Honorable Mention

Effect of Frataxin Knockout on Mouse Cardiomyocytes Using DsRed.T3 as a Quantifying Marker

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Background: Discosoma Red (DsRed) is a strong fluorescent marker that has many practical uses for scientific studies. We engineered a transgenic mouse expressing DsRed.T3 only in cardiomyocyte nuclei, and then crossed this with a conditional knockout mouse with loss of Frataxin (FXN) in heart. It is known that dysfunction of the Frataxin (FXN) gene can cause Friedrich's Ataxia (FRDA), a disease associated with ataxia, weakness and dilated cardiomyopathy in humans. The current study aimed to: 1) Determine if DsRed overexpression in cardiomyocyte nuclei would negatively affect cardiac tissue, and 2) Use the DsRed.T3 mouse to determine whether FXN knockout (KO) would cause a loss of cardiomyocytes.
Methods: The study was done by examining three different strains of mice: wild-type, DsRed.T.3 overexpressing Tg mice, and FXN KO mice with loss of FXN in cardiomyocytes. Mice were analyzed using genotyping, frozen immunofluorescent stains, α-actinin and Hoechst, TPLSM, confocal microscopy, western blotting, H&E, echocardiography, and heart:body weight ratios.
Results: DsRed.T3 is localized to the nucleus of cardiomyocytes. At 6.5 months of age, there were significant effects on cardiac function. It was also shown that there was a loss of cardiomyocyte nuclei in the FXN KO group.
Conclusion: This study shows how researchers can study the heart, and more specifically, Friedreich's Ataxia, while also shedding light on how FXN loss may ultimately affect the heart in FRDA patients.