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**From:** Yount, Velda

## KECK SCIENCE DEPARTMENT SEMINAR

***“Effects of hydrocortisone, ascorbic acid, and thiamine treatment on oxidative stress in healthy neonatal foals”***

**Georgia Macy**  
**College of Veterinary Medicine**  
**University of Georgia**

**Friday, February 10, 2023**

**12:15-1:15pm**

**Burns Lecture Hall (B31)**

**Keck Science Center**

***“Light refreshments will be served after the seminar”***

**Abstract:** Georgia Macy<sup>1</sup>, Sarah Vaughn<sup>1</sup>, Londa Berghaus<sup>1</sup>, Natalie Norton<sup>1</sup>, David Hurley<sup>2</sup>, Michelle Barton<sup>1</sup>, Margaret Lemons<sup>1</sup>, Jessica Cathcart<sup>1</sup>, Shyla Giancola<sup>1</sup>, Kelsey Hart<sup>1</sup>

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Sepsis is a leading cause of morbidity and mortality in neonatal foals and induces oxidative stress and inflammatory dysregulation. Metabolic resuscitation is a proposed immunomodulatory and antioxidant therapy in septic people that includes low-dose hydrocortisone, ascorbic acid, and thiamine (HAT). Specific immunomodulatory effects of HAT in horses are unknown. We hypothesized HAT treatment in healthy foals would increase plasma concentrations of these compounds, alter inflammatory cytokine concentrations, and reduce plasma oxidative markers. Healthy 2-day-old foals were randomly assigned to HAT (1.3 mg/kg/day hydrocortisone, 400 mg/kg/day ascorbic acid, 20 mg/kg/day thiamine, n = 8) or saline placebo (n = 8) intravenously every 6 hours for three days. Plasma thiamine and ascorbic acid concentrations were measured via high-performance liquid chromatography and cortisol concentrations were measured via a chemiluminescent assay before, 48 hours into, and 48 hours after treatment. At each sampling timepoint, validated whole blood bacterial stimulation assays were performed to determine cytokine and oxidative stress responses. Plasma antioxidant capacity (PAC) and reactive oxygen metabolites (d-ROMs) were measured via a validated photometric assay. Cytokines were measured via validated ELISA or multiplex assays. Data were compared within and between groups using mixed-effects modeling with Holm-Sidak post hoc analysis (p<0.05). HAT administration significantly increased concentrations of these compounds over time and in HAT treated foals compared to controls (p≤0.05). PAC was similar between and within groups over time (p>0.05). d-ROMs were similar between and within groups at baseline and after

cessation of treatment ( $p>0.05$ ) but were significantly decreased during HAT treatment in comparison to baseline values, and in HAT treated foals compared to controls ( $p\leq0.002$ ). Whole blood stimulation induced cytokine responses, but differences between groups were not significant, which may represent type II error. Three days of HAT treatment increased plasma cortisol, ascorbic acid, and thiamine concentrations and decreased circulating oxidant metabolites in healthy foals. Further study is needed to determine if HAT therapy is beneficial in equine sepsis.

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