Co-Culture of Rat Primary Hepatocytes with Human Umbilical Vein Endothelial Cells

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Bioartificial liver (BAL) is an extracorporeal liver support system, which contains biological components such as hepatocytes as a biocatalyst. The BAL will act as a bridge to provide patients with the extension of survival time until a donor organ becomes available for transplantation or their own liver can be regenerated [1]. The performance of a BAL depends on the functional activities of the hepatocytes immobilized in the system. However hepatocytes are well known to dedifferentiate following isolation and lose much of their hepatic functions within the first 2 days in culture. Consequently there have been many attempts to try to maintain and improve hepatocyte function by devising culture configuration such as culture media and substrata.

One of the most promising techniques in retaining liver-specific functions is co-culturing hepatocytes with other cell types, such as epithelial cells, endothelial cells and fibroblasts [2]. In the liver, hepatocytes exists as one-cell thick plates along sinusoidal endothelial cells and hepatocytes utilize soluble factors of blood plasma through endothelial cell layers. Therefore endothelial cells are the most attractive non-parenchymal cell type for hepatocyte co-culture. Indeed many two- and three-dimensional co-culture studies with sinusoidal endothelial cells have been reported. However, the limited availability of the cells has been a critical factor to utilize them to BAL application and study model for intercellular interactions.

Among the normal endothelial cells, human umbilical vein endothelial cells (HUVECs) have the highest proliferous capacity in culture. So, in this presentation we evaluate the HUVECs as a substitute for the sinusoidal endothelial cells that could enhance the liver-specific functions of the cultured hepatocytes.

References

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