

The Big Picture

In this chapter, the chemical principles discussed in earlier chapters will be used to solve a fictitious mystery. Some topics from each chapter that will be woven into the storyline include:

- The periodic table, mixtures (Ch. 1)
- Air quality (Ch. 2)
- The electromagnetic spectrum (Ch. 3)
- Isotopes (Ch. 4)
- Combustion reactions (Ch. 5)
- Solar power (Ch. 6)
- Electric vehicles (Ch. 7)
- Polarity and intermolecular forces (Ch. 8)
- The composition of plastics (Ch. 9)
- Enzymes (Ch. 10, 11)
- Drug design (Ch. 12)
- DNA fingerprinting (Ch. 13)

Friday, Aug. 1—7:08 pm: A Relaxing Evening Interrupted

After another long and productive work week, Professor David Thompson relaxed with a glass of wine, contemplating the future with joyful anticipation. In just two weeks, he would deliver a landmark presentation at the American Chemical Society meeting in Boston—marking the culmination of his 25-year research career.

For the last 20 years, his research has focused on the development of “smart” cancer treatment drugs. His most promising molecule, called Zeta-12, features a targeting agent that attaches itself to individual cancer cells, and then releases the drug to kill the cells with high specificity and efficiency. He has received continual funding from the National Institutes of Health (NIH), which helped fund the basic studies and extensive clinical trials for the drug. His presentation at the upcoming meeting would detail the successful completion of Phase III clinical testing, leading to FDA approval, and a possible trillion-dollar market. Next week, he plans to partner with a major pharmaceutical company that would supply Zeta-12 to cancer treatment centers across the globe.

Your Turn 14.1 Scientific Practices Cancer Treatment Drugs

Using the Internet, find examples of “smart” cancer treatment drugs that are currently in development.

- a. What are the possible benefits of these drugs, relative to those currently used for chemotherapy?
- b. In drug discovery, what are the differences between Phase I, Phase II, and Phase III clinical testing?

Thompson’s phone rang, interrupting his train of thought. *I’ll just let it ring, since it’s probably Julie complaining about her alimony*, he thought. It had been six months since their heated divorce—an all-too-common ending for marriages with a workaholic