7 Natural Products in Drug Discovery

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7.1 INTRODUCTION

Natural products are loosely defined as secondary metabolites produced by living organisms. These compounds are called "secondary" because they are generally not directly involved in the primary processes of growth and development of the host. In the majority of cases, the intrinsic biological functions of these secondary metabolites remain unknown. It has been postulated that such secondary metabolites must have a vital role, otherwise evolutionary pressure would have purged their encoding genes. One case where the role of the secondary metabolites seems reasonably clear occurs in the microbial world. Antibiotics are natural products produced by microorganisms that adversely affect other microbes, either through outright killing or inhibition of growth. The producer microbe maintains a resistance mechanism that renders it insensitive to its own antibiotic. Although the production of antibiotics for self-defense or to eliminate competition for resources seems reasonable, there are still many unanswered questions about this process.

Natural products are conveniently classified into families of compounds according to their biosynthetic origin. For the purpose of this chapter, we will consider the most prevalent biosynthetic types as examples. Representative examples of the major biosynthetic classes are illustrated in Figure 7.1. Perhaps the most biogenetically diverse family of natural products is the alkaloids, originally described as basic compounds found predominantly in plants. Alkaloids have varied biosynthetic