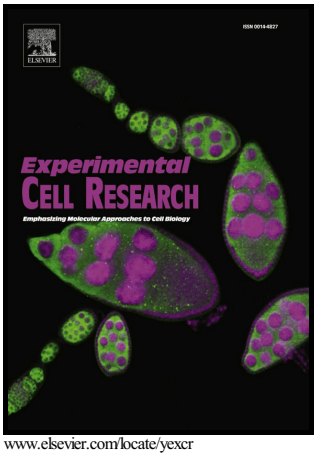

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Liver 'organ on a chip'

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Introduction/Abstract

The liver plays critical roles in both homeostasis and pathology. It is the major site of drug metabolism in the body and, as such, a common target for drug-induced toxicity and is susceptible to a wide range of diseases. In contrast to other solid organs, the liver possesses the unique ability to regenerate. The physiological importance and plasticity of this organ make it a crucial system of study to better understand human physiology, disease, and response to exogenous compounds.

The purpose of this review is to inform the reader of the significance and available methods for replicating human liver physiology and pathology *ex vivo*. First, the physiologic roles of the liver and its cellular constituents will be discussed. Second, we will discuss the need for developing an *ex vivo* liver system. Third, the advantages and disadvantages of different cell sources used to populate the system will be mentioned. Fourth, the benefits of currently employed *ex vivo* liver culture systems (both commercially available and used in research laboratories) will be discussed. Finally, future directions to advance these systems, including