

**351d Tissue Engineering: Microsystems and Macrosystems for Functional Genomics, Metabolic Engineering, Stem Cell Differentiation and the Treatment of Liver Disease (Area 15d/E Plenary Lecture)**

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Our laboratory has focused on developing reproducible and reliable systems for studying cellular processes and for treating liver failure and steatosis. By using microfabrication techniques together with the double gel hepatocyte system in some cases, and hepatoma cell lines in others, we have generated new robust cellular bioreactors, high throughput tools for characterizing gene expression in real time, and reasonably effective stem cell differentiation systems. On the macroscale, we have developed experimental perfusion systems and metabolic analysis tools for the investigation of liver metabolic anomalies that exist in most severe injuries and chronic diseases like cancer and AIDS. Finally, using modification to the perfusion system mentioned above, we hope to develop strategies for the eventual banking of tissues and organs.