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**Project**

*In Vivo Ablation of Liver  
Cancer by High-Intensity Focused  
Ultrasound and Ethanol*

**Faculty Mentor**

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The aim of this experiment was to grow tumor xenograft models in vivo and measure the effectiveness of treatment with High Intensity Focused Ultrasound (HIFU) alone and in combination with Ethanol. Liver cancer cells were of the HEP3B cancer cell line and cultured in T-175 flasks with DMEM until confluent (~10 million cells/flask). Once cells were confluent they were mixed with High Concentration Matrigel in a 1:1 ratio so they could be seeded in vivo for tumor growth. Matrigel and Cancer cells were removed from the aliquot with an 18 gage syringe and injected into the each flank of 20 male athymic nude mice using a 25 gage syringe (Theoretically yielding 40 total tumors).

After a few weeks of monitoring and measuring tumor sizes they reached the 8\*8 threshold and were selected to 1 of 4 different treatment groups: Control (PBS Injection), Ethanol Only, HIFU only, HIFU + Ethanol. The tumors were treated with 1.1 MHz Sonic Concepts HIFU Transducer locked in a system where the focus was directly established at a certain point where the mouse could be treated using ultrasound gel to aid in passing the signal to the tumor. Directly after treatment tumor ablation regions were measured using ultrasound. Tumors were then continuously monitored and measured to observe tumor progression post treatment. After 5 days and 14 days select groups of euthanized and tumors were dissected and prepared to be pathologically analyzed.

Results from ultrasound images showed tumor ablation in HIFU and HIFU + Ethanol groups. Regression of tumor size post treatment was observed in only in the HIFU + Ethanol group. Pathology report also indicated that the HIFU + Ethanol group had a significantly higher cancer cell necrosis percentage.