MEDICAL LABORATORY OBSERVER

CANCER BIOMARKERS: SURVIVING THE JOURNEY FROM BENCH TO BEDSIDE

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CE learning objectives and CE questions prepared by Masih Shokrani, PhD, MT(ASCP), Clinical Laboratory Sciences Program, College of Health and Human Sciences, Northern Illinois University, DeKalb, IL.

CE QUESTIONS

1. How many protein biomarkers are currently approved for clinical use by the FDA?
a. 12 b. 9
c. 100 d. 22

2. HER2/neu is a DNA-based biomarker for breast cancer.
a. TRUE b. FALSE

3. Cancer biomarkers can be used _____.
a. to diagnose disease at an early stage
b. to assess disease progression or recurrence
c. to better determine the best course of therapy
d. All of the above.

4. Which of the following statements is true of AFP?
a. Elevated AFP levels in serum are associated with several disease states.
b. The specificity and sensitivity of AFP as a biomarker is relatively low.
c. Both a and b.
d. Neither a nor b.

5. HE4 is a cancer biomarker that is recommended to monitor patients for epithelial ovarian cancer recurrence.
a. TRUE b. FALSE

6. PSA is tumor biomarker _____.
a. that is increased in prostate cancer
b. for which screening is recommended for men above 50 years
c. for which levels are also elevated in benign prostatic hypertrophy
d. All of the above.

7. Which of the following statements about CEA is true?
a. CEA is not typically present in the blood of healthy individuals.
b. Elevated CEA levels are used to monitor colon cancer after tumor resection.
c. Elevated CEA levels are also associated with several other forms of cancer.
d. All of the above.

8. Elevated CA 19-9 levels are specific to only pancreatic cancer.
a. TRUE b. FALSE

9. Which of the following is a candidate cancer biomarker?
a. VEGF
b. Calcitonin
c. Both a and b.
d. Neither a nor b.

10. The following is true of thyroglobulin (Tg) as cancer biomarker:
a. Tg is used only by the thyroid gland.
b. Tg is used to monitor thyroid cancer.
c. Tg levels are also elevated in patients with Graves' disease.
d. All of the above.

11. Except for those biomarkers that have variations in post-translational modifications, no single biomarker has been identified that is expressed only by cancer tissue.
a. TRUE b. FALSE

12. The main goal of verification phase in the development of cancer biomarkers is the affirmation of candidate _____.
a. sensitivity
b. specificity
c. both a and b
d. neither a nor b

13. Parameters that play an important role in making decisions on the clinical utility of a potential biomarkers include _____.
a. cost of the biomarker assay
b. biomarkers assays that are clinically viable in disease management
c. both a and b
d. neither a nor b

14. The phases of a theoretical model that have been used for novel biomarkers, from identification to clinical implementation, include _____.
a. discovery b. verification
c. validation d. All of the above.

15. The following is true of use of mass spectrometry (MS) for the verification phase of a potential biomarker:
a. It can be used to predict peptides mass to charge ratios.
b. It can be programmed to increase sensitivity for the detection of low-abundance protein.
c. Both a and b.
d. Neither a nor b.

16. Multiple reaction monitoring (MRM) MS is able to detect proteins in the _____ concentration.
a. 100 to 1,000 ng/mL
b. 10 femtogram/µL
c. 1 femtogram/µL
d. None of the above.

17. Factors that can affect the levels of detectable biomarkers include _____.
a. sample collection
b. sample storage
c. patient characteristics
d. All of the above.

18. Validation requires the analysis of _____ samples using a higher stringency than that for marker identification.
a. a few
b. a half dozen
c. hundreds or thousands of
d. a handful of

19. Factors that affect results obtained by MS for novel biomarkers include lack of standardization in _____.
a. sample collection
b. sample processing
c. sample storage
d. All of the above.

20. Which of the following contribute to variations in MS discovery of novel biomarkers?
a. Operator or instrument-dependent variations
b. Instrument-dependent variations
c. Both a and b.
d. Neither a nor b.

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CE Test on CANCER BIOMARKERS: SURVIVING THE JOURNEY FROM BENCH TO BEDSIDE

March 2011

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Circles must be filled in, or test will not be graded.
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	A	B	C	D
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11.	○	○		
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○
16.	○	○	○	○
17.	○	○	○	○
18.	○	○	○	○
19.	○	○	○	○
20.	○	○	○	○

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