: Drug transporters; Hepatic drug disposition; Drug-drug interactions; Hepatotoxicity; Organic anion transporting polypeptides (OATPs)

I

The chronic liver disease known as non-alcoholic fatty liver disease (NAFLD) is characterized by steatosis and the accumulation of fat in

3D cell culture models, or animal models for accurate prediction of drug disposition [5].

D **:** Investigate the metabolic pathways of specific drugs to understand the enzymes involved in their biotransformation. Identify the major metabolites formed and assess their pharmacological activities. This research can aid in drug design and optimization.

G **:** Study the impact of age-related factors on drug metabolism and pharmacokinetics in pediatric and geriatric populations. Investigate the differences in drug disposition between different age groups and optimize drug dosing regimens for these populations [6].

D **:** Evaluate the influence of drug delivery systems on drug absorption, distribution, metabolism, and excretion. Investigate different formulation strategies such as nanoparticles, liposomes, and prodrugs, and assess their impact on drug pharmacokinetics.

: One of the major organs that is in charge of the metabolism and elimination of both endogenous and exogenous molecules is the liver. Primary hepatocytes remain the gold standard for evaluating hepatic drug metabolism and transport among numerous in vitro and in vivo model systems. To address species differences in drug metabolism, hepatocytes from the species of interest, including humans, can be isolated. Assessment of overall hepatobiliary drug disposition is made possible by the expression of multiple metabolic enzymes and transporters by primary hepatocytes. However, sandwich-cultured hepatocytes (SCH) regain polarity, allowing proper localization of basolateral and canalicular transporters as well as the formation of functional bile networks. Additionally, sandwich-cultured hepatocytes (SCH) regain polarity, allowing proper localization of basolateral and canalicular transporters as well as the formation of functional bile networks. However, hepatocytes in suspension or under conventional culture conditions quickly lose cell polar [7].

D

Drug-metabolizing enzymes and transporters play a crucial role in controlling PK. Determinants of PK In addition, posttranscriptional and transcriptional factors like nuclear receptors and noncoding RNAs (ncRNAs) play a crucial role in modulating PK and offer a comprehensive understanding of regulatory mechanisms that can be used to resolve PK issues. These system driven PK studies can work on the outcome of medication advancement connected with its adequacy and security and work on the sane utilization of drug in clinical practice [8].

D **C**

Drug-metabolizing enzymes in charge of PK metabolism Exogenous and endogenous substances are both metabolized by enzymes. The majority of drugs undergo metabolic a

standard method for predicting DDIs for small molecules might not work with therapeutic biologics. It is essential to advocate for developing strategies and regulations regarding potential DDIs involving biologics in light of the rising number of therapeutic biologics on the market. Assessment of the modulation of CYP activities and immunogenicity is recommended on the basis of the most recent findings regarding the major mechanisms for the pharmacokinetic-based DDIs of therapeutic biologics. In terms of pharmacodynamics-based DDIs, it is highly recommended to identify and monitor clinical endpoints that are relevant to therapeutic biologics' efficacy as well as their adverse effects [13].

C

The complex models-based experimental scientific exploration of drug discovery and development continues. For predicting the behavior of a drug in patients, these models provide a variety of data from studies on healthy human subjects, in vivo animal species, and in vitro systems. These data either reveal the entire distributional and dispositional properties of a drug, as revealed by a human ADME study using 14C-labeled compounds, or they address a specific aspect of drug metabolism, such as permeability and transporter properties, as derived from Caco-2 models. It's very important to choose the right model, then use that model or models with the right strategy and right data interpretation. Some of the most common experimental models used in drug metabolism and disposition have been discussed in this review. The majority of modern drugs are discovered and developed by utilizing the appropriate experimental models at the appropriate times [14].

A

None

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