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## Characterization of Left-Ventricular Thrombus Formation Using High Frequency Ultrasound

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### ABSTRACT

Heart failure is a leading cause of death in the United States, and cardiac thrombus, a common morbidity associated with heart failure, significantly increases a patient's risk of embolic events. The objective of this project is to characterize left-ventricular (LV) thrombus development using high frequency ultrasound imaging in a murine model. C57BL/6J wild-type mice (n=6) were injected intraperitoneally with iron dextran five times a week for six weeks to increase oxidative stress in the heart. Granulocyte-colony stimulating factor (G-CSF) was subcutaneously injected daily during the second week to initiate stem cell migration and stimulate endothelial cell activation, thus increasing the hypercoagulability state of the blood. A high-frequency, small animal ultrasound system (Vevo2100, VisualSonics FUJIFILM Inc.) and a 40 MHz central frequency transducer were used to track LV thrombus progression and evaluate LV function weekly. Four out of six mice developed thrombus, but no significant differences in LV performance were observed when compared to mice that did not form a thrombus. Further investigation is necessary to study the role of attenuated heart function on thrombus formation. Future work will incorporate a murine model of myocardial infarction to investigate if a severely compromised heart increases the risk of or accelerates LV thrombus formation. This study will aid in identifying patients who are predisposed to thrombus formation following a heart attack, leading to more effective prevention and treatment methods.

### KEYWORDS

Thrombus, heart failure, reduced heart function, cardiac thrombus, left ventricle, ultrasound, murine model, iron dextran, G-CSF