



FIGURE 2-1: The drug cycle. The four phases of the drug cycle are (1) absorption via the gastrointestinal mucosa, (2) distribution via the circulatory system, (3) metabolism via the liver, and finally (4) excretion via the kidneys.

absorbed. Intramuscular injections provide fairly quick absorption because muscles have a rich supply of blood to provide rapid entry into the circulation. Intravenous (IV) injection is the fastest way to the blood supply because the drug is injected directly into a vein.

As a health-care professional, you can take steps to facilitate drug absorption. For instance, when administering an ointment for a rash, you can make sure that the skin is clean and dry. If a prescriber orders an intramuscular injection, you will choose which muscle to use for best absorption. A tattooed arm could possibly hinder absorption because of decreased blood flow caused by scar tissue and tattoo paint. You would choose a muscle that is free of any lesions. Conversely, you must be careful when giving IV medications so that they are not absorbed too rapidly. For example, if morphine is given too rapidly, a patient may become severely hypotensive and stop breathing.

Other factors that may vary the absorption rate and **bioavailability** (how much of the drug is absorbed for use) of medications include:

- **Fat or lipid solubility:** The more soluble a medication is in fat or lipids, the more easily it is dissolved and absorbed through the stomach into the bloodstream.
- **pH:** Medications with a low pH (acidic) are easily absorbed in the stomach, whereas those with a higher pH (alkalotic) are less likely to be absorbed effectively.
- **Concentration of the medication:** The higher the medication concentration is, the more easily the medication is absorbed.
- **Length of contact:** The longer a topical medication remains on the skin or mucosa, the greater the absorption will be. If a patient sucks on a lozenge until it dissolves, more medication is released in the mouth than if the patient chews and swallows the lozenge.
- **Age:** Both children and older patients absorb more medication through the skin than do healthy adults, so topical medication is usually applied in a very thin layer.
- **Food:** A large amount of food slows the absorption of systemic medications. Stomach acid facilitates absorption of systemic medications; therefore, medication is absorbed faster when acid in the stomach is increased.