Determining the Effect of Extracellular Matrix on the Differentiation and Functionality of Stem Cells for Bioengineering Organs

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More than 6,500 Americans each year have died waiting for an organ transplant, and of those who receive a transplant only one out of four are biologically correct, however bioengineering organs through scaffolding could potentially become a new method in solving this issue. The experiment was designed to study whether the extracellular matrix (ECM) chicken liver scaffold could stimulate functional proliferation and attachment of the WB-F344 stem cell line, and induce stem cell differentiation from unspecialized cells to specialized hepatocytes. After obtaining the ECM from the process of decellularization using one percent of Triton X-100 and Sodium Dodecyl Sulfate, the cells were sent for a Hematoxylin and Eosin stain for confirmation that the cells show favorability with the matrix. The ECM was then seeded with the WB-F344 stem cells, to evaluate compatibility and differentiation. Based on the results the cells were confirmed to attach onto the matrix. A t-test was performed to test the significance and at a p-value of 0.05, the results were significant that the cells have differentiated and started to function by releasing albumin, a protein produced by hepatocytes. The cells were favorable onto the matrix, which makes it a potential and multi-compatible scaffold that promotes differentiation and whole organ regeneration.

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