Chapter 2

Genomic Medicine-Unraveling the Human Blueprint

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Abstract

Examining the complex relationship between heredity and pharmacological responses, this study provides insight on how pharmacogenomics may improve therapeutic efficacy and minimize adverse effects, ushering in an era of patient-centered healthcare. Technological discoveries and advancements are bringing about significant modifications in the treatment of genetic illnesses. This study explores the rapidly evolving subject of genetic medicine, emphasizing how it may affect clinical discussions and how the availability of genetic testing alternatives is expanding. In addition to incorporating Big Data tools for identifying clinically relevant genetic variations using high-capacity NGS data and EHRs, the article explores challenges in handling genomic medicine data from next-generation sequencing (NGS) and electronic health records (EHRs). It also offers solutions for processing, organizing, and interpreting genomic and clinical data. Healthcare precision medicine provides tailored treatment plans and early illness risk assessment. Determining who is healthy and who is not needs a thorough review of medical data. This method facilitates in the comprehension of biological indicators of alterations in health. Better patient outcomes may result from the integration of artificial intelligence with precision and genomic medicine. Genetic redundancy arises when several pathways might create the same phenotype due to molecular contingency and evolutionary processes. A hypothesis of molecular complexity postulates that gene interactions, which are made up of both insufficient and required complexity that accumulates and changes over time, are what cause evolutionary transitions.

Keywords: Genome, Personalized Medicine, Pharmacogenomics, Epigenomics, Genomic, Multiomics

1. Introduction

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