I. Project Title
Effects of a behavioral weight loss intervention on reducing bisphenol exposure in women with overweight and obesity.

II. Project Completion Date
September 1, 2019

III. Student(s), Department(s), and Major(s)
(1) Hannah Brunner-Gaydos, Department of Kinesiology and Public Health, Kinesiology Major
(2) Shelby Thomas, Department of Kinesiology and Public Health, Kinesiology Major
(3) Madison Hibbs, Department of Kinesiology and Public Health, Kinesiology Major
(4) Lily Medrano, Department of Kinesiology and Public Health, Kinesiology Major

IV. Faculty Advisor and Department
Dr. Todd Hagobian, Department of Kinesiology and Public Health

V. Cooperating Industry, Agency, Non-Profit, or University Organization(s)
Cal Poly Center for Health Research

VI. Executive Summary
Bisphenols (BPA, BPS, BPF) are synthetic organic chemicals with endocrine disrupting properties that are routinely used in the production of plastics used for lining food and beverage containers as well as other products commonly used by consumers. Bisphenol exposure, widespread in the US with 93% of the population having detectable urine levels, is known to have negative health effects related to weight gain, obesity, cardiovascular disease and other chronic illnesses. Surprisingly, few studies have experimentally tested a randomized intervention to reduce bisphenol exposure.

This study, ancillary to an ongoing clinical trial examining the effects of a weight loss intervention on disease risk markers and reoccurrence of gestational diabetes, examined whether the 4-month standard behavioral weight loss intervention reduces urine bisphenol exposure. Thirty women with overweight or obesity were recruited and randomized to a weight loss intervention or control group. We hypothesized that weight loss and reduced urinary bisphenol (BPA, BPS) levels would be correlated at 4 months. We used a competitive Enzyme-Linked Immunosorbent Assay (cELISA) kit run in triplicate to assess urinary BPA levels. The cELISA was analyzed with a Multiskan FC microplate photometer and concentration values were determined using GraphPad Prism 8 software by using a standard curve. A repeated measure analysis of variance (RMANOVA) was then
used to determine differences in urine bisphenol concentrations. This pilot study revealed no association between reduced urinary bisphenol (BPA, BPS) levels and weight loss ($P > 0.05$). Future studies with larger sample sizes and increased magnitude of weight loss are needed to further evaluate the relationship between weight loss and reduction in bisphenol exposure.

VII. **Major Accomplishments**

1. We did not detect an association between a standard behavioral weight loss intervention and the reduction in urinary Bisphenol A and Bisphenol S.

   $P>0.05$ (non-significant)

(2) We presented a poster on our findings at the 2019 Cal Poly College of Science and Math Undergraduate Research Conference.

VIII. **Expenditure of Funds**

The budget was altered from our original proposal due to a change in the urine analysis method used. Additional laboratory supplies were provided by the Center for Health Research and Kinesiology department.

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<th>Baker/Koob Budget</th>
<th>Cost per unit</th>
<th>Quantity</th>
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IX. **Impact on Student Learning**

Student researchers learned high quality research method and data collection techniques as well as NIH standard protocols for recruiting, enrolling, and randomizing participants. Specifically, we
learned to (1) prepare Institutional Board Review proposals, (2) screen and enroll volunteers in a study, (3) collect and analyze urine samples using a cELISA, (4) analyze results using RAMONAVA, (5) write up final findings, and (6) present scientific research at a symposium.