NADPH Oxidase Activity and Muscle Microvascular Dysfunction in Obesity
September 5th, 2019

Sample size and Power Analyses: Aim 1 considerations: Group sample size of 22 achieves >80% power to detect a difference of 0.18 uM H_2O_2 (ROS: from mean of 0.6 uM) with estimated group standard deviation (sigma) of .30 and with a significance level (alpha) of 0.05. These means and anticipated differences between treatment and control probes are reasonable estimates based on the presented data in figure 4 above and estimates of meaningful physiological differences between treatment and control probes. Aim 2 considerations: Aim 2 is a prospective design of ROS response to perfused agents before as compared to after training. Group sample size of 22 achieves >80% power to detect a difference of 0.15 between the null hypothesis that probe ROS mean percent change is 0.2 (20% mean percent change between pre and post) and the alternative hypothesis that the mean is 0.35 (35% mean percent change between pre and post) with estimated group standard deviations of percent change of 0.136 and with a significance level (alpha) of 0.05 using a two-sided two-sample t-test. This will answer Aim 2 of the study for determining any pre-training/post-training differences. Thus, the investigators feel confident that 25 subjects per group will be large enough to detect differences in ROS while allowing for the potential 10% dropout the investigators have experienced in past training studies.

Statistical Analyses and Interpretation of Results: Treatment versus control probe comparison will be performed at the appropriate phases for Aims 1a-1d via student t-tests or ANOVAs specific for the sub-aim. The investigators will quantify the change in the outcome variables (ethanol outlow/inflow ratio or H_2O_2) with training and compare the training response via sub-aim specific (Aims 2a-2b) two-way repeated measures ANOVAs [(probe type (treatment vs control) by time (pre vs post)]. Student Neuman Keuls' post-hoc tests will be used when significant main effects are observed. Pearson-Product Moment correlations will be run to compare the ROS data and endothelial-dependent responses, as it is anticipated that there will be an inverse relationship between dialysate ROS and response to acetylcholine. Exploratory analyses will be run comparing subgroups African American and Caucasian participants, as well as male and female participants due to the potential differences in oxidative stress, inflammation, endothelial function and CVD risk in these groups. The funding level will not allow enough participants to be studied to provide adequate statistical power to address these issues. Statistical analysis will be run using SPSS /PASW Statistics version 18, with an alpha level of 0.05.