CHAPTER OVERVIEW

Section 2: Dose and Dose Response

Learning Objectives

After completing this lesson, you will be able to:

- Define *dose* and explain its importance in determining toxicity.
- Analyze and compare dose-response curves.
- Describe the safety or toxicity of substances based on specific dose levels.

In this section...

Topics include:

What We've Covered

In this section, we explored the following main points:

- Dose is the amount of a substance administered; however, several parameters are required to characterize exposure to xenobiotics, including the:
  - Number of doses
  - Frequency of doses
  - Total time period of exposure
- The dose-response relationship helps establish causality, or that the chemical induced the observed effects; the threshold effect, or the lowest dose that induced effects; and the slope, or the rate at which effects increase with dose increases.
- Estimating doses for toxic effects involves:
  - Lethal Doses/Concentrations, such as LD0, LD10, and LC50, which denote doses or concentrations that are expected to lead to death in specific percentages of a population.
  - Effective Doses, such as ED50 and ED90, which denote doses that are effective in achieving a desired endpoint in specific percentages of a population.
  - Toxic Doses, such as TD0 and TD50, which denote doses that cause adverse toxic effects in specific percentages of a population.
- The Therapeutic Index (TI) compares the effective dose to the toxic dose of a drug.
- The Margin of Safety (MOS) compares the toxic dose to 1% of the population to the effective dose to 99% of the population.
- NOAEL is the **highest** dose at which there **is no** observed toxic effect.
- LOAEL is the **lowest** dose at which there **is** an observed toxic effect.

Coming Up...

In the next section, we will take a closer look at various types of toxic effects.