

**ABSTRACT #124**

**HORMONES OF ENERGY METABOLISM IN SEPTIC FOALS: ASSOCIATIONS BETWEEN INSULIN, GLUCAGON, LEPTIN, ADIPONECTIN, GHRELIN AND GROWTH HORMONE.** RJIM Barsnick<sup>1</sup>, SDA Hurcombe<sup>1</sup>, NM Slovis<sup>2</sup>, KA Sprayberry<sup>2</sup>, PA Smith<sup>1</sup>, RE Toribio<sup>1</sup>. 1. The Ohio State University College of Veterinary Medicine, Columbus, OH. 2. Hagyard Equine Medical Institute, Lexington, KY.

Endocrine dysregulation of energy metabolism is well documented in critically ill human neonates, but limited information exists in critically ill neonatal foals. The purpose of this study was to investigate the association between hormones that regulate energy metabolism (insulin, glucagon, leptin, adiponectin, ghrelin and growth hormone) and their association with blood glucose and triglyceride concentrations in healthy and critically ill neonatal foals.

We hypothesized that concentrations of insulin and leptin will be positively correlated with serum glucose and negatively correlated with serum triglyceride concentrations. Glucagon, ghrelin, growth hormone (GH) and adiponectin will be positively correlated with triglycerides and negatively correlated with glucose concentrations. Further, ghrelin will be associated with GH.

We included 44 septic, 62 sick non-septic, and 19 healthy foals of <7 days of age. Blood samples were collected on admission. Foals with a positive blood culture or a sepsis score  $\geq 12$  were considered septic. The Spearman rank order statistic was used to define correlations between variables.

Serum glucose concentrations were positively correlated with insulin and leptin (insulin only in septic foals), and negatively correlated with glucagon, adiponectin, ghrelin and growth hormone (growth hormone only in septic foals). Serum triglyceride concentrations were positively correlated with glucagon, ghrelin and growth hormone (glucagon and ghrelin only in septic foals). Glucose, triglycerides, insulin, ghrelin and glucagon were also associated with the sepsis score (data not shown). Correlations between the hormones are shown in table 1.

Table 1. Correlation ( $r$ ) between the hormones (all foals of the study population), \* $p < 0.05$

Variable	Insulin		Glucagon		Leptin		Adiponectin		Ghrelin	
	$\rho$	$P$ value	$\rho$	$P$ value	$\rho$	$P$ value	$\rho$	$P$ value	$\rho$	$P$ value
Glucagon	-0.072	0.423	-	-	-	-	-	-	-	-
Leptin	0.02	0.828	0.164	0.067	-	-	-	-	-	-
Adiponectin	-0.098	0.277	0.031	0.727	-0.332	<0.0001*	-	-	-	-
Ghrelin	-0.2	0.025*	0.453	<0.0001*	-0.009	0.919	0.098	0.277	-	-
Growth Hormone	-0.198	0.027*	0.281	0.002*	-0.04	0.65	0.078	0.384	0.177	0.048*

This study showed that energy endocrine dysregulation is frequent in septic foals as a result of increased caloric needs and systemic inflammation. We observed a complex hormonal response, as demonstrated by the association between hormones, glucose, triglycerides, and the sepsis score. Ghrelin and GH were associated with insulin and glucagon, supporting their role in energy regulation.