Table 33-2 Biological Half-Lives of Some Injectable Drugs

Drug	Half life ($t_{1/2}$) (Hours)
Adalimumab (Humira®)	240–480
Ampicillin	0.8
Cisplatin	30–100
Cephazolin	2.0
Clindamycin	2.4
Digitoxin	40
Epogen	4–13
Etanercept (Enbrel®)	70
Gentamicin	2
Infliximab (Remicade®)	184–228
Insulin	Intravenous injection–10 mins. Subcutaneous injection–4 hrs. Intramuscular injection–2 hrs.
Minocycline	10–12
Propofol	2–24
Tobramycin	2
Vancomycin	6

Source: From Ref. 2 and from the Physicians' Desk Reference, 64th ed., 2010, www.PDR.net.

affect drug solubility in aqueous solution include solution pH and the extent of ionization of the drug in solution.

If the drug is ionic (an electrolyte), it will form a charged species as a function of solution pH and, of course, can be synthesized as a soluble salt. The solubility of an electrolyte will depend on pH and the solubility of the ionized form at a given pH. Solubility versus pH profiles of drugs that are weak acid electrolytes (e.g., can form salts with cationic elements like sodium and potassium) and drugs that are weak base electrolytes (e.g., can form salts with anionic elements like HCl, sulfate, or phosphate species) are seen in Figure 33-3. These profiles are "Z-shaped" or "S-shaped" curves in that once the pH reaches a point where the salt dissociates, that is, the neutral free acid or base is formed, the solubility of the drug plummets. The dissociation constant (pK_a for a weak acid or pK_b for a weak base) indicates the pH at which

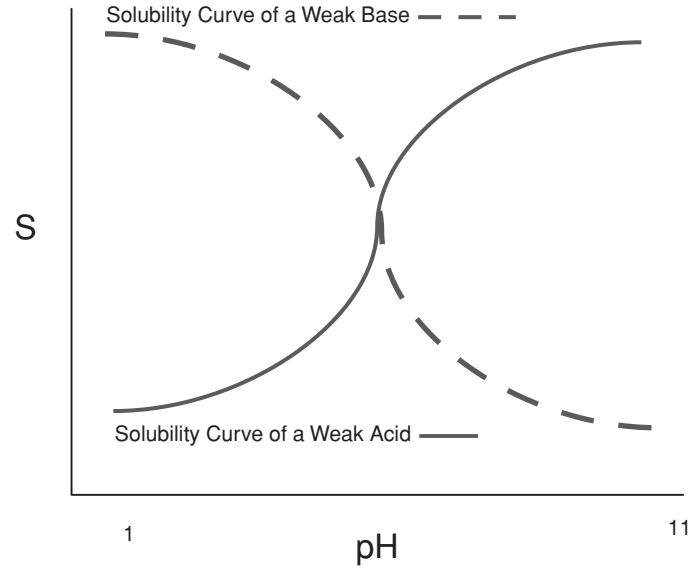

Figure 33-3 Solubility (S) versus pH profiles for salts of weak acids and weak bases.