Anticancer Drugs Encyclopedia Article

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Anticancer Drugs

Anticancer drugs are medicines used to treat various kinds of **cancer**. The tools of molecular **genetics** are increasingly used to specifically design anticancer drugs that target specific cancers.

Cancer is the growth of **tumor** cells that interfere with the growth of healthy cells. The approach to treating cancer depends on where in the body it occurs, the type of cells making up the cancer, and how advanced the cancer is. The usual treatments are surgery, chemotherapy (treatment with anticancer drugs), radiation, or some combination of these methods.

Normally, cells in the body divide in an orderly, regulated, manner. This is how the body grows, repairs wounds, and replaces worn-out tissues. But certain cells may sometimes begin to divide uncontrollably, forming masses called tumors. Some tumors are harmless (benign). However, cancerous (malignant) tumors spread into nearby tissues and invade other parts of the body and can threaten life. Most anticancer drugs interfere with the growth of tumor cells, eventually causing their death. But because these drugs are so powerful, they may also affect the growth of normal body cells, causing side effects.

Patients who identical clinical symptoms and the same diagnosis sometimes respond differently to the administration of anticancer drugs. This scenario is a classic presentation of a pharmacogenetic anomaly. Unlike other **inborn errors of metabolism** which commonly manifest at birth or shortly thereafter, an individual with a pharmacogenetic defect does not know that a **mutation** exists until he/she is given a drug or similar substance that results in a negative physical response. One goal of **pharmacogenetics** is to provide a better understanding of the underlying cause of such incidents so that the total number of episodes can be reduced. In the future, it will become increasingly necessary to know the patient's genotype (types or variations of individual genes carried by an individual) and metabolic phenotype with respect to the drug being given to determine the most appropriate regimen of therapy for that individual. In addition to providing patients specific anticancer drug therapies, pharmacogenetics will aid in the clinician's ability to predict adverse reactions before they occur and identify the potentials for complications. New tests will be developed to monitor the effects of drugs, and new medications will be found that will specifically target the particular genetic mechanisms that allow cancerous **cell** transformations.