Vidhya Kumar
PhD Candidate

“Towards Multiorgan Characterization of Cardiometabolic Health and Disease”

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VITA

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COMMITTEE MEMBERS

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ABSTRACT

Cardiometabolic disease, a condition characterized by an abnormal metabolic phenotype, presents a major public health burden, as it is a chronic condition that affects over 30% of American adults. Currently it is believed that cardiometabolic disease is caused by chronic over-nutrition and lack of exercise, although the exact path of disease development is still incompletely understood. Recent improvements in the treatment of cardiometabolic disease and its downstream conditions, cardiovascular disease and diabetes, indicate the beneficial effects of early detection and aggressive treatment. Strategies to detect changes in multiple organ systems due to cardiometabolic disease could be used for earlier diagnosis and provide information for targeted therapies to prevent severe downstream consequences.

This work seeks to develop multimodality techniques to evaluate the effects of cardiometabolic disease and produce reliable biomarkers that may be used to better inform understanding and treatment of disease. First, it presents a standardized magnetic
resonance spectroscopy technique to quantify mitochondrial oxidative phosphorylation capacity in skeletal muscle. The spectroscopy technique is then used to evaluate the effects of cardiac rehabilitation exercise training in patients with and without metabolic abnormalities. Second, a novel multi-energy computed tomography method for quantification of myocardial fibrosis is described. The pre-clinical development of the computed tomography method and clinical validation of the technique are presented.

Together, the techniques developed and described in this work present a multimodality approach to characterize cardiometabolic health and disease.

**RECENT ABSTRACTS AND PRESENTATION**

RECENT PUBLICATIONS


AWARDS AND HONORS

Predoctoral Training Grant- Cardiovascular Science (NIH T32)

FUTURE PLANS

I plan to obtain a position in industry after graduating from this program.