20 Novel Dosage Forms and Drug Delivery Technologies

OBJECTIVES

After reading this chapter, the student will be able to:

1. Describe the benefits of new, innovative drug delivery systems
2. Describe the mechanisms utilized to develop new, novel dosage forms
3. List novel drug delivery systems for each topical, oral, vaginal, ophthalmic, and parenteral route
4. List drugs that are typically administered by each of these drug delivery systems
5. Explain the advantages each novel delivery system may or may not have over traditional oral administration
6. Describe the principles of iontophoresis and phonophoresis and their benefits in advancing topical drug administration
7. Differentiate between liposomes for parenteral administration and standard parenteral solutions; describe a situation where liposomes for parenteral administration would be the preferred therapeutic dosage form over standard parenteral solutions
8. Identify the appropriate indication for two implantable medications and describe the mechanism of drug release for each

This chapter discusses novel drug delivery systems that are modifications of those previously presented, are relatively new on the market, or do not fit into the categories in the previous chapters. They may be relatively new, use new or relatively new delivery systems, or use unique delivery systems or unique devices before, during, or after administration. Dramatic changes have been introduced, with new technology and new devices now on the market. In some cases, traditional capsules and ointments have been replaced by osmotic pumps, wearable ambulatory pumps, electrically assisted drug delivery, and a host of other delivery methods based on various polymer technologies. Feedback mechanisms are now feasible: Actual drug delivery may be a response to a sensor detecting variations in certain body chemicals and prompting infusion of a drug to correct the imbalance.

Changes are coming about as new technologies are developed and reduce the limitations of existing therapies. In some cases, the new drugs require new delivery systems because the traditional systems are inefficient or ineffective; this may be true especially of some of the recombinant DNA and gene therapies of the future. We may soon be manipulating genes as active drugs and as drug