

Continuing Education Questions

WINTER 2003

To receive 3.0 contact hours of basic level P.A.C.E.® credit for **Focus: Viral Infections**, insert your answers in the appropriate spots on the immediately following page; then complete and mail the form as directed.

NOTE: There may be more answer spaces on the answer sheet than needed. If so, leave them blank. Make sure the number of the answer space you fill matches the number of the question you are answering.

LEARNING OBJECTIVES

1. Describe the general viral characteristics of dengue viruses.
2. Describe how dengue fever is transmitted and the species of the vectors associated with dengue virus transmission.
3. List three factors that promote dengue virus infections in endemic areas.
4. Describe the two clinical syndromes produced by dengue fever virus.
5. Discuss three laboratory diagnostic methods used to detect dengue fever.
6. Identify the geographical area in which the initial endemic of HPS occurred.
7. Identify the primary means of transmission for hantavirus.
8. Describe the four phases of clinical manifestations of HPS.
9. Discuss the pathology and pathophysiology of HPS.
10. Describe the three diagnostic laboratory tests for HPS established by CDC.
11. Identify three characteristic hematological and six chemical findings associated with HPS.
12. Discuss the treatment of and steps to avoid infection with hantavirus.
13. Describe the general viral characteristics of West Nile virus.
14. Name the species of the primary vectors that have been identified to transmit West Nile virus.
15. List three reservoir hosts for West Nile virus.

16. Identify the two populations at highest risk for encephalitis from West Nile virus infections.
17. Describe four laboratory confirmation criteria established by CDC to identify West Nile virus.

Dengue fever in the Western Hemisphere

1. Dengue fever virus belongs to which one of the following viral families?
 - a. Bunyaviridae
 - b. Flaviviridae
 - c. Reoviridae
 - d. Togaviridae
2. What is the vector associated with the transmission of the dengue virus?
 - a. *Aedes* sp.
 - b. *Anopheles* sp.
 - c. Tsetse fly
 - d. *Culex* sp.
3. Which of the following methods may not detect dengue virus antibodies in secondary infections?
 - a. MAC-ELISA
 - b. IgG-ELISA
 - c. PCR
 - d. RT-PCR
4. Dengue virus is transmitted
 - a. by bite from an infected female *Aedes* mosquito.
 - b. from person to person.
 - c. by dog bite.
 - d. from natural reservoir bird to mosquito.
5. Dengue fever is also known as:
 - a. desert fever.
 - b. rift Valley fever.
 - c. breakbone fever.
 - d. Four Corners syndrome.
6. The diagnosis of dengue infections can be accomplished by:
 - a. IgM antibody-capture ELISA (MAC-ELISA).
 - b. growing virus in mosquito cell lines.
 - c. reverse transcriptase-polymerase chain reaction (RT-PCR) method.
 - d. all of the above.

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FOCUS: VIRAL INFECTIONS

7. Dengue shock syndrome is staged as Grades III and IV because of:
 - a. generalized macular rash.
 - b. overwhelming arthralgia and myalgia.
 - c. remarkable circulatory collapse.
 - d. intense bone pain.
 8. *Aedes aegypti* is also the vector for:
 - a. West Nile virus.
 - b. yellow fever virus.
 - c. hantavirus.
 - d. malaria.
 9. Factors that promote dengue virus infections in endemic areas include:
 - a. urbanization.
 - b. travel.
 - c. poor sanitation and poverty.
 - d. all of the above.
 10. A person may suffer from dengue hemorrhagic fever when he or she becomes reinfected with:
 - a. DEN-1.
 - b. DEN-2.
 - c. DEN-3.
 - d. two different dengue virus serotypes.
- Hantavirus**
11. HPS is primarily transmitted by:
 - a. chipmunks.
 - b. deer mice.
 - c. wild rats.
 - d. mosquitoes.
 12. All of the following are prevention measures for HPS, **EXCEPT**:
 - a. seal food in rodent proof containers.
 - b. use EPA approved rodenticides.
 - c. wash hands often.
 - d. keep garbage receptacles tightly fastened.
 13. Treatment of HPS may include:
 - a. ribavirin.
 - b. acyclovir.
 - c. foscarnet.
 - d. AZT.
 14. A commonly used clinical laboratory methodology for diagnosis of HPS is:
 - a. ELISA
 - b. FAT
 - c. complement fixation.
 - d. agglutination.
 15. Two organs which demonstrate increased concentration of virus in HPS are:
 - a. lung and heart.
 - b. brain and heart.
 - c. spleen and heart.
 - d. diaphragm and meninges.
 16. The geographical area of initial endemicity of HPV was the:
 - a. Northeast U.S.
 - b. Four Corners region.
 - c. Central Plains region.
 - d. Great Lakes region.
 17. Characteristic manifestations seen in the cardiac phase of HPS is/are:
 - a. shock and pulmonary edema.
 - b. bloody diarrhea.
 - c. vomiting and shock.
 - d. kidney failure.
 18. Antigen detection of SNV in tissue is accomplished by:
 - a. immunohistochemistry.
 - b. E.L.I.S.A.
 - c. light microscopy.
 - d. viral culture.
 19. A hematological finding most common in HPS is:
 - a. thrombocytopenia.
 - b. reticulocytosis.
 - c. white cell inclusions.
 - d. erythrocytosis.
 20. IgM capture-ELISA detects antibodies to SNV:
 - a. during an acute infection.
 - b. in the convalescent phase.
 - c. for many years after the infection.
 - d. in both acute and convalescent samples.

FOCUS: VIRAL INFECTIONS

West Nile Virus: An Emerging Virus in North America

21. The following is (are) known vector(s) for West Nile virus?
 - a. *Culex pipiens*
 - b. *Anopheles* sp.
 - c. *Aedes vexans*
 - d. a and c
22. West Nile virus belongs to the family:
 - a. bunyaviridae.
 - b. flaviviridae.
 - c. reoviridae.
 - d. togaviridae.
23. Which of the following methods is (are) recommended to confirm WNV infections?
 - a. IgM-capture EIA in CSF sample.
 - b. Both IgM EIA and IgG EIA/PRNT confirmed in a single serum sample.
 - c. Recovery of WNV from tissue.
 - d. All of the above.
24. West Nile virus is closely related genetically to:
 - a. St Louis Encephalitis virus.
 - b. hantavirus.
 - c. dengue fever virus.
 - d. Lassa fever virus.
25. The following segments of the population are at highest risk of developing severe encephalitis from WNV infection:
 - a. elderly.
 - b. young adolescents.
 - c. newborns.
 - d. a and b.
26. WNV infection can be transmitted from:
 - a. person-to-person.
 - b. animal-to-person.
 - c. natural reservoir bird host to mosquito.
 - d. handling dead or infected animals.
27. WNV infections have been reported in:
 - a. crows and other birds.
 - b. horses.
 - c. chipmunks.
 - d. all of the above.
28. Which of the following WNV lineage has been associated with clinical human encephalitis infections?
 - a. Lineage 1
 - b. Lineage 2
 - c. Neither
 - d. Both
29. The WNV recovered in the NYC outbreak was determined to be closely related to the strain causing infections in:
 - a. Africa.
 - b. Israel.
 - c. Europe.
 - d. the Soviet Union.
30. A probable WNV infection can be demonstrated by showing:
 - a. IgG antibodies in paired samples of acute phase and convalescent phase.
 - b. IgM antibody in a single serum.
 - c. a ≥ 4 -fold serial change in the PRNT in serum.
 - d. a, b, and c.

Continuing Education Registration Form

To earn continuing education (P.A.C.E.®) credit, (1) complete the form below, (2) record your answers, and (3) tear out and mail this form with a check or money order (\$18 for ASCLS members, \$28 for non-members for all articles) to:

American Society for Clinical Laboratory Science
P.O. Box 79154
Baltimore, MD 21279-0154

A certificate and credit will be awarded to participants who achieve a passing grade of 70% or better. Participants should allow 8 weeks for notification of scores and receipt of certificates.

Focus: Viral Infections carries 3.0 contact hours of basic level credit. This form can be submitted for credit for up to one year from the date of issue.

Print or type carefully.

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Check all that apply

- ☐ I am an ASCLS member
- ☐ I am not an ASCLS member
- ☐ I would like to receive ASCLS membership information
- ☐ I have previously participated in Focus
- ☐ I would like information on other continuing education sources

Answers

Circle correct answer (questions are on previous two pages).

- | | | | |
|--------------|---------------|---------------|---------------|
| 1. a b c d e | 8. a b c d e | 15. a b c d e | 22. a b c d e |
| 2. a b c d e | 9. a b c d e | 16. a b c d e | 23. a b c d e |
| 3. a b c d e | 10. a b c d e | 17. a b c d e | 24. a b c d e |
| 4. a b c d e | 11. a b c d e | 18. a b c d e | 25. a b c d e |
| 5. a b c d e | 12. a b c d e | 19. a b c d e | 26. a b c d e |
| 6. a b c d e | 13. a b c d e | 20. a b c d e | 27. a b c d e |
| 7. a b c d e | 14. a b c d e | 21. a b c d e | 28. a b c d e |

Participant Information

Please circle the most appropriate answers.

1. Is this program used to meet your CE requirements for:
(a) state license (b) NCA (c) employment (d) other

2. Specialty: (a) biochemistry/urinalysis (b) microbiology
(c) lab administration (d) hematology/hemostasis (e) education
(f) immunology (g) immunohematology

3. Workplace: (a) hospital over 500 beds (b) hospital 200–499
beds (c) hospital 100–199 beds (d) hospital under 100 beds
(e) private lab (f) community blood bank (g) group practice
(h) private physician (i) clinic (j) other

4. Salary range: (a) under \$10,000 (b) \$10,000 to \$20,000
(c) \$20,000 to \$30,000 (d) \$30,000 to \$40,000
(e) over \$40,000

5. Did these articles achieve their stated objectives?
(a) yes (b) no

6. How much of these articles can you apply in practice?
(a) all (b) some (c) very little (d) none

7. Employment status: (a) full time (b) part time (c) student
(d) not employed (e) retired

8. How long did it take you to complete both the reading
and the quiz? _____ minutes

9. What subjects would you like to see addressed in future
Focus articles?

Answers to 2000 FOCUS Continuing Education Questions

13(1) WINTER 2000 CURRENT ISSUES IN ASSESSMENT

Common Formats of Multiple Choice Questions Testing Application of Knowledge in Clinical Laboratory Science

- Below are the stems of four examination items on granulocytic precursors. Select the stem for an application level item.
 - What stage of granulocyte precursor is seen in this photo-image?
- In the box below is an application level examination item. Into which category of application items does it fall?

A patient has a hemoglobin concentration of 7.5 g/dL with erythrocytes that appear normochromic. Which of the following is the hematocrit value that correlates with these data?

- 0.13
- 0.23
- 0.29
- 0.32

b. Calculations

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- Into which category of items does the following question fall?

A gram-negative bacillus was recovered from a facial abscess. This organism is non-saccharolytic, produces pits in blood agar, and gives off the odor of hypochlorite bleach. Which of the following is the MOST probable identity?

- Haemophilus aphrophilus*
- Eikenella corrodens*
- Alcaligenes xylosoxidans*
- Acinetobacter anitratus*

a. Application level: interpretation of test results presented in non-visual forms

- Application level multiple choice items differ from recall items in that application level items:
 - always have a stem that presents data or a short case.
- Analyze the following test item and assess its cognitive level and category.

Examination of a fluorescent (monoclonal) antibody-stained smear of conjunctival scrapings from a 7-day-old infant exhibits many WBCs, epithelial cells, and small, round, homogeneously-stained, apple-green forms. The most likely organism causing this infection is:

- Chlamydia trachomatis*.
- Neisseria gonorrhoeae*.
- Cytomegalovirus.
- Staphylococcus aureus*.

a. Recall level impostor

- Assess the cognitive level of items 1 through 5 above. Which are at the application level?
 - Items 1, 2, 3, and 5
- A teacher has used a computer image of neutrophils with toxic granulation to teach identification of this abnormality in the instructional phase of the course. This image is from a patient who had a co-existent hypochromic, microcytic anemia. Assuming that the teacher wants to avoid testing for recall and instead to focus on application, for testing purposes:
 - this image can be used to test for recognition of hypochromia but not toxic granulation.
- Which of the following strategies for item construction would be best in order to develop an application level item related to quality control in the clinical chemistry department?
 - Name an assay principle/method and ask the test taker to select the type of QC materials to use.
- Which of the following item formats would likely increase item difficulty without raising the cognitive level above recall?
 - Testing a fact from a reading assignment for which there was no specified objective.

CONTINUING EDUCATION

Common Formats of Multiple Choice Questions Testing Analytical Skills in Clinical Laboratory Science

10. The use of an examination blueprint helps to ensure the:
b. examination will emphasize what the designer intends.

11. Below are the stems for four multiple-choice items related to ABO testing. Which is at the analysis level?
b. A patient forward types as Group A but reverse types as Group AB. The autocontrol is positive. The antibody screen reacts 2+ with all cells after 37 °C incubation but all are negative after AHG. Coombs control cells are reactive. To accurately ABO type this patient, which of the following techniques should be used?

12. What could be done to ensure that the item below is answered at the analysis level?

There is no growth in any of the tubes of a minimal inhibitory concentration (MIC) test, including the control tube. The **MOST** probable explanation for these results is that the:

b. Provide a picture of the tubes rather than describing "no growth"

13. For the analysis level item below, determine the category of analysis items to which it belongs.

In preparation of a serum sample for a total bilirubin determination by the Malloy-Evelyn method, hemolysis was noted. The sample is placed in a regular test tube and left on the bench top for several hours prior to analysis. The results may be:

c. Predicting results, outcomes, effects and implications

14. For the analysis level item below, determine the category of analysis items to which it belongs.

A 23-year old male is seen in the emergency department bleeding profusely from a gunshot wound. A wallet card from the patient indicates his blood type to be group A, Rh positive. The physician orders three units of blood to be released without the usual typing and crossmatch procedures. What group and type of blood should be selected for this patient?

d. Identifying next steps, further testing needed or appropriate follow-up actions

15. Which of the following is **NOT** a benefit of using an examination blueprint?

a. an examination of moderate difficulty.

16. Which of the following is characteristic of all analysis level items?

b. Some form of data in the stem

17. There was no question 17.

But Can They Do It? Clinical Competency Assessment

18. Which of the following is **NOT** one of the four steps in development of a competency assessment process?
c. Give students feedback

19. An OSCE is designed to measure:
c. both of the above.

20. Advantages of simulations include the ability to assess skills that:
d. all of the above

21. All of the following might be included in a CLS competency assessment portfolio EXCEPT a:
c. list of extracurricular activities.

22. Of the following competency assessment methods, which one would be most comprehensive for determining a phlebotomist's competency level?
a. OSCE

13(2) SPRING 2000 LEUKEMIA UPDATE

Acute Promyelocytic Leukemia (AML-M3) – Part 1: Pathophysiology, Clinical Diagnosis, and Differentiation Therapy

1. Given that the processes of both carcinogenesis and leukemogenesis generally require multiple mutations to produce malignancy, why are leukemias harder to cure?
a. Leukemia is not a solid tumor and the malignant cells are naturally spread to the bloodstream more quickly than in solid tumors.

2. Acute leukemias progress more aggressively than chronic leukemias because:
b. blast cells grow more rapidly and are more readily retained by the bone marrow than less immature cells thus producing marrow hypoplasia.

3. Which of the following best describes the uniqueness of the molecular defect in AML-M3?
d. A single t(15;17) translocation may be sufficient for full transformation.

4. Select the clinical feature not associated with AML-M3.
c. Patients develop partial albinism and photophobia.

CONTINUING EDUCATION

5. Which of the following lab findings would be considered unexpected in a patient with AML-M3?
d. Blasts found in AML-M3 consistently stain strongly positive with MPO, SBB, and NSE.
6. All of the following statements are true for the variant AML-M3m EXCEPT?
a. WBC count is usually $100 \times 10^9/L$.
7. Compared to other leukemias, conventional chemotherapy incurs a greater health risk to the patient with AML-M3 due to the:
b. incidence of chemotherapy induced DIC.
8. Select the statement that best describes the mechanism involved in differentiation therapy for the treatment of AML-M3.
c. Differentiation therapy restores maturation of the malignant promyelocytes.
9. The most successful approach to the treatment of AML-M3 is:
a. differentiation therapy followed by chemotherapy.
10. Which of the following symptoms is NOT associated with retinoic acid syndrome?
d. Liver failure
11. The chromosomal translocation most often observed in AML-M3 involves chromosomes:
c. 15 and 17
12. Select the translocation that has NOT been observed on AML-M3?
b. t(9;22)
13. The RAR α gene normally functions to:
d. bind retinoic acid to promote myeloid differentiation.
14. The PML gene is thought to function normally to:
a. suppress myeloid cell growth.
15. Which statement best describes the structure of the fusion gene?
c. First six exons of the PML gene fused to the last four exons of the RAR α gene.
16. Which of the following represents a proposed mechanism of leukemogenesis involving the fusion protein in AML-M3 patients?
a. Fusion protein binds the co-repressor complex with stronger affinity than wild-type RAR α .
17. Which molecular technique is considered the least cumbersome and quickest while maintaining reasonable sensitivity and specificity?
b. FISH
18. Which molecular technique is most useful at detecting minimal residual disease in previously treated patients?
c. rtPCR
19. Select the statement that best represents the most promising proposed mechanism of ATRA induced differentiation therapy?
d. Therapeutic doses of ATRA causes the fusion protein to release the co-repressor complex and bind histone acetylase to stimulate transcription.

Acute Promyelocytic Leukemia (AML-M3) – Part 2: Molecular Defect, DNA Diagnosis and Models of Leukemogenesis and Differentiation Therapy

20. ATRA therapy is most effective when the PML breakpoint occurs at:
a. bcr1

Immunophenotyping Leukemias: The New Force in Hematology

21. Within the flow cytometer, forward angle and 90 degree right angle scattered light measures:
a. cell particle size and granularity
22. CD markers used to classify subpopulations of T cell include all of the following EXCEPT:
d. CD19
23. Two of the more common fluorochromes used in two-color immunofluorescence analysis of antigens are fluorescein isothiocyanate (FITC) and R-phycoerythrin (R-PE).
a. True
24. An appropriate screening panel for a lymphoma or chronic leukemia would include all of the following EXCEPT:
c. CD 34
25. Using only pattern recognition generated from a dotplot, a diagnosis of leukemia can be concluded.
b. False

13(3) SUMMER 2000 BENCHMARKING LABORATORY OPERATIONS

1. Comparing laboratory operations through benchmarking enables laboratory managers to:
b. identify areas that have opportunities for improvement.
2. One of the key laboratory functions for which benchmarking indicators are available is:
c. technical performance.

CONTINUING EDUCATION

3. Which of the following products is **NOT** marketed by the College of American Pathologists?
d. Lab Trends®
 4. A Participant Profile is essential for each laboratory participating in a subscription benchmarking program in order to:
b. define peer groups.
 5. Which of the following benchmarking products do **NOT** define a billed test as equal to one CPT code:
b. MECON® PEERnext®
d. ORYX™
 6. Proficiency testing performance is a means of benchmarking:
a. technical functions.
 7. The laboratory manager exerts the most influence over which performance indicator:
b. supply costs
 8. Which benchmarking system is currently used by the University Hospital Consortium?
a. HBSI ACTION®
 9. The basic laboratory performance ratios are:
c. cost ratios.
 10. Areas of excellence in a laboratory's operation can be identified by the:
c. benchmarking process.
 2. Which of the following analytes is decreased during normal pregnancy?
b. Protein S
 3. Which of the following statements about PAI-1 is correct?
d. PAI-1 is a cofactor of PAI-2.
 4. Given the following information identify the patient at greatest risk of preeclampsia.
b. A 24-year-old who is a heavy smoker and has the Factor V Leiden mutation.
 5. Which of the following is **NOT** an inherited thrombophilia?
d. von Willebrand's
 11. Increased levels of prothrombin fragment 1+2 (F1 + 2) indicate that:
c. prothrombin has been converted to thrombin.
 12. Prothrombin fragment 1+2 (F1+2) is detected by using:
b. molecular markers.
 13. In the management of acute DIC the most valuable coagulation assays are:
b. platelet counts and the PT, APTT, and fibrinogen.
- Disseminated Intravascular Coagulation (DIC)**
14. Which is the activator of the clotting system most commonly encountered in DIC patients?
b. Tissue factor
 15. Which breakdown product of fibrinogen or fibrin indicates the in vivo presence of thrombin and plasmin?
d. D-dimer
 16. Which laboratory finding would rule out acute, decompensated DIC?
c. Normal fibrinogen levels
 17. Which laboratory test would be most useful to diagnose, in the proper clinical setting, compensated DIC?
a. Thrombin-antithrombin (TAT) complex
 18. Which treatment option is contraindicated in the management of DIC patients?
c. Antifibrinolytics
- 13(4) FALL 2000
THROMBOTIC RISK AND
LABORATORY TESTING
Hemostatic Changes Associated with
Normal and Abnormal Pregnancies**
1. Which of the following is not a risk factor for preeclampsia?
c. Increased levels of antithrombin III

Answers to 2001 FOCUS Continuing Education Questions

13(1) WINTER 2000

PROFESSIONAL DEVELOPMENT

Passing the Torch: Mentoring the Next Generation of Laboratory Professionals

1. One fact related to the current shortage of clinical laboratory practitioners is that:
d. CLT and CLS programs are unable to recruit sufficient numbers of students to reach program capacity.
2. The term "mentor" has its origins in:
a. Homer's poem *The Odyssey*.
3. Which statement is **NOT** characteristic of the mentoring relationship?
b. It is impersonal and of short duration.
4. Mentoring is distinguished from teaching and supervising by the:
c. Non-judgmental nature of the mentoring relationship.
5. Fagan and Fagan reported that benefits of mentoring in nursing included increased:
a. satisfaction with work and learning of technical skills.

6. Which statement best describes the application of mentoring in the profession of clinical laboratory science?
c. Effective mentors for new practitioners would be competent and have a desire to mentor.

Mentoring Tomorrow's Leaders in Education

7. The program type with the highest percentage of full-time faculty members is:
c. CLS-University.
8. What percentage of program directors expects to have faculty vacancies due to retirement in the next five years?
c. 39%
9. Which of the following types of mentoring activities is reported as most commonly practiced by program directors or their institutions?
d. Direct instruction or administrative support of new faculty members.
10. The most frequently cited factor discouraging practitioners from becoming educators is:
b. salary and compensation.
11. The most frequently cited basis for choosing a career in clinical laboratory education is:
a. love of clinical laboratory science and love of teaching.
12. The projected need for new clinical laboratory faculty members in all programs combined over the next five years could be approximately:
d. 330.

Accreditation Responsibilities: Issues Facing New Program Directors

13. What is the role of NAACLS in clinical laboratory education programs?
b. Assures the quality of programs through self evaluation and peer review.
14. Which of the following is **NOT** considered to be a benefit of program accreditation?
b. Guarantees to students that they will become certified upon program completion.
15. The overall purpose of the NAACLS *Essentials* is to:
a. provide an established set of standards against which programs may be evaluated.
16. In order to prepare for program accreditation, it is very important that new program directors consult the NAACLS *Essentials* and the:
c. NAACLS *Guides to Accreditation*.
17. A good approach for a program director to use in developing a self-study is to:
a. consider the self-study as an opportunity for identifying needed improvements.

Mentoring for Retention and Advancement in the Multigenerational Clinical Laboratory

18. The oldest generation still employed today is:
a. the Veteran generation.

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CONTINUING EDUCATION

19. Which generation is characterized as being independent, adaptable, goal-oriented, and not intimidated by authority?
c. Generation X.
20. Which statement best describes the way in which Generation X views professional and personal lives?
d. Personal and professional lives should be balanced; they are equally important.
21. The most numerous cohort presently employed in the clinical laboratory and holding most of the management positions is:
b. the Baby Boomers.
22. Members of the Veteran generation may be valuable mentors of new clinical laboratory practitioners due to their:
b. work ethic, technical skills, and patience.
23. Which of the following would be **LEAST** likely to be of importance in mentoring Generation X for retention and advancement in the clinical laboratory?
d. Laboratory managers should make sure that staff is having fun at work at all times.
3. Of the following, the source of cells proportionally richest in HSC is:
d. umbilical cord blood.
4. The HLA antigens routinely matched include all of the following EXCEPT:
d. HLA-DP.
5. The cryopreservation agent used in the freezing of HSCs is:
a. DMSO.
6. Minimum numbers of HSCs per kilogram of patient body weight during an allogeneic transplant are:
a. $2.0 \text{ to } 5.0 \times 10^6$.
7. Time to engraftment is defined as the time between the transplant and the development of a granulocyte count of:
c. $>500/\text{mL}$.
8. Graft rejection is most often associated with:
d. low numbers of transplanted HSCs.
12. Which of the following is **NOT** associated with the use of CD34+ selected cells in a peripheral blood stem cell transplant [PBSCT]?
a. Higher incidence of bacterial infections
13. Increased risk of bacterial infection is most closely linked with which of the following?
d. Prolonged neutropenia
14. The risk of graft-vs.-host disease is most closely linked to which of the following?
b. Degree of HLA mismatch between donor and recipient
15. Recipients of which of the following types of HSC transplants would most likely have the greatest incidence of bacterial infection?
a. Allogeneic BMT
16. The most commonly isolated organisms in posttransplant infections are:
c. gram positive organisms.
17. The major viral organism causing disease during the late post-transplant period is:
a. Epstein-Barr virus.
18. Which of the following is **NOT** associated with predisposing a recipient to infections during the 'late' posttransplant period?
b. HLA mismatch between donor and recipient

Complications and Risks in Hematopoietic Stem Cell Transplant Patients

9. The major complication for hematopoietic stem cell [HSC] transplant patients during the first 30 days posttransplant is:
d. bacterial infections.
10. Use of leukodepleted red blood cells will help decrease the risk of infection with which organism?
b. Cytomegalovirus
11. Posttransplant lymphoproliferative disease may be caused by which organism?
a. Epstein-Barr virus

14(2) SPRING 2001

IMMUNOHEMATOLOGY

Hematopoietic Stem Cell Transplantation

1. Hematopoietic stem cells are:
d. uncommitted progenitor cells.
2. Mobilization of HSC from the bone marrow into the peripheral blood can be accomplished by:
b. cytokine treatment.

14(3) SUMMER 2001

PATHOGENS WITH NEWLY ASSOCIATED DISEASES

Genital HPV: Links to Cervical Cancer, Treatment, and Prevention

1. Infections caused by HPV include:
b. genital warts.

CONTINUING EDUCATION

2. HPV type(s) commonly associated with cervical cancer are:
b. 16, 18.
3. All of the following are suspected risk factors for HPV EXCEPT:
a. short-term contraceptive use.
4. Prevention of HPV transmission includes:
d. answers a and b.
5. Treatment of HPV infections includes:
d. all of the above.
6. A commonly used clinical laboratory method for the detection of HPV infections is:
c. HPV DNA assay.

Listeriosis: An Emerging Food-Borne Disease

7. *Listeria monocytogenes* is:
b. beta hemolytic.
8. Person-to-person transmission occurs through:
c. placental transfer.
9. An appropriate sample to submit for analysis is:
a. CSF
10. Which of the following plays a role in the pathogenicity of *L. monocytogenes*?
a. Ability to multiply intracellularly
11. The antibiotics effective in killing all *L. monocytogenes* strains are:
a. gentamicin and amoxicillin.
12. Which of the following individuals are at great risk for serious listerial infection?
e. All of the above
13. *L. monocytogenes* appear as:
c. gram positive nonsporeforming rods.

14. *L. monocytogenes* is identified by which of the following characteristics:
b. catalase +; Bile esculin +; CAMP +; motile at room temperature.
15. Which of the following manifestations usually occur in the newborns that show signs of infection at birth or shortly thereafter?
b. Septicemia
16. Which of the following culture media is used to screen for *Listeria* organisms in food products?
d. MOX agar
17. Food processors perform tests to detect *Listeria* on food:
b. routinely.

IRON OVERLOAD

Hereditary Hemochromatosis: A Case Study and Review

1. The greatest portion of body iron is normally found in what compound?
b. Hemoglobin
2. Regulation of iron equilibrium occurs via:
c. absorption from the GI tract.
3. What is a possible explanation for increased iron absorption in hereditary hemochromatosis (HH)?
a. Altered HFE protein increases the binding of transferrin to receptors on cells of the small intestine
4. Which HFE genotype is most likely to result in clinical hemochromatosis?
d. C282Y/C282Y.
5. What percentage of Caucasians are C282Y heterozygotes?
c. 10% to 15%.

6. Which of the following is most likely NOT a factor in the underdiagnosis of HH?
a. HH is extremely rare, especially in women
7. Which tests are needed to determine transferrin saturation?
c. Serum iron and TIBC
8. The most sensitive biochemical test for the diagnosis of HH is the:
a. transferrin saturation.
9. Which screening test result is considered suggestive of HH by the College of American Pathologists (CAP)?
b. Transferrin saturation of >60% on two occasions
10. The best test to monitor the amount of storage iron in individuals diagnosed with HH is the:
d. serum ferritin.
11. Which of the following is NOT a good use for DNA testing for HFE mutations?
d. Population screening of asymptomatic individuals
12. The upper reference limit for serum ferritin in females is:
b. 200 ng/mL.
13. During the iron depletion phase the HH patient is typically treated by:
a. removing a unit of blood once or twice weekly.
14. All of the following should be avoided by persons diagnosed with HH EXCEPT:
c. taking Vitamin E supplements.

CONTINUING EDUCATION

15. Common causes of death in persons with HH include all of the following **EXCEPT**:
 - a. complications of diabetes.
16. An important test for differentiating primary iron overload due to HH from secondary causes of iron overload is:
 - d. DNA tests for HFE mutations.
17. Clinical expression of HH is thought to be delayed in which group?
 - a. Women of childbearing age
18. Causes of secondary iron overload include all **EXCEPT** which of the following?
 - b. Anemia of chronic disease
19. Persons with HH do **NOT** qualify as blood donors because:
 - b. they are not considered to be strictly volunteers.
20. What is the current status of universal screening for HH?
 - c. Screening persons over 20 years of age using biochemical tests is recommended by the CAP
24. Organs that may be damaged by iron deposits in chronic iron overload include the:
 - e. all of the above.
25. Most proposed mechanisms to explain the biochemical and physical changes observed in hemochromatosis focus upon:
 - a. free radical reactions.
26. Clinical chemistry laboratory tests used in addition to the iron concentration/iron saturation/TIBC triad of tests to diagnose iron overload include all of the following **EXCEPT**:
 - e. immunoglobulin electrophoresis.
27. The absorption of iron appears to be regulated in the:
 - d. small intestine.
28. The three most common causes of iron overload are:
 - c. hereditary hemochromatosis, diseases associated with secondary iron overload, increased iron absorption.
3. Which of the following procedures is most useful for diagnosing disease states associated with larger changes in DNA?
 - b. Southern blot
4. Comparing the dot blot assay using allele-specific oligonucleotides with the Southern blot assay using restriction enzymes, which of the following statements are true?
 - c. Both assays can detect single base pair mutations.
5. Which of the following techniques has the ability to detect different infectious agents in the same assay?
 - b. Microarrays
6. Which of the following describes the components of the PCR mixture?
 - d. DNA polymerase, dNTPs, primers, target DNA
7. Viral load of HIV can be measured by which of the following techniques?
 - NASBA (1)
 - RT-PCR (2)
 - bDNA (3)
 - Southern blot (4)
 - c. 1, 2, and 3 are correct

Chronic Iron Overload and Toxicity: Clinical Chemistry Perspective

21. Conditions associated with secondary iron overload include:
 - d. all three of the above.
22. Heme iron is more effectively absorbed than non-heme iron.
 - a. True
23. Which of the following promotes iron absorption?
 - d. Ascorbate (vitamin C)

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MOLECULAR DIAGNOSTIC TESTING

The New Millennium Laboratory: Molecular Diagnostics Goes Clinical

1. In comparison to serological assays, advantages of nucleic acid testing include all of the following **EXCEPT**:
 - b. cost reduction.
2. Which of the following techniques is considered to be the 'gold standard' method by which other molecular methods are evaluated?
 - a. DNA sequencing
8. Which of the following techniques involves signal amplification measured by chemiluminescence?
 - b. bDNA
9. Which of the following nucleic acid amplification techniques do not require the use of a thermocycler?
 - d. SDA and TMA
10. Non-kit or 'home-brew' assays utilized in a molecular diagnostics laboratory:
 - d. require monitoring of amplicon contamination

CONTINUING EDUCATION

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CARDIOVASCULAR DISEASE RISK TESTING

Cardiovascular Risk Markers

1. What condition is **NOT** a form of cardiovascular disease?
 - a. Pulmonary embolus
2. What single disorder accounts for the largest number of sudden deaths in the USA?
 - b. Heart attacks
3. What type of vascular plaque is regarded as the most vulnerable to rupture?
 - c. Type V
4. What chronic disease is well established as a major risk factor for cardiovascular disease?
 - b. Adult onset diabetes mellitus
5. What laboratory-based CVD risk marker is likely to be the most effective predictor?
 - a. Low density lipoprotein cholesterol because it is well known
6. What mechanism renders lipoprotein (a) an important CVD risk factor?
 - a. Lp (a) binds fibrin in place of plasmin.
7. What laboratory analyte is a marker of coagulation activation?
 - c. Prothrombin fragment 1+2
8. What aspect of C-reactive protein physiology makes it an effective marker for CVD?
 - c. CRP is elevated by inflammation
9. Why is the high sensitivity C-reactive protein assay not useful among inpatients? The CRP:
 - b. is grossly elevated in acute disease.
10. What is the risk ratio for CVD of the fifth quintile of fibrinogen levels?
 - c. 2.89
11. What property of elevated plasma fibrinogen contributes to CVD?
 - b. Fibrinogen contributes to plasma viscosity.
12. What method is most often used to assay plasma fibrinogen?
 - a. The clot-based Clauss assay
13. What combination of laboratory results may indicate dysfibrinogenemia?
 - c. Normal thrombin clotting time and prolonged reptilase time
14. What is the relative risk for peripheral artery disease of a homocysteinemia?
 - d. 6.8
15. What methionine pathway enzyme abnormality is typically associated with mildly elevated plasma homocysteine levels?
 - a. Thermolabile methylene tetrahydrofolate reductase
or
b. Cystathionine beta synthase deficiency
16. What vitamin deficiency is **NOT** associated with homocysteinemia?
 - d. Niacin
17. What methionine pathway enzyme abnormality is typically associated with congenital severely elevated plasma homocysteine levels and cystinuria?
 - b. Cystathionine beta synthase deficiency
18. What two laboratory methods are most commonly used to assay plasma homocysteine?
 - b. Immunoassay and high performance liquid chromatography
19. What CVD mechanism is **NOT** attributed to homocysteinemia?
 - b. Oxidation of lipids in atherosclerotic plaque
or
d. Macrophage incorporation of LDL cholesterol in the endothelium
20. What requirement must be met in preparing plasma specimens for homocysteine assays?
 - a. Plasma must be separated from RBCs as soon as possible

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