: Isotonic-Has the same salt concentration as the environment
Hypotonic-Lower salt concentration than environment Hypertonic-Higher salt concentration than environment B. Describe your observations for each organism: 1% NaCl- Limited/no inhibition 4% NaCl-Minor inhibition 10% NaCl- Noticeable inhibition C. Explain your results. The sodium chloride has little affect in low concentrations but the affects are seen as the concentrations get increased. 10% NaCl must be a toxic level for the organism

D. Describe your observations for each organism: 1% Sucrose-Limited 4% Sucrose-Minor 10% Sucrose-Noticeable E. Explain your results. 10% must be toxic for the organism Data Tables: CultureNaCl BrothTube 1%NaCl Broth Tube 4% NaCl Broth Tube 10% *S. Cerevisiae*No GrowthMinimal growthSlight fermentation present color change to almost green *S. Epidermidis* No GrowthNo GrowthSlight decomposition at the top of the tube CultureSucrose Media Tube 1%Sucrose Media Tube 4%Sucrose Media Tube 10% *S.*

Cervisea Permeability visible Permeability visible Significant permeability visible S. Epidermis

No permeability visible Permeability visible Permeability slightly visible

CONCLUSION: In conclusion, I learned that bacteria in general are quite resistant to these variations but all the same, in some cases the functioning of their proteins could be affected. MBK Lab 10 ??? Lab Report Name:

_____ Section: _____ EXPERIMENT 10 TITLE:

Antibiotic Sensitivity OBJECTIVES: To understand the basic principles of antimicrobial therapy, become familiar with the phenomenon of antibiotic resistance; and to become familiar with and employ an antibiotic sensitivity test

PROCEDURES: The Kirby-Bauer Test I prepared a nutrient agar plate and stored the 2nd plate for future use then I prepared a liquid broth S. epidermidis culture and disinfected the work area. I coated the surface of the agar thoroughly with liquid S. epidermidis and turned it 90 degrees and repeated the swabbing process. Then I divided the dish into three sections and labeled the first section novobiacin, the second penicillin, and the third gentamicin. I used the tweezers to transfer the antibiotic disks to the surface of the agar plate. I incubated the agar dishes upside down for approximately 48 hours.

I interpreted the results and disinfected the dish and my work area.

QUESTIONS: Define the term “selectively toxic.” Why is it an important feature of antimicrobial agents? This term refers to specificity of the antimicrobial agent to kill or disable/denature a specific virulent factor while

not harming non virulent factors. What are broad and narrow spectrum antimicrobials? What are the pros and cons of each? Broad spectrum acts against a wide range of bacteria (both gram+ and gram-) narrow spectrum is only effective against specific families of bacteria.

What are some common mechanisms by which antimicrobial resistance emerges? Production by the microorganism of a drug-inactivating enzyme that destroys or greatly diminishes the drug's ability to kill the micro-organism. Alterations in the bacterial outer membrane, such that the drug no longer binds to the exterior of the micro-organism, active transport of the drug across the cytoplasmic membrane in the cell ceases, or active efflux (pumping) of the drug out of the cell before it can damage the micro-organism What were the results of your Kirby-Bauer test for *S. epidermidis*?

Small zones up to several mm. AntibioticResistantIntermediateSusceptible
Gentamicinagainst gram-negative bacterialIntermediate Susceptibility of the infecting organismIt inhibits normal protein synthesis in susceptible microorganisms NovobiacinResistance upon the presence of two specific amino acidIntermediate susceptibility in regards to dosage if it is smallerHigh susceptibility to *Staphylococcus aureus* PenicillinExtremely resistant to microbespenicillin-intermediate and resistantpossibly if treated with higher doses CONCLUSION: I have learned that alteration in the drug target (the part of the icro-organism where damage is done) leads to ineffective levels of drug binding to or near the target site. MBK Lab 11 ??? Lab Report Name:

_____ Section: _____ EXPERIMENT 11 TITLE:

Fomite Transmission OBJECTIVES: To learn modes of pathogen transmission, and to identify sites of potential fomite transmission in their environment.

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PROCEDURES: I prepared two Petri dishes and on the bottom of each dish I used a marker to divide them into fourths (labeling them 1-8). I identified 8 areas in my house that I felt were sources of fomite transmission. The door knob

The bathroom sink My car steering wheel My toilet seat The refrigerator The kitchen sink The telephone The kitchen floor After moistening a sterile swab with distilled water and rubbing it vigorously on the door knob and then I swabbed the dish with the swab. I performed the same steps for all 8 areas I identified. I incubated them all for approximately 48 hours and disinfected the area and dishes afterwards. QUESTIONS: What are the three elements necessary to spread infection? Source of pathogen, susceptible person, vector to get to the susceptible person What can make a potential host susceptible?

Weakened immune system due to past illness, poor diet, lack of activity, zero immunity to that particulate infection, ect.... Describe the three primary modes of transmission. Direct, indirect, and vector transmission Describe the 8 sites you chose to test. What were your results for each? No. Location Evaluation of your dishes for growth 1The door knobVisible small E. Coli present 2My car steering wheelVisible larger moving bacteria present 3SheetNothing visible 4My toilet seatSmall moving particles 5The refrigeratorMedium moving particles 6The telephoneNothing visible 7The kitchen floorNothing visible The kitchen sinkMoving particles CONCLUSION: In conclusion, I learned that fomite transmission by direct contact requires the presence of an agent or organism in the environment and that there are many diseases transmitted by the direct contact route. After completing the <https://assignbuster.com/microbiology-labs-assignment/>

experiment I didn't realize how much bacteria is on the everyday things that I use. MBK Lab 12 ??? Lab Report Name: _____ Section:

_____ EXPERIMENT 12 TITLE: Microbes in the Environment

OBJECTIVES: To gain an appreciation for the adaptability and importance of microbes and to identify environmental sources of microbes

PROCEDURES: Microbes in the Air, Microbes in the Water, Microbes in the Soil, Microbes in Smoke, Microbes in the Air, Microbes in the Water I heated the nutrient agar and prepare 4 agar dishes and labeled the bottom of the dishes " air", " water", " soil", and " smoke". I chose the corner of the living room to leave the " air" dish uncovered for 2 hours and then incubated it for 48 hours. I gathered a water sample from the fountain outside of my apartment building ??? I believe birds bathe in that and I inoculated the " water" dish with the sample water, let it sit uncovered for 15 minutes and then incubated it for approximately 48 hours.

I collected the soil from in front of my apartment building and placed it in the sample cup. I added some distilled water and inoculated it for approximately 48 hours. I tried to obtain sample of smoke in the air and inoculated it for approximately 48 hours as I did the other specimens. QUESTIONS: List five environments in which you are likely to find microbial life. School, Train Hospital, Toilet, steering wheel, river Describe five vital functions microbes serve. Fighting disease, Agriculture, Horticulture, Food production, Alcohol Production

Describe what type of growth you observed in your " air" dish (number of colonies, shape, color, defining characteristics, etc.). None Describe what

type of growth you observed in your "soil" dish (number of colonies, shape, color, defining characteristics, etc.). None Describe what type of growth you observed in your "water" dish (number of colonies, shape, color, defining characteristics, etc.). 32 colonies, grayish coloration, clumping of colonies Did you see the same or different type of microbes in each dish? Explain your answer. Only saw microbes in the one plate. Air:

ColonySizeShapeMarginSurfaceColor A 1 mmIrregularLobatewrinkledMilky white B 1.5 mmRoundWavysmoothWhite center, clear surrounding C 2 mmIrregularLobateSmoothWhite center, milky white surrounding D 1mmIrregularwavySmoothYellow, gold, clear surrounding E 2.

5mmirregullarWavySmooth, contoured edgesTan center, white ring, clear ring Soil: ColonySizeShapeMarginSurfaceColor A 2 mmNo defined shapeNo defined marginWrinkledClear B 3mmirregularlobatewrinkledCream white

Water: ColonySizeShapeMarginSurfaceColor A 3mmRoundLobateSmoothTan to white B 2mmRoundSmoothSmoothOrange

C 3mmRoundSmoothSmoothClear to off-white D

1mmirregularlobatesmoothtransparent Bathroom door:

ColonySizeShapeMarginSurfaceColor A 2mmRoundLobateSmoothClear B2 mmRoundLobatesmoothOrange C 1mmRoundSmoothSmoothYellow D 2mmRoundSmoothSmoothWhite E 2mmroundwavymucoidalwhite

CONCLUSION: Microbes are everywhere in the atmosphere, and their presence affects the environment that they are growing in. The effects of microorganisms on their environment can be beneficial or harmful with regard to human measure or observation. MBK Lab 13 ??? Lab Report Name:

Section: _____ EXPERIMENT 13 TITLE: Fungi OBJECTIVES: To learn identifying features of common groups of mold and yeast, become familiar with different reproductive strategies in fungi, and identify primary fungal structures and morphologies PROCEDURES: Growing Fungal Cultures, Microscopic Observation ??? Wet Mount, Microscopic Observation ??? Simple Stain, Growing Fungal Cultures, Microscopic Observation ??? Wet Mount, Microscopic Observation ??? Simple Stain I gathered a piece of whole wheat bread, a slice of orange (fruit) and placed them into a plastic baggie with a little bit of water in it.

I put them both in the upper kitchen cabinets and observed after 24-48 hours. After disinfecting my work area I used the inoculating loop to take samples of the fungi of the stored specimens (bread and fruit). I prepared a wet-mount and observed it under the microscope. I took a sample of my first colony and placed it on the staining tray and cover the sample with Gram's iodine. I observed it with the microscope and disinfecting the area. After 24 hours I didn't notice much of microbial growth however I did notice that the items in the bag were becoming very moist.

Prepare a wet-mount of your 4 samples and observe with your microscope.

QUESTIONS: A. Describe conidiospores and sporangiospores and name a mold that produces each of these. Conidiospores are borne externally in chains on an aerial hypha called a Conidiophore. Sporangiospores are produced within a sac or sporangium on an aerial hypha called a sporangiophore. B. What is a zygospore? What group of mold produces them? A zygospore is a reproductive part of a fungus, a chlamydospore that

is created by the nuclear fusion of haploid hyphae of different mating types C.

Describe what type of growth you observed in each of your substrates (number of colonies, shape, color, defining characteristics, etc.). I saw several colonies which were dark in color. They had a filamentous appearance as well. D. Did you see the same or different type of microbes in each substrate? Explain your answer. I saw different types of microbes in each substrate. E. Describe what type of morphological characteristics you observed in your wet-mount preparations. The growths looked very similar to bread mold. F. Describe what type of morphological characteristics you observed in your stained preparations.

Were you able to see different characteristics than in the wet-mount preparations? The two had different appearances. G. Were you able to identify any of the fungal colonies you grew? What observation did you base your identification upon? I wasn't really sure in identifying my observation.

SCIENCE LAB SAFETY REINFORCEMENT AGREEMENT While all experiments in this manual are small-scale or micro-scale, which reduces most potential risks, unforeseen risks may still exist. The need to prevent injuries and accidents cannot be over-emphasized! Use of this lab manual and the LabPaq are expressly conditioned upon your agreeing to follow all safety precautions and accept full responsibility for your own actions. Thus it is prudent to review the LabPaq's basic safety rules and relevant safety precautions. You should study the safety section of the manual until you can honestly state the following: __I know that except for water, most solvents such as toluene, alcohols, acetone, ethers, ethyl acetate, etc. are highly

flammable and should never be used near an open flame. __I know that the heat created when water is added to concentrated acids is sufficient to cause spattering.

When preparing dilute acid solutions, I will always add the acid to the water (rather than the water to the acid) while slowly stirring the mixture. __I know it is wise to wear rubber gloves when handling acids and other dangerous chemicals; that acid spills should be neutralized with sodium bicarbonate (baking soda); and that acid spilled on the skin or clothes should be washed off immediately with a lot of cold water. __I know that many chemicals produce toxic fumes and that cautious procedures should be used when smelling any chemical. When I wish to smell a chemical I will never hold it directly under my nose but instead will use my hand to waft vapors toward my nose. If I experiment at home I will keep a window or door open while performing experiments. __I will always handle glassware with respect and promptly replace any defective glassware because even a small crack can cause glass to break when heated. To avoid cuts and injuries, I will immediately clean up and properly dispose of any broken glassware. __I will avoid burns by testing glass and metal objects for heat before handling. I know that the preferred first aid for burns is to immediately hold the burned area under cold water for several minutes. __I know that serious accidents can occur if the wrong chemical is used in an experiment. I will always carefully read the label before removing any chemical from its container. __I will avoid the possibility of contamination and accidents by never returning an unused chemical to its original container. To avoid waste I will try to pour out only the approximate amount of chemicals required. 44 __I will select a work area

that is inaccessible to children and pets while experiments are in progress. I will not leave experiments unattended and I will not leave my work area while chemical equipment is set up unless the room will be locked. __To avoid the potential for accidents I will clear my home lab workspace of all nonlaboratory items before setting up my lab equipment and chemical experiments. __Before beginning an experiment I will first read all directions and then assemble and organize all required equipment and supplies. __I will wear approved safety glasses at all times while working on lab experiments involving chemicals, and if I ever spill any chemical on myself I will immediately flush the spill with a lot of water and then consult a doctor if required. _To protect myself from potential hazards I will wear long pants, a long-sleeved shirt, and enclosed shoes and I will tie up any loose hair, clothing, or other materials when performing chemical experiments. __I will never attempt an experiment until I fully understand it. If in doubt about any part of an experiment, I will first speak with my instructor before proceeding. __I will never eat, drink, or smoke while performing experiments. __After completing all experiments I will clean up my work area, store the lab equipment in a safe place that is inaccessible to children and pets, and wash my hands to remove any chemicals. __I will always conscientiously work in a reasonable and prudent manner so as to optimize my safety and the safety of others whenever and wherever I am involved with any type of chemical equipment or experimentation. Permission to utilize a LabPac is contingent upon you agreeing to follow all prescribed safety procedures. Please review this document several times until you are certain you understand it and then sign the agreement below. Your instructor may require you to send him/her a copy. I am a responsible adult who has read, understood, and agree to fully

abide by all safety precautions prescribed by my science lab manual for lab work and the use of LabPaqs. I recognize the inherent hazards potentially associated with science experimentation and I will always experiment in a safe and prudent manner. Thus, I unconditionally accept full and complete responsibility for any and all liability related to my purchase and/or use of a science LabPac or any other science products or materials provided by Hands-On Labs, Inc. (HOL).

_____ Student's
Signature Date