

Viability of 3D Alginate Encapsulation Isolated and Aggregated Rat Hepatocytes Through 8-days of Roller Bottle Culture

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This project is one of many experiments in Dr. Macdonald's lab, looking into the viability of 3D alginate encapsulated rat hepatocytes. This is an effort to more effectively model the liver in vitro, for purposes such as improved medicine testing. Previous research has shown that oxygen availability differs based on the size of the encapsulates, therefore, cell viability within encapsulates likely will as well. In this experiment, hepatocytes were isolated into 250 μm and 500 μm diameter encapsulates, along with a coculture sample, which included nonparenchymal cells. The cells were imaged daily over the course of 8 days, and were dyed in order to indicate whether they were living, apoptotic, or necrotic. Based on these results, the cocultured cells appeared to remain living at a much greater rate than either of the two monocultures. Both the 250 μm and the 500 μm diameter samples showed significant apoptosis and necrosis over the 8 day period. Cell viability was also determined throughout the experiment, using an LDH assay. The coculture sample had the best viability, with 94.7% of the cells remaining viable 8 days after encapsulation. The 250 μm diameter sample had 52.7% of the cells remaining viable at the conclusion of the experiment. The 500 μm diameter encapsulates were unable to get an accurate LDH reading, as the amount of LDH present in the sample was too high for the reader.