## Clinical utility of plasma fructosamine concentration as a hypoglycemic biomarker during early lactation in dairy cattle

## **ABSTRACT**

Background: Plasma fructosamine concentration ([FRA]) is a widely used long term hyperglycemic biomarker in humans and dogs, but its clinical usefulness as a hypoglycemic biomarker in dairy cattle is uncertain.

Objectives: To evaluate the relationship between plasma [FRA] and glucose concentration ([gluc]) as well as indices of energy balance during early lactation in dairy cattle, and to characterize the influence of plasma total protein concentration ([TP]) and albumin concentration ([albumin]) on [FRA].

Animals: Convenience sample comprising 103 periparturient Holstein-Friesian cattle.

Methods: Plasma [gluc], [TP], [albumin], and other clinicopathologic indices of energy status were determined periodically from Day 4 postpartum. Body condition score (BCS) was assessed, and backfat thickness (BFT) and longissimus dorsi muscle thickness (LDT) were measured ultrasonographically. Plasma [FRA] was measured at approximately 28 days postpartum. Associations between plasma [FRA] and study variables were evaluated using Spearman's rho and stepwise forward linear regression. Statistical significance was declared at P < 0.05.

Results: A positive association was detected between plasma [FRA] and mean plasma [gluc] from Days 4-28 postpartum (rs =  $\pm 0.36$ , P <  $\pm 0.001$ ), and between plasma [FRA] and LDT (rs =  $\pm 0.28$ , P =  $\pm 0.007$ ), BCS (rs =  $\pm 0.23$ , P =  $\pm 0.029$ ), and BFT (rs =  $\pm 0.21$ , P =  $\pm 0.043$ ). Multivariable regression identified a positive association between plasma [FRA] and mean plasma [gluc] and [albumin] from Days 4-28 postpartum. Correcting plasma [FRA] for [albumin] improved the association (rs =  $\pm 0.46$ , P <  $\pm 0.001$ ) between plasma [FRA] and mean plasma [gluc].

Conclusions and clinical importance: Plasma [FRA] does not provide a clinically useful method for quantifying the magnitude of hypoglycemia or negative energy balance in dairy cows during early lactation.

**Keyword:** Glycated protein; Hyperketonemia; Hypoglycemia