

the drug product throughout its usual shelf life, the principles of chemistry, physical pharmacy, microbiology, and pharmaceutical technology must be applied. The formulation must be such that all components are physically and chemically compatible, including the active therapeutic agents, the pharmaceutical ingredients, and the packaging materials. The formulation must be preserved against decomposition due to chemical degradation and protected from microbial contamination and the destructive influences of excessive heat, light, and moisture. The therapeutic ingredients must be released from the dosage form in the proper quantity and in such a manner that the onset and duration of the drug's action are that which are desired. The pharmaceutical product must lend itself to efficient administration and must possess attractive features of flavor, odor, color, and texture that enhance acceptance by the patient. Finally, the product must be effectively packaged and clearly and completely labeled according to legal regulations.

Once prepared, the pharmaceutical product must be properly administered if the patient is to receive maximum benefit. The medication must be taken in sufficient quantity, at specified intervals, and for an indicated duration to achieve the desired therapeutic outcomes. The effectiveness of the medication in achieving the prescriber's objectives should be reevaluated at regular intervals and necessary adjustments made in the dosage, regimen, schedule, or form, or indeed, in the choice of the drug administered. Patients' expressions of disappointment in the rate of progress or complaints of side effects to the prescribed drug should be evaluated and decisions made as to the continuance, adjustment, or major change in drug therapy. Before initially taking a medication, a patient should be advised of any expected side effects and of foods, beverages, and/or other drugs that may interfere with the effectiveness of the medication.

Through professional interaction and communication with other health professionals, the pharmacist can contribute greatly to patient care. An intimate knowledge of drug

actions, pharmacotherapeutics, formulation and dosage form design, available pharmaceutical products, and drug information sources makes the pharmacist a vital member of the health care team. The pharmacist is entrusted with the legal responsibility for the procurement, storage, control, and distribution of effective pharmaceutical products and for the compounding and filling of prescription orders. Drawing on extensive training and knowledge, the pharmacist serves the patient as an advisor on drugs and encourages their safe and proper use through patient counseling. The pharmacist delivers pharmaceutical services in a variety of community and institutional health care environments and effectively uses medication records, patient monitoring, and assessment techniques in safeguarding the public health.

To appreciate the progress that has been made in drug discovery and development and to provide background for the study of modern drugs and pharmaceutical dosage forms, it is important to examine pharmacy's heritage.

THE HERITAGE OF PHARMACY

Drugs, in the form of vegetation and minerals, have existed as long as humans. Human disease and the instinct to survive have led to their discovery through the ages. The use of drugs, crude though they may have been, undoubtedly began long before recorded history, for the instinct of primitive man to relieve the pain of a wound by bathing it in cool water or by soothing it with a fresh leaf or protecting it with mud is within the realm of belief. From experience, early humans would learn that certain therapy was more effective than others, and from these beginnings came the practice of drug therapy.

Among many early races, disease was believed to be caused by the entrance of demons or evil spirits into the body. The treatment naturally involved ridding the body of the supernatural intruders. From the earliest records, the primary methods of removing spirits were through the use of spiritual incantations, the application of