



FIGURE 1.1 Reverse transcriptase was the first enzyme successfully targeted in a drug discovery program focused on developing treatment options for HIV infection and AIDS. AZT® (Retrovir), Viread® (Tenofovir), and Zeffix® (Lamivudine) are inhibitors of this important enzyme. HIV protease, another enzyme critical to the progression of HIV and AIDS has also been the subject of intense study. The antiviral agents Viracept® (Nelfinavir), Norvir® (Ritonavir), and Crixivan® (Indinavir) are HIV protease inhibitors that were developed for the treatment of HIV infection and AIDS.

development of novel therapeutic agents. In the United States, overall cancer death rates have declined 11.4% between 1950 and 2009, and progress against some specific cancer types has been substantial. Breast cancer, prostate cancer, and melanoma, for example, have seen significant increases in their 5-year survival rates over the same period. The 5-year survival rate for breast cancer increased from 60% to 91%, while the survival rate for prostate cancer increased from 43% to over 99%, and melanoma survival rose from 49% to 93%.¹³ A significant portion of the improved clinical outcomes in cancer can be attributed to improved chemotherapeutic agents. The identification of antitumor natural products and natural product analogs such as Taxol® (Paclitaxel),¹⁴ Velban® (Vinblastine),¹⁵ Adriamycin® (Doxorubicin),¹⁶ and Hycamtin® (Topotecan)¹⁷ has clearly demonstrated the importance of natural products in modern medicine, while the development of small molecule kinase inhibitors such as Gleevac® (Imatinib),¹⁸ Tasigna® (Nilotinib),¹⁹ and Tarceva® (Erlotinib)²⁰ provide clear evidence of the power of modern drug discovery techniques (Figure 1.2).

The treatment of cardiovascular disease has also seen dramatic improvements in the wake of the discovery of a multitude of therapeutic agents designed to mitigate symptoms or prevent the underlying causes of the disease. A myriad of treatments have been developed to address hypertension, also known as “the silent killer” because of its asymptomatic nature, leading to improvements in both the quality of life and life expectancy of patients. Diuretics (e.g., Midamor® (Amiloride),²¹ Lozol® (Indapamide)²²), β -blockers (e.g., Tenoretic® (Atenolol),²³ Inderal® (Propranolol)²⁴), and