Effect of Glutamine Supplementation on Splanchnic Metabolism in Lactating Dairy Cows.  
By Doepel et al., page 4325. Glutamine (Gln) is classified as a nonessential amino acid for ruminants as it can be synthesized by cows. However, the suggestion has been made that during critical periods, such as postcalving, it might become conditionally essential because dietary supply plus de novo synthesis may not be sufficient to meet requirements. Supplementation with Gln increased milk yield, but this study did not support the hypothesis that supplemental Gln would reduce glucose utilization across the gut or increase liver gluconeogenesis or mammary glutamine uptake to increase milk protein synthesis. Liver synthesis of urea, however, was increased to detoxify the extra Gln infused, resulting in an increased hepatic removal of some essential amino acids.