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Liver organoid platforms for disease modeling and drug testing

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Lecture : Liver organoids have been recently highlighted as in vitro models for liver disease modeling and hepatotoxicity evaluation of drugs. However, they are limited in recapitulating complex cellular and extracellular interactions, leading to immaturity and low hepatic functionality. To overcome these limitations of current liver organoid models, we developed a novel culture technique based on liver-specific matrix and microfluidics. Stem cell-derived liver organoids generated with liver extracellular matrix and microfluidic device reconstituted native liver tissue-like phenotypic and functional features. The advanced liver organoids successfully modeled fatty liver diseases and enabled precise evaluation of the efficacy and toxicity of candidate drugs. Therefore, liver organoids engineered with liver-mimetic microenvironment would be able to provide a highly efficient platform for mechanism studies of liver diseases and drug efficacy/toxicity testing. Acknowledgment: This work was supported by a grant (2018M3A9H1021382) from the National Research Foundation of Korea (NRF).