



How Drug Move through the Body

Distribution

Distribution is the transport of a drug from the bloodstream to tissue sites where it will be effective, as well as to sites where the drug may be stored, metabolized, or eliminated from the body. Once a drug reaches its intended destination, the drug molecules move from blood through cellular barriers to various tissues. These barriers include the walls of blood vessels, the walls of the intestines, the walls of the kidneys, and the special barrier between the brain and the bloodstream that acts as a filtration system to protect the brain from exposure to potentially harmful substances.

The drug molecules move from an area of high drug concentration-the bloodstream-to an area of low drug concentration-the tissues-until a balance between the two areas is reached. This process is known as diffusion. When a drug reaches its highest concentration in the tissues, the body begins to eliminate the drug and its effect on the body begins to diminish. The time it takes for the level of a drug to fall by 50 percent is known as the drug's half-life. Depending on the drug, this measurement can vary from a few minutes to hours or even days. For example, if a drug's highest concentration level in the blood is 1 mg/ml and this level falls to 0.5 mg/ml after five hours, the half-life of the drug is five hours. A drug's half-life is used to determine frequency of dosage and the amount of drug administered.

Distribution of a drug may be delayed by the binding of the drug to proteins in the blood. Because the proteins are too large to pass through blood vessel walls, the drug remains in the blood for a longer period until it is eventually released from the proteins. While this process may increase the amount of time the drug is active in the body, it may decrease the amount of the drug available to the tissues.