1) Introduction

Chemicals are absorbed from external environments to the internal tissues of an organism, where they may be acted upon by the physiological processes of the organism (pharmacokinetics) and in some cases cause harmful, beneficial, or benign effects on the organism in return (pharmacodynamics). Movement within individual tissues and throughout the organism can often be quantified using complex analytical assays and equipment. Alternatively, chemical movement may be predictable or estimable based solely upon prior knowledge of the chemical's physiochemical properties and of the biological system in question. Physiochemical properties are unique to each chemical; though in some cases two or more similar chemicals share the same value for a particular property, such as molecular weight. This is in contrast to physiology, where though some inter-individual variability exists across representatives of a particular species, all rats, mice, and humans share many conserved physiological characteristics; such as the presence and general localization of the lungs, liver, and brain, as well as the mechanisms for blood flow between them. Such characteristics, or physiological parameters, for several species have been collected into compendiums of physiological data for humans and animals, providing ranges of normal values for tissue volumes, organ blood flows, respiratory rates and other parameters (1, 2).

By combining physiological parameters with physiochemical parameters (partition coefficients, pH, molecular weight, etc), the **absorption** (uptake), **distribution** (disposition), **metabolism**, and **excretion** (ADME) of essentially any chemical in the body can be predicted; the end result of which is a "time-course" profile of chemical movement within various tissues of

the body. The information produced may inform chemical risk assessments and pharmaceutical dosing regimens. Initially however, an understanding of the principles of ADME, and factors that influence ADME, must be conveyed to the reader.