FALL 2020

Biochemistry and Molecular Biology Brown Bag Series

Venkata Sai Usha Sri Polaki

" Role of exercise in macrophage polarization of perivascular adipose tissue and adipose tissue inflammation in hypertensive mice model"

Tuesday, September 22, 2020

11:00 AM

Blackboard Collaborate

https://us.bbcollab.com/guest/63a1b38f991a44808125ab87d4766c20

Lab: Ji C. Bihl

Boonshoft School of Medicine
WRIGHT STATE UNIVERSITY

WRIGHT STATE UNIVERSITY

https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract Title:

Hypertension, also known as high blood pressure, is a long-term medical condition in which the blood pressure in the arteries is persistently elevated. It can lead to severe health complications and increase the risk of heart disease, stroke, and sometimes death. Perivascular adipose tissue (PVAT) is known as the adipose tissue (AT) surrounding all the blood vessels and plays a critical role in the pathogenesis of the vascular disease. In vascular pathologies, PVAT increases in volume and becomes dysfunctional, with altered cellular composition and molecular characteristics. Macrophages have been found to accumulate in PVAT during hypertension, which might be involved in the inflammation of hypertension. Inflammation has been shown to play an important role in hypertension; however, the exact mechanisms by which the activated immune cells partly lead to the development and maintenance of hypertension remain to be elucidated. The objective of this study is to determine the role of exercise in the inflammation of AT and PVAT by modulating the polarization of macrophages in hypertensive mice. Renin transgenic (R+) mice have been used as a hypertensive mice

model. The PVAT, AT, and plasma samples were collected for the analysis of inflammatory cytokines, macrophages isolation, and polarization. The release of cytokines from AT and PVAT was determined by ELISA and the release of cytokines from plasma was determined by bio plex cytokine analysis. Our ELISA results did not show the changes of exercise on the release of cytokines in AT but could decrease the pro-inflammatory cytokines in PVAT. While our flow cytometry results showed that exercise affected the macrophage polarization in adipose tissue but not in PVAT. Cytokine analysis of plasma samples showed a decrease in pro-inflammatory cytokines IFN-g and IL-6, as well as anti-inflammatory cytokines IL-4 and IL-13, while an increase in IL-10 was noted, which might be related to effects of exercise by alleviating the release of cytokines. Very interestingly, we found that exercise also decreased vascular remodeling in the aorta. In conclusion, our data suggest that exercise might have effects on alleviating inflammation and modulating the polarization of macrophages in AT and PVAT of R+ mice. Further studies and more animal numbers are needed to confirm the protective effect of exercise in modulating the macrophage polarization in the hypertensive mice model.