

## **Analysis of Inflammatory Markers in Response to Induction of Reprometabolic Syndrome by a Eucaloric High Fat Diet in Normal Weight Women.**

Thy Nguyen, BA,<sup>1</sup> Katherine Kuhn, MS,<sup>1</sup> Matthew Bolt, MS,<sup>2</sup> Andrew P. Bradford, PhD,<sup>\*1</sup> and Nanette Santoro, MD<sup>\*1</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, University of Colorado School of Medicine, Aurora, Colorado, 80045, United States of America

<sup>2</sup>Department of Biostatistics and Informatics, Colorado School of Public Health, Aurora, Colorado 80045, United States of America

\*Joint senior authors

### **ABSTRACT**

Obesity is associated with chronic low-level inflammation and is known to contribute to metabolic dysfunction and hypogonadotropic hypogonadism, which we have previously termed the 'Reprometabolic Syndrome.' To investigate potential factors involved in obesity-related reproductive endocrine dysfunction, we conducted a secondary analysis of inflammatory markers in a sample of normal weight women exposed to a one-month eucaloric high-fat diet (HFD), which, as reported earlier, induced the relative hypogonadotropic hypogonadism characteristic of Reprometabolic Syndrome. Eighteen healthy women with a BMI between 18.0-24.9 kg/m<sup>2</sup> and regular menstrual cycles participated in the study. Frequent blood sampling was performed during the early follicular phase before and after the one-month eucaloric HFD intervention (48% of calories from fat). Serum samples pooled from each participant were analyzed using immunoassay to measure levels of 30 cytokines, interleukins, and chemokines. Differences pre- and post-HFD intervention were examined by one-sample t-tests. Exposure to the eucaloric HFD did not result in changes in body weight. HFD-induction of Reprometabolic Syndrome in normal weight women was associated with a significant elevation only in the anti-inflammatory cytokine IL-10 ( $p=0.04$ ). Eotaxin, IL-6 and MIP-1 $\beta$  also increased in response to the HFD, but not statistically significantly ( $p=0.07$ ). Results suggest that the increase in multiple inflammatory markers, typically associated with obesity, are not primary mediators of the relative hypogonadotropic hypogonadism of Reprometabolic Syndrome.