LPS challenge. With respect to TNFα gene expression, no dietary effect ($P > 0.10$) was observed; however, LPS-treated PAM cells had greater (77.35 vs 1.23; $P < 0.001$) relative abundance of TNFα mRNA compared to non-LPS treated cells. The relative abundance of TNFα mRNA was greatest (85.9 vs 18.0 and 14.0; $P = 0.01$) at 3 h compared to 6 and 24 h after LPS addition. With respect to IL10 gene expression, there was a diet × LPS interaction ($P = 0.01$) where CTL+ had greater (10.6 vs 1.0; 1.8; and 1.2) IL10 mRNA relative abundance compared to CTL-, SDPP-, or SDPP+ treatments. The expression of IL10 in PAM cells was time independent ($P > 0.10$). With respect to TNFα concentration in culture media, there was a LPS × time interaction ($P = 0.01$) where CTL+ and SDPP+ cells secreted greater (54.29 and 80.91 vs 0.05 and 1.47 ng/mL) TNFα compared to CTL- or SDPP- at 24 h; however, no dietary effect on TNFα secretion was observed. In conclusion, LPS upregulates the expression (TNFα and IL10 mRNA) and secretion (TNFα) of pro- and anti-inflammatory cytokines by PAM cells; however, feeding SDPP had no effect on the expression and secretion of these cytokines upon secondary stimulation with LPS.

Key Words: cytokines, porcine alveolar macrophages, spray dried porcine plasma

P089 **Long term effects of spray-dried plasma in nursery diets on intestinal immune response to subsequent stress.** A. Moeser [1], J. Campbell [2,*], J. Crenshaw [2], J. Polo [2], *[1]North Carolina State University, Raleigh, [2]APC, Inc., Ankeny.*

The objective was to test the effects of level and duration of feeding spray-dried plasma (SDP) post-weaning (PW) on support of intestinal mucosa against subsequent moving stress and infection during transition from the nursery to the grower at 50 d of age. A total of 44 pigs (15-18 d of age) were fed 0%, 2.5% (1 wk PW), or 5% (2 wk PW) SDP in nursery diets. At approximately 32 d PW, pigs were subjected to mixing and transport stress and challenged with *Salmonella typhimurium* (ST). Pigs were inoculated intra-gastrically with doses of 3 x 10^9 cfu ST. A control group was fed 0% SDP and not challenged (NC). At 2 d post-infection villi height was reduced and ileal crypt depth was increased ($P<0.05$) as a result of challenge compared to NC pigs. Ileal crypt depth of pigs fed 5% SDP (250 μm) for 2 wk PW was greater ($P<0.05$) compared to all other treatments (132, 197, and 180 μm for NC, ST, and 2.5%, respectively) which might indicate a more robust recovery of the intestinal epithelia. Dextran flux increased ($P<0.05$) in challenged pigs fed diets with either 0 or 2.5% SDP (for 1 wk PW) compared to control NC pigs. Pigs fed the diet with 5% SDP (for 2 wk PW) did not exhibit increased permeability in response to challenge and stress. Ileal tissue concentration of TNF-α was increased ($P< 0.05$) in challenged pigs (209 and 186 pg/mL for ST and 2.5%, respectively) regardless of dietary SDP compared to control NC pigs (69 pg/mL) and was greatest for 5% SDP (313 pg/mL) which may indicate an enhanced immune response against ST. In summary, transportation stress combined with ST challenge induced clinical disease and intestinal barrier dysfunction. Pigs fed the enhanced nutrition supplied by the diet with 5% SDP during the initial 14 d PW were more resilient to gut injury caused by subsequent transport stress and ST. Results suggest 5% SDP supplemented in diets and fed for 2 wk PW enabled the pig to better cope with subsequent stress and enteric challenge later in life.

Key Words: stress, spray-dried plasma, salmonella, pigs

NONRUMINANT NUTRITION: SOW NUTRITION AND MANAGEMENT

P090 **Effects of dietary L-carnitine and chromium picolinate on sow reproductive performance.** N. W. Shelton [1,*], J. L. Nelssen[1], M. D. Tokach [1], S. S. Dritz [1], R. D. Goodband [1], J. M. DeRouchey[1], L. L. Greiner [2], J. Connor [2], J. C. Woodworth [3], *[1]Kansas State University, Manhattan, [2]Innovative Swine Solutions, Carthage, [3]Lonza, Allendale.*

A total of 211 sows and litters (PIC) were used to compare the effects of dietary L-carnitine and chromium on sow reproductive performance. Two dietary treatments were used including a control with no added L-carnitine or chromium and a test diet with 25 ppm L-carnitine and 200 ppb chromium from chromium picolinate (CC). Treatments were allotted in a generalized block design with parity serving as the blocking factor. Gilts and sows received treatment diets for at least 24-d prior to breeding, during gestation, lactation, and up until breeding for the subsequent parity. During gestation, sow feedings levels were based on parity and body condition. During lactation, sows were fed once daily and limited to 6.1 kg. Pigs were individually weighed at birth and d 18 of lactation. Adding CC to sow diets did not increase ($P>0.07$) the number of pigs born (14.1 vs. 13.9) or live born (12.9 vs. 13.0), BW of total (136 vs. 137 g) or live born (138 vs. 140 g) piglets, and litter weight for total (18.5 vs. 18.8 kg) or live born (17.4 vs. 17.9 kg) compared with sows fed the control diet. Adding CC to sow diets did not ($P>0.07$) impact the amount of variation in pig birth weight. Gilts and parity 2 sows fed CC nursed larger and heavier litters on d 7 of lactation compared to those not receiving CC (11.9 vs. 10.8; 30.5 vs. 28.4 kg); however, parity 3 and older sows fed CC nursed smaller and lighter litters compared to those not receiving CC (9.8 vs. 10.2; 25.0 vs. 27.4 kg; Parity × Treatment, $P<0.04$). Adding CC to sow diets did not impact ($P>0.07$) pig number (10.2 vs. 10.1), pig BW (544 vs. 556 g), or litter weight (61 vs. 62 kg) on d 18 of lactation. Sows fed diets containing CC also had increased ($P<0.02$) lactation feed intake (5.4 vs. 5.2 kg) and decreased ($P<0.01$) lactation BW loss (7 vs. 13 kg) compared with sow consuming diets without CC. Farrowing rate (90.3 vs. 92.3%), number of pigs born (12.8 vs. 12.0), and the number of pigs born alive (11.2 vs. 10.9) on the subsequent litter were unaffected ($P>0.07$) by adding CC to sow diets. This experiment showed minor differences in sow performance with the addition of 25 ppm L-carnitine and 200 ppb chromium from chromium picolinate.

Key Words: chromium, L-carnitine, sow performance

P091 **Effects of feeding low or high peroxidized distillers dried grains with solubles (DDGS) to sows on reproductive performance, incidence of low birth weight pigs, and within-litter variation of piglet birth weight.** X. Li [1], G. C. Shurson [1], S. K. Baidoo [2], D. D. Gallaher [3], J. E. Anderson [4], L. J. Johnston [5,*], *[1]Department of Animal Science, University of Minnesota, Saint Paul, [2]Southern Research and Outreach Center, University of Minnesota, Waseca, [3]Department of Food Science and Nutrition, University of Minnesota, Saint Paul, [4]Division of Science and Math, [5]West Central Research and Outreach Center, University of Minnesota, Morris.*

An experiment was conducted to evaluate the effects of feeding sows DDGS (gestation = 40%; lactation = 20%) containing low or high peroxidized lipid (LOD or HOD) on reproductive performance, incidence of low birth weight pigs, and within-litter variation of piglet birth weight. Mixed parity sows (n = 48; mean parity = 3.2) were assigned to 1 of 3 dietary treatments [corn-soybean meal control