Sex Differences in Cardiac Energetics During Viral Myocarditis

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Myocarditis is a disease in which there is inflammation located within the muscle tissue of the heart, or myocardium. It is characterized by infiltration of mononuclear inflammatory cells including macrophages and lymphocytes. The male sex is an immanent risk factor for developing heart failure for several cardiovascular conditions, such as myocarditis. The hypothesis was that female mice with myocarditis will have less inflammation, better functioning mitochondria and better left-ventricular global longitudinal strain (GLS) compared to males. This study was conducted by measuring and comparing the function of mitochondria from mice using qRT-PCR gene expression. RNA was isolated using the QiaCube and the resulting RNA was nanodropped to determine concentration values. Then, cDNA was created using the isolated RNA and reverse transcriptase. Finally, qRT-PCR was performed using the cDNA and master mix. The primers used were CD38, CD45, and CD11b which are all markers for myeloid cells. In addition, the function of the heart was compared between male and female mice with myocarditis using advanced small animal echocardiography analysis techniques, such as global longitudinal strain and 4-D echoes. This was conducted by measuring the left ventricle of uninfected and infected mice through both the long axis and short axis view. The resulting data was ejection fraction and global longitudinal strain which measures the contractility of the heart. The results supported the hypothesis because it was determined that males had a significantly higher expression of CD38, CD45, and CD11b during myocarditis. Males had a significantly lower GLS value compared to female mice.

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