LEC 5 Q –MICROBIOLOGY

1. Which feature of the Vitek system allows for the personalization of antibiotic treatment?
A) Identification card
B) Antimicrobial susceptibility test card (AST card)
C) Colorimetric barcode analysis
D) Turbidity measurement

2. In the context of antimicrobial susceptibility testing, why is it important to establish a standard turbidity?
A) To enhance the growth of microorganisms
B) To prevent false negatives and false positives in antibiotic effectiveness
C) To ensure accurate identification of microorganisms
D) To facilitate rapid testing procedures

3. What is the clinical significance of determining the Minimum Inhibitory Concentration (MIC) of an antibiotic?
A) It indicates the most potent antibiotic available
B) It helps avoid toxicity in patients with organ dysfunction
C) It confirms the presence of bacterial resistance
D) It allows for the rapid identification of the pathogen

4. What does a urine culture showing ≥ 10^5 CFU/mL indicate?
A) No urinary tract infection (UTI)
B) Significant bacteriuria confirming UTI
C) False positive result
D) Normal flora presence

5. Which of the following is a limitation when interpreting urine culture results?
A) The timing of urine collection
B) The type of media used for culture
C) The method of inoculation
D) The presence of multiple pathogens

6. Why is it critical to collect a mid-stream urine sample?
A) To concentrate the sample
B) To minimize contamination from external flora
C) To enhance the growth of pathogens
D) To increase urine volume

7. What are the possible causes of sterile pyuria?
A) Bacterial infection and antibiotic treatment
B) Renal tuberculosis and renal stones
C) Cystitis and urethritis
D) Both B and C

8. Which statement is true regarding blood cultures?
A) They should only be performed on symptomatic patients.
B) They require a minimum of 5 mL of blood for accurate results.

C) Incubation periods can vary from 1 to 3 days.
D) They are primarily used to identify urinary pathogens.

9. In which scenario is a urine culture result of ≥ 10^3 CFU/mL considered significant?
A) If Staphylococcus aureus is identified
B) In patients with symptomatic UTIs
C) Only in infants or very young children
D) When renal stones are present

10. How does the Vitek system utilize barcode technology in microorganism identification?
A) To enhance visual inspection of cultures
B) To track patient samples throughout the testing process
C) To read and analyze biochemical test results and compare them to a database
D) To calibrate the turbidity of bacterial suspensions

Answers
1 B
2 B
3 B
4 B
5 D
6 B
7 D
8 A
9 B
10 C

11. What role does the turbidity measurement play in bacterial suspension preparation?
A) It determines the type of bacteria present.
B) It indicates the effectiveness of the antibiotics.
C) It ensures proper concentration for accurate susceptibility testing.
D) It helps in the identification of pathogenic strains.

12. What is the significance of having 64 wells in the antimicrobial susceptibility test card?
A) To allow for testing of various pathogens simultaneously
B) To enable testing at multiple antibiotic concentrations
C) To facilitate faster results
D) To simplify the identification process

13. Which of the following is NOT a method of urine sample collection?
A) Mid-stream urine
B) Suprapubic aspiration
C) Catheterization
D) Blood draw

14. What can lead to false negatives in antibiotic susceptibility testing?
A) Excessive turbidity in bacterial suspension
B) Inadequate incubation time
C) Use of the wrong culture media
D) Contamination during sample collection

15. What is the main purpose of using a calibrated loop in urine culture?
A) To maintain sterility of the sample
B) To ensure accurate quantification of bacterial counts
C) To enhance the growth of pathogens
D) To prevent dilution of the sample

16. In urine culture interpretation, which scenario would require further investigation despite showing ≥ 10^4 CFU/mL?
A) Presence of Escherichia coli
B) Identification of Staphylococcus aureus
C) Significant bacteriuria with no symptoms
D) Mixed bacterial flora

17. Which condition could result in pyuria without significant bacteriuria?
A) Urinary tract infection
B) Renal calculi
C) Bacterial cystitis
D) Pyelonephritis

18. Why is it important to stop antibiotics before collecting a urine sample for culture?
A) To improve patient comfort during the procedure
B) To ensure the presence of bacteria for accurate culture results
C) To minimize contamination risks
D) To prevent urine dilution

19. What does a positive blood culture indicate in a clinical setting?
A) The patient has a urinary tract infection
B) There is a systemic bacterial infection present
C) The patient is dehydrated
D) There is a local infection only

20. How does the presence of WBCs in urine relate to infection?
A) It indicates dehydration
B) It suggests an inflammatory response to infection
C) It confirms bacterial growth
D) It has no clinical significance

Answers
11 C
12 B
13 D
14 A
15 B

16 B
17 B
18 B
19 B
20 B

21. What is the primary indication for performing a urine culture?
A) To assess kidney function
B) To diagnose a urinary tract infection (UTI)
C) To check for dehydration
D) To identify viral infections

22. In the Vitek system, how is the identification of microorganisms primarily achieved?
A) Through visual inspection of colonies
B) By analyzing metabolic pathways using colorimetric changes
C) By measuring antibiotic resistance
D) By direct sequencing of DNA

23. Why is it crucial to incubate blood cultures for an extended period (5 to 21 days)?
A) To allow for the detection of slow-growing organisms
B) To ensure contamination does not occur
C) To enhance the metabolic activity of bacteria
D) To prepare for immediate antibiotic administration

24. What is the clinical significance of identifying the specific pathogen in a blood culture?
A) It allows for empirical treatment of the infection
B) It helps determine the source of infection and appropriate therapy
C) It indicates the patient's immune status
D) It confirms the presence of a viral infection

25. What could potentially skew the results of a urine culture if the sample is not collected properly?
A) The time of day the sample is taken
B) Contamination with skin flora
C) The method of culture used
D) The temperature of the sample during transport

26. What is the expected turbidity range for a standard bacterial suspension prepared for testing?
A) 0.1 - 0.2 McFarland
B) 0.3 - 0.5 McFarland
C) 0.5 - 0.63 McFarland
D) 1.0 - 1.5 McFarland

27. Which condition could lead to a false positive result in urine culture?
A) Inadequate sample collection
B) High bacterial load in the sample

C) Presence of normal flora
D) All of the above

28. What does a urine culture result of ≥ 10^4 CFU/mL typically indicate?
A) Uncomplicated UTI
B) Contamination during collection
C) Insufficient bacterial growth
D) No clinical relevance

29. Which of the following statements about the identification card in the Vitek system is accurate?
A) It contains only 10 biochemical tests.
B) It provides a comprehensive profile of metabolic activities.
C) It is specific only for gram-negative bacteria.
D) It does not include yeast identification.

30. What is a common cause of renal tuberculosis that may result in sterile pyuria?
A) E. coli infection
B) Mycobacterium tuberculosis
C) Staphylococcus aureus
D) Candida species

Answers
21 B
22 B
23 A
24 B
25 B
26 C
27 D
28 A
29 B
30 B

31. In antimicrobial susceptibility testing, what does an MIC of 16 µg/mL imply about the chosen antibiotic?
A) It is ineffective against the bacteria tested.
B) It is highly effective and can be used at this concentration.
C) It is only effective in combination with other antibiotics.
D) It may cause renal toxicity in sensitive patients.

32. What is a critical factor when interpreting results from the urine culture with mixed flora?
A) Identifying all bacteria present
B) Determining the predominant organism's count
C) Ensuring that all samples are taken at the same time
D) Using a blood agar plate exclusively

33. Why is the inoculation technique different for urine cultures compared to other types of cultures?
A) Urine cultures require anaerobic conditions.
B) Urine cultures necessitate quantification of bacteria.
C) Urine cultures use different growth media entirely.
D) Urine cultures require immediate processing.

34. Which type of organism is NOT typically isolated in a urine culture?
A) Uropathogenic Escherichia coli
B) Staphylococcus saprophyticus
C) Mycobacterium tuberculosis
D) Enterococcus species

35. What role do biochemical tests play in the Vitek identification process?
A) They confirm the presence of antibiotic resistance.
B) They assess metabolic capabilities to differentiate organisms.
C) They provide a visual confirmation of bacterial identity.
D) They measure the turbidity of bacterial suspensions.

36. When should a blood culture be prioritized, even in the absence of identifiable pathogens?
A) When the patient has an autoimmune disorder
B) If the patient is febrile with unclear symptoms
C) Only when there is evidence of localized infection
D) When there are concurrent urine culture results

37. Which condition may complicate the interpretation of urine culture results?
A) Presence of leukocytes without bacteria
B) Inoculation of multiple media types
C) Collection of urine via catheterization
D) Presence of crystals in the urine

38. In the context of urine culture, what does the term "significant bacteriuria" refer to?
A) Any growth of bacteria in a culture
B) The presence of ≥ 10^5 CFU/mL indicating potential infection
C) The presence of mixed flora in low quantities
D) Isolated growth that does not cause symptoms

39. Why is a urine sample collected via suprapubic aspiration particularly useful in infants?
A) It provides a non-invasive method for urine collection.
B) It avoids contamination from the urethra.
C) It allows for easier identification of pathogens.
D) It prevents dehydration during the procedure.

40. Which of the following best describes the role of colorimetric analysis in the Vitek system?
A) It determines the antibiotic resistance pattern of the isolated bacteria.
B) It identifies the bacterial species based on metabolic activity.

C) It provides quantitative data on bacterial growth rates.
D) It enhances the growth of specific organisms.

Answers
31 B
32 B
33 B
34 C
35 B
36 B
37 A
38 B
39 B
40 B

41. What potential issues arise from using a single antibiotic concentration during susceptibility testing?
A) It may not account for varying patient responses.
B) It complicates the identification of the microorganism.
C) It increases the likelihood of contamination.
D) It can lead to misleading identification of bacteria.

42. Which aspect of the Vitek system enhances its speed compared to traditional methods like API?
A) The use of visual identification techniques
B) The implementation of advanced biochemical tests
C) The automated processing and colorimetric analysis
D) The reliance on manual inoculation procedures

43. What is the impact of having a bacterial suspension with excessive turbidity on antibiotic testing?
A) It increases the accuracy of MIC determination.
B) It may mask the effectiveness of the antibiotic.
C) It facilitates faster result interpretation.
D) It has no impact on the testing process.

44. In what situation would a urine culture yield a significant bacteriuria result despite low CFU/mL counts?
A) Presence of Uropathogenic E. coli at 10^3 CFU/mL
B) Isolation of Staphylococcus aureus in a symptomatic patient
C) Mixed flora showing 10^4 CFU/mL in a catheterized sample
D) No growth in a centrifuged urine sample

45. Why might renal stones lead to sterile pyuria?
A) They cause direct bacterial infection.
B) They elicit an inflammatory response without infection.
C) They disrupt urine flow, preventing infection.
D) They enhance bacterial growth in urine.

46. Which statement regarding the interpretation of pyuria is correct?
A) Pyuria always indicates the presence of significant bacteriuria.
B) Pyuria can occur in the absence of infection due to inflammatory conditions.
C) Pyuria is irrelevant in diagnosing urinary tract infections.
D) Pyuria is solely due to bacterial presence in urine.

47. What does the term "sterile pyuria" imply about the presence of WBCs in urine?
A) There is an active bacterial infection present.
B) There is an inflammatory response without detectable bacteria.
C) The urine is contaminated with external flora.
D) There is a high bacterial count that has been misidentified.

48. In blood culture, why is the volume of blood to broth critical?
A) It ensures a sufficient dilution of bacteria for accurate identification.
B) It provides a nutrient-rich environment for fastidious organisms.
C) It allows for accurate quantification of bacterial load.
D) It minimizes the risk of contamination.

49. Which bacteria might require specialized culture media due to its growth requirements?
A) Escherichia coli
B) Staphylococcus aureus
C) Mycoplasma species
D) Klebsiella pneumoniae

50. How does the Vitek system's database contribute to the identification process?
A) It provides a library of antibiotics for treatment.
B) It stores metabolic profiles for comparing unknown samples.
C) It logs patient histories to tailor treatments.
D) It tracks antibiotic resistance trends over time.

Answers
41 A
42 C
43 B
44 B
45 B
46 B
47 B
48 A
49 C
50 B

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