Effects of aging on exercise-induced extracellular vesicle alteration of immune cell activity.

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As we age, we lose the ability to recover from exercise and lose muscle mass. Muscle growth is called hypotrophy and occurs after the process known as myogenesis. One factor involved in myogenesis comes from the assistance of the immune cells known as macrophages. These macrophages can polarize into two different types that are pro-inflammatory and pro-resolution, which help the process of myogenesis. What causes the macrophages to polarize is currently unknown, however, we hypothesize that tiny communication cells known as extracellular vesicles (EVs) aid in this process. To test this hypothesis, we need to characterize the effects EVs have on macrophage polarization. To measure gene regulation, we will use qPCR to determine the level of RNA in the cells. When looking at surface markers we will use Flow Cytometry to look at lineage and cell differentiation. Finally, to understand the types of cytokines being released by the macrophages we will use the ELISA technique. Our results show that after being treated with EVs the macrophages will shift from the normal M0 macrophage state to the either the pro-inflammatory state (M1) or anti-inflammatory state (M2). When separated by age we see that our younger subjects EVs polarize macrophages better than old subjects. These results suggest that age could affect the EV signaling pathway that polarizes the macrophages. This lack of polarization could be a reason as to why humans take longer to recover from injury as we age.