

## Advancements in DILI Prediction Models

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Drug-Induced Liver Injury (DILI) remains a prominent reason for drug withdrawals from the market, emphasizing its crucial role in drug safety. The unpredictable nature of DILI, coupled with its diverse etiological factors, underscores the challenge of its early detection and prevention. In this review, we will consider three main themes in DILI predictions. First, we examine the advancements in predicting DILI using preclinical models. These models have been foundational in offering insights into the potential hepatotoxic effects of drugs. Yet, their predictive accuracy can sometimes be compromised by the inherent discrepancies between model organisms and humans. Subsequently, we delve into the transformative potential of Next-Generation Sequencing (NGS) technology. By deciphering complex genetic and molecular interactions, NGS emerges as a crucial New Approach Methodology (NAM) in DILI research, enriching our understanding of the intricate mechanisms involved. Finally, we focus on the emergence of Artificial Intelligence (AI) and computational methodologies in DILI predictions. These modern technologies have ushered in a new paradigm, enabling the rapid analysis of vast datasets and offering prospects for improved DILI prediction accuracy. In conclusion, we present a comprehensive perspective on the multifaceted landscape of DILI prediction. By harnessing the strengths of preclinical models, the depth of NGS, and the analytical powers of AI, we have the opportunity not only to enhance the accuracy of DILI prediction but also to shed light on its elusive mechanisms. This holistic view has the potential to revolutionize our understanding of DILI, catalyzing safer drug development and paving the way for personalized therapeutic strategies.