

genous; chronic lymphocytic; and chronic myelogenous. *Lymphomas* are tumors of lymphoid tissue characterized by abnormal proliferation of the white blood cells normally found in lymphoid tissue. They usually develop within lymph nodes and may occur anywhere, because virtually all body tissues contain lymphoid structures. The two main types are Hodgkin's disease and non-Hodgkin's lymphoma. *Multiple myeloma* is a tumor of the bone marrow in which abnormal plasma cells proliferate. Because normal plasma cells produce antibodies and abnormal plasma cells cannot fulfill this function, the body's immune system is impaired. As the malignant cells expand, they crowd out normal cells, interfere with other bone marrow functions, infiltrate and destroy bone, and eventually metastasize to other tissues, such as the spleen, liver, and lymph nodes.

Solid neoplasms are composed of a mass of malignant cells (parenchyma) and a supporting structure of connective tissue, blood vessels, and lymphatics (stroma). The two major classifications are carcinomas and sarcomas. *Carcinomas* are derived from epithelial tissues (skin, mucous membrane, linings and coverings of viscera) and are the most common type of malignant tumors. They are further classified by cell type, such as adenocarcinoma or basal cell carcinoma. *Sarcomas* are derived from connective tissue (muscle, bone, cartilage, fibrous tissue, fat, blood vessels). They are subclassified by cell type (eg, osteogenic sarcoma, angiosarcoma).

Grading and Staging of Malignant Neoplasms

When a malignant neoplasm is identified, it is further "graded" according to the degree of malignancy and "staged" according to tissue involvement. Grades 1 and 2 are similar to the normal tissue of origin and show cellular differentiation; grades 3 and 4 are unlike the normal tissue of origin, less differentiated, and more malignant. Staging indicates whether the neoplasm is localized or metastasized and which organs are involved. These characteristics assist in treatment (eg, localized tumors are usually amenable to surgical or radiation therapy; metastatic disease requires systemic therapy).

Effects of Cancer on the Host

Effects vary according to the location and extent of the disease process. There are few effects initially. As the neoplasm grows, effects occur when the tumor becomes large enough to cause pressure, distortion, or deficient blood supply in surrounding tissues; interfere with organ function; obstruct ducts and organs; and impair nutrition of normal tissues. More specific effects include anemia, malnutrition, pain, infection, hemorrhagic tendencies, thromboembolism, hypercalcemia, cachexia, and various symptoms related to impaired function of affected organs and tissues.

ANTINEOPLASTIC DRUGS

General Characteristics

1. Most drugs kill malignant cells by interfering with cell replication, with the supply and use of nutrients (eg, amino acids, purines, pyrimidines), or with the genetic materials in the cell nucleus (DNA or RNA).
2. The drugs act during the cell's reproductive cycle (Fig. 64-2). Some, called cell cycle specific, act mainly during specific phases such as DNA synthesis or formation of the mitotic spindle. Others act during any phase of the cell cycle and are called cell cycle nonspecific.
3. Cytotoxic drugs are most active against rapidly dividing cells, both normal and malignant. Commonly damaged normal cells are those of the bone marrow, the lining of the gastrointestinal tract, and the hair follicles.
4. Each drug dose kills a specific percentage of cells. To achieve a cure, all malignant cells must be killed or reduced to a small number that can be killed by the person's immune system.
5. Antineoplastic drugs may induce drug-resistant malignant cells. Mechanisms may include inhibiting drug uptake or activation, increasing the rate of drug inactivation, pumping the drug out of the cell before it can act, increasing cellular repair of DNA damaged by the drugs, or altering metabolic pathways and target enzymes of the drugs. Mutant cells also may emerge.
6. Most cytotoxic antineoplastic drugs are potential teratogens.
7. Most antineoplastic drugs are given orally or intravenously (IV); some are given topically, intrathecally, or by instillation into a body cavity.
8. A few drugs are available in liposomal preparations. These preparations increase drug concentration in malignant tissues and decrease concentration in normal tissues, thereby increasing effectiveness while decreasing toxicity. For example, liposomal doxorubicin and daunorubicin reduce the drugs' cardiotoxic effects.

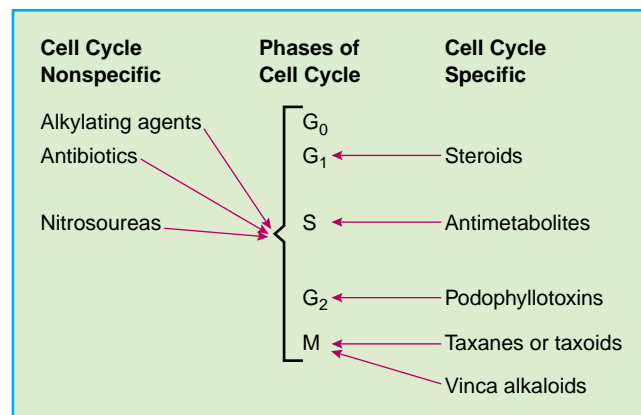


Figure 64-2 Cell cycle effects of cytotoxic antineoplastic drugs.