

## Effects of Chemotherapy Regimens on Skeletal Muscle Mitochondrial Function in Breast Cancer Patients Measured by Near Infrared Spectroscopy

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**Background:** Cancer patients undergoing chemotherapy are known to develop skeletal muscle mitochondrial dysfunction and subsequent cachexia due to massive treatment related oxidative stress, increasing the risk of chemotherapy-related morbidity and mortality. The timeline is unknown as to when this dysfunction starts to occur and is traditionally measured via invasive muscle biopsy. This adds additional burden to the patient and makes tracking of cachexia difficult. **Purpose:** To assess the effects of differing chemotherapy regimens on skeletal muscle mitochondrial function throughout treatment in breast cancer (BC) patients, using near infrared spectroscopy (NIRS).

**Methods:** Non-metastatic BC patients will be recruited prior to the initiation of chemotherapy involving taxanes, anthracyclines, and/or trastuzumab. Mitochondrial function of the vastus lateralis muscle will be measured during activation, noninvasively, by assessing changes in oxygenated and deoxygenated hemoglobin using the NIRS PortaMon device. Within 5 days prior to every infusion, participants will perform moderately intense exercise on a stationary ergonometric bike. Data will be analyzed by one-way ANOVA to detect differences in mitochondrial oxidative capacity between chemotherapy regimens as well as between treatment time points within each individual regimen. Between treatment differences will be considered statistically significant at  $\alpha < 0.05$ .

**Discussion:** The results of this project will further provide insight into how different chemotherapy regimens impact mitochondria at a cellular level, potentially further informing oncology practice regarding the costs and benefits of a chemotherapy regimen. This is a novel way to noninvasively assess mitochondrial function during treatment in a cancer population, which has not yet been previously studied.