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As I have seen, remarkable advancement in the design of tools and applied genomic research. The pharmaceutical industry, and indeed much of the academic biomedical research community, initially viewed comparative genomics as a limited resource confined to the "body weight species" of medical research: mouse, rat, and human. Of course, an exception has always been infectious diseases, for which comparative genomics plays a vital role in understanding viral, bacterial, and parasitic pathogens — although the importance of looking at nonpathogenic, truly non-mammalian species was often a tough sell. However, that view is changing. The high-throughput comparative analysis of the genomes of cold-blooded vertebrates, birds, and other mammalian species are providing new understandings of the human genome. Moreover, genomic sequences are becoming available for several species that are important for drug research, such as dogs and primates, as well as more specialized applications, such as bovine models for osteoarthritis and arthritis or a model for a variety of developmental and neurological conditions.

The chapters in this book are roughly equally distributed between two sections: "Basic Research in Comparative Genomics" and "Applied Research in Comparative Genomics." My goal for organization is not to create further differentiation or subdivisions in the field but rather to point out the complementarities and synergies across the broad field of comparative genomics. Domestic administrators and software engineers might ask me to select or prioritize the public genomic sequences for integration into our internal bioinformatics environment. Much to their chagrin, my stock response for selection was, "All of them." Fortunately, that message was well accepted and interpreted. Because of the growing importance of species genomics, comparative genomic analysis, in particular molecular evolutionary approaches, is increasingly important in drug discovery. I hope these readers in the applied sciences see the important opportunities for mining species genomes beyond those of immediate practical utility to their field and are enlightened about technological advances in DNA sequencing and phylogenetic methods as well as understanding our impact of comparative genomics on shaping evolutionary thought on the evolution of species and populations. Conversely, those with a perspective focused on basic basic evolutionary issues might gain an appreciation of the utility of comparative genomics in biomedical and agricultural research.

Rather than a comprehensive volume covering every aspect of comparative genomics, this book embodies the diverse interests of prominent researchers in the field. The first section, "Basic Research in Comparative Genomics," begins with nine chapters covering different challenges in the field and the methodologies used to address them. Appropriately, Michael Manier leads with a review of the revolutionary advances in DNA sequencing technology that promise to transcendently accelerate the generation of new genomic data. Next, expanding our insight into evolution