

MYSTERY GROWTH LABORATORY PRACTICAL

OBJECTIVE/RATIONALE

Recognizing reactions to media is important in identifying unknown microorganisms. The student will identify typical reactions of microorganisms to media.

TEKS: 121.14 3B, 3C, 3G, 4A

TAKS ELA 1, 4
Mathematics 8
Science 1, 2, 3

National Science Education Standards A9-12;C9-12

National Health Care Skills Standards .01, .04, .05, .06, .07, .08

National Curriculum Standards for School Mathematics S1; S3

**Teacher Note*

Students should have successfully completed the Bacteria Growth Characteristics Laboratory Investigation before attempting the laboratory practical.

KEY POINTS

I. Types of Media

- a. Agar commonly used for initial culture
 1. blood
 2. chocolate
 3. MacConkey
 4. Citrate nutrient agar
- b. Broths commonly used for initial culture
 1. Gram-negative broth
 2. Trypticase soy broth
- c. Most commonly used agar are blood and chocolate. Both of these types of media will contain nutrients for both Gram-positive and Gram-negative bacteria.
- d. List media/broths that will be used in the student laboratory and the importance of each:
 1. MSA – Mannitol Soy Agar
 2. MAC – MacConkey Agar
 3. BLD - Blood
 4. EMB – Eosin Methylene Blue
 5. CNA – Colistin-nalidixic acid Agar
 6. PEA – Phenylethyl Alcohol Agar
 7. TSA - Trypticase Soy Agar
 8. CHOC - Chocolate
 9. TSB – Trypticase Soy Broth

- 10. UREA BROTH
- 11. GN BROTH

ACTIVITIES

- I. Complete the Mystery Growth Laboratory Practical.

MATERIALS/RESOURCES

MSA., MAC, BLOOD, EMB, CNA, PEA, TSA, and CHOCOLATE AGAR PLATES
TSB, UREA BROTH, and GN BROTH

Available from your local hospitals (a great resource, use their outdated supplies)
<http://www.carolinabiologicals.com>

Mystery Growth Laboratory Practical

ASSESSMENT

Successfully complete the Mystery Growth Laboratory Practical

ACCOMMODATIONS

For reinforcement, the student will create a poster depicting different biochemical reactions of the organisms to the media.

For enrichment, the student will predict the type of media to use for the following specimens: wound, cerebral spinal fluid (CSF), and gastrointestinal.

REFLECTIONS

MYSTERY GROWTH LABORATORY PRACTICAL

NAME:

DATE:

CLASS:

Please answer the following questions.

STATION 1

1. This organism is a:
 - a lactose fermenter
 - b nonlactose fermenter
2. This is commonly used for:
 - a Gram-positive bacteria
 - b Gram-negative bacteria

STATION 2

3. This media is:
 - a. enrichment media
 - b. differential media
 - c. selective media
 - d. a and b
 - e. b and c

STATION 3

4. This media is used for growth of:
 - a. Neisseria and Hemophilus
 - b. Shigella and Salmonella
 - c. Escherichia coli
 - d. None of the above

STATION 4

5. This selective media is used for growth of
 - a. Gram-positive bacteria
 - b. Gram-negative bacteria

STATION 5

6. Describe the colonial morphology you see on this media.

7. The type of hemolysis seen on this media is:
 - a. Alpha hemolysis
 - b. Beta hemolysis
 - c. Delta hemolysis
 - d. Gamma hemolysis

8. This media is commonly used to differentiate between species of:
 - a. Hemophilus
 - b. Neisseria
 - c. Streptococcus
 - d. Staphylococcus

STATION 6

9. The metallic green sheen on this media usually indicates:
 - a. Escherichia
 - b. Pseudomonas
 - c. Proteus
 - d. Serratia

STATION 7

10. The colony “swarming” on this media indicates:
 - a. Escherichia
 - b. Pseudomonas
 - c. Proteus
 - d. Serratia

STATION 8

11. The bacteria that causes the reaction occurring on this media is:
 - a. Staphylococcus aureus
 - b. Staphylococcus epidermidis
 - c. Enterococcus faecalis
 - d. Micrococcus luteus

STATION 9

12. The red color of this colony on a TSA plate is indicates:
 - a. Escherichia
 - b. Pseudomonas
 - c. Proteus
 - d. Serratia

STATION 10

13. The bacteria in this test tube have changed the broth from a clear color to a pink color. Explain the reaction that has occurred.

STATION 11

14. Describe the microorganisms seen on this microscope slide.

STATION 12

15. Describe the microorganisms seen on this microscope slide.

MEDICAL MICROBIOLOGY
MYSTERY GROWTH LABORATORY PRACTICAL
ANSWER KEY

The twelve stations for the laboratory practical should be placed far enough away from each other so students may feel comfortable during the test time. Each station should be labeled with the number corresponding to the test questions. You may choose to set a time limit at each station with students rotating around the room at the same time.

The stations are as follows:

1. Station 1: Gram-negative Escherichia coli on a MacConkey agar plate. The colonies will be purple in color, indicating a lactose fermenter.
2. Station 2: Gram-negative Escherichia coli on an Eosin Methylene Blue (EMB) agar plate. The colonies will be colored on the EMB agar.
3. Station 3: Chocolate agar plate for growth of Neisseria or Hemophilus.
4. Station 4: CNA plate for Gram-positive bacteria.
5. Station 5: Sheep blood agar plate with growth of a Streptococcus species. Beta hemolysis.
6. Station 6: Gram-negative Pseudomonas aeruginosa grown on MacConkey agar plate. The bacteria will display a metallic green sheen after 24 hours of growth.
7. Station 7: Gram-positive Proteus vulgaris on MacConkey agar plate. The bacteria will display a “swarming” growth, covering the whole plate after 24 hours.
8. Station 8: Gram-positive Staphylococcus aureus grown on Mannitol Salt agar plate. A yellow halo will appear around the colony.
9. Station 9: Gram-positive Serratia marcescens grown on Trypticase Soy agar plate. The colonies will appear red in color after 24 hours.
10. Station 10: Gram-positive Proteus vulgaris in urea broth. The Proteus produces the enzyme urease which breaks down urea to ammonia, water and carbon dioxide. The pH is changed to alkaline from the byproducts and the indicator phenol red changes from yellow to reddish-purple.
11. Station 11: Microscope with slide of Gram-positive bacilli or cocci of your choice.
12. Station 12: Microscope with slide of Gram-negative bacilli or cocci of your choice.