LEARNING OBJECTIVES

On completion of the chapter, the reader will be able to:

1. Describe the multistage process of carcinogenesis, which includes invasion, promotion, transformation, and progression.
2. Define the following terms related to the genetic basis of cancer: proto-oncogenes, oncogenes, tumor suppressor genes, DNA repair genes, cell cycle clock, apoptosis, cellular senescence, telomeres, and epigenetics.
3. Identify common receptors and pathways that have been identified in cancers and are targeted by available anticancer drugs.
4. Describe appropriate cancer screening for an individual based on their age, gender, and known risk factors.
5. Describe the staging systems for cancer and how these systems indicate the extent of disease and guide anticancer treatment selection.
6. Compare and contrast the utility of the different modalities, such as surgery, radiation therapy, and anticancer drugs, for cancer treatment of localized and systemic disease and define the terminology used to describe anticancer treatment, including adjuvant, neoadjuvant, induction and consolidation, and maintenance. Provide a rationale for combination therapy.
7. Explain the rationale and method for assessing the benefit of adjuvant therapy in a patient with no clinically detectable disease.
8. Use the Gompertzian growth curve to define the following terms related to cancer growth: exponential tumor growth, growth fraction, tumor burden, and doubling time.
9. Classify a chemotherapy as cell-cycle phase-specific or phase-nonspecific. Explain the impact this has on the administration schedule.
10. Explain the mechanism of action of commonly used anticancer drugs in language suitable for patient teaching, and language suitable for education of health care professionals.
11. Given a class of anticancer drugs, describe toxicities that are common to the class and toxicities that are unique to specific drugs within that class.
12. Compare and contrast the naming and adverse effects of different types of monoclonal antibodies. Determine the source of the monoclonal antibody given the name.
13. Define the different terminology used to evaluate the response of the tumor to therapy.
14. Describe the role of tumor heterogeneity in the design of anticancer drug regimens.
15. Outline patient- and tumor-specific factors that may affect the outcomes of cancer or treatment in an individual patient.
16. Analyze patient-specific laboratory indicators of hepatic and renal function and recommend dose modification for commonly used anticancer drugs if needed.
17. List laboratory values required to administer chemotherapy, including minimum blood counts generally needed to receive chemotherapy. Develop a treatment plan for the treatment or prevention of myelosuppression that is supported by clinical practice guidelines.
18. Calculate the dose of chemotherapy to be administered using the BSA or Calvert equations.
19. Develop a treatment plan to minimize the impact of anticancer treatment-related toxicities to a patient about to receive chemotherapy.