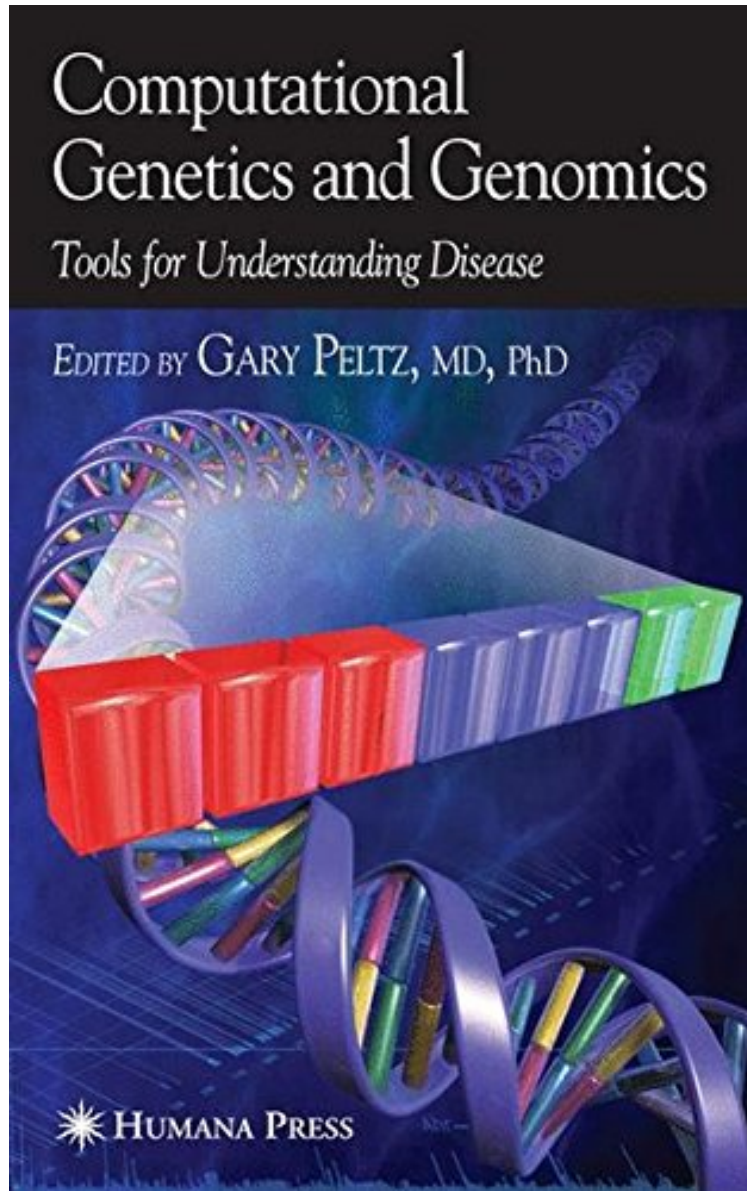


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# Computational Genetics and Genomics: Tools for Understanding Disease

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## Genomics: Tools for Understanding Disease:

Ultimately, the quality of the tools available for genetic analysis and experimental disease models will be assessed on the basis of whether they provide new information that generates novel treatments for human disease. In addition, the time frame in which genetic discoveries impact clinical practice is also an important dimension of how society assesses the results of the significant public financial investment in genetic research. Because of the investment and the increased expectation that new treatments will be found for common diseases, allowing decades to pass before basic discoveries are made and translated into new therapies is no longer acceptable. *Computational Genetics and Genomics: Tools for Understanding Disease* provides an overview and assessment of currently available and developing tools for genetic analysis. It is hoped that these new tools can be used to identify the genetic basis for susceptibility to disease. Although this very broad topic is addressed in many other books and journal articles, *Computational Genetics and Genomics: Tools for Understanding Disease* focuses on methods used for analyzing mouse genetic models of biomedically important traits. This volume aims to demonstrate that commonly used inbred mouse strains can be used to model virtually all human disease-related traits. Importantly, recently developed computational tools will enable the genetic basis for differences in disease-related traits to be rapidly identified using these inbred mouse strains. On average, a decade is required to carry out the development process required to demonstrate that a new disease treatment is beneficial.

From the Back Cover Despite ever-increasing investments in genetic research, the translation of genetic discoveries into new therapies has been a slow process. In *Computational Genetics and Genomics: Tools for Understanding Disease*, well-recognized computational geneticists review and assess both currently available and developing tools for the rapid identification of the genetic basis for susceptibility to disease. The authors introduce a new computational approach that makes it possible to identify the genetic basis for differences in physiological or pathological responses among inbred mouse strains, thus facilitating more rapid genetic discovery. The focus is on the haplotype-based computational genetic analysis method and its application to inbred mouse strains. Using murine models of asthma, lung disease, osteoporosis, and substance abuse, the contributors provide an overview of available mouse models, what has been learned from them, and which new models must be developed to advance our understanding of these diseases. They also describe how genetic analysis of human populations has yielded information on the genetic basis for susceptibility to asthma and other inflammatory diseases. Authoritative and path-breaking, *Computational Genetics and Genomics: Tools for Understanding Disease* surveys and assesses both currently available and powerful new computational genetic mapping methods that can be used to quickly analyze genetic models of biomedically important traits. This information provides a basis for uncovering the genetic factors regulating human disease-related traits.