119 Standardized total tract digestible phosphorus requirement of 11- to 25-kg pigs.

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A total of 1080 barrows and gilts (PIC; 337 × Camborough, initially 11.4 ± 0.29 kg BW) were used in a 21-d trial to determine the standardized total tract digestible (STTD) P requirement of nursery pigs from 11 to 25 kg. Pigs were allotted to pens at weaning according to BW and gender. There were 6 replicate pens/treatment and 23 to 27 pigs/pen. Pens of pigs were randomly allotted to experimental diets based on average BW 21 or 24-d postweaning, in a randomized complete block design. The 7 dietary treatments consisted of 0.26, 0.30, 0.33, 0.38, 0.43, 0.48, and 0.53% STTD P. The NRC (2012) estimates a 0.33% STTD P requirement for nursery pigs from 11 to 25 kg. Two corn-soybean-meal-based diets were formulated to contain 0.26 and 0.53% STTD P by increasing the inclusion of calcium carbonate and monocalcium phosphate at the expense of corn, maintaining a constant 1.17:1 total Ca:P ratio, with no phytase added to the diets. Diets were blended using a robotic feeding system to achieve the intermediate STTD P levels. Experimental data was analyzed using generalized linear and nonlinear mixed models, fitting the data with heterogeneous residual variances when needed, and pen as the experimental unit. Competing models included linear (LM), quadratic polynomial (QP), broken-line linear (BLL), and broken-line quadratic (BLQ). Best-fitting models for each response were selected using the Bayesian information criterion. Increasing STTD P improved ADG, ADFI, and G:F (linear, $P < 0.05$). For ADG, the best-fitting models were LM and QP, estimating the maximum response at greater than 0.53% STTD P for both models. For G:F, best-fitting models were QP and BLL. The QP model estimated the maximum at 0.43% (95% CI: 0.36 to > 0.53%), with 99% of maximum G:F achieved at 0.36%. The BLL plateau was estimated at 0.34% (95% CI: 0.29 to 0.38%). In conclusion, the estimated STTD P requirement for nursery pigs from 11 to 25 kg ranged from 0.34 to at least 0.53% depending on the response criteria and statistical model.

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120 After all, tomorrow is another day for the transition cow: Depending on liver and reproductive health, of course.

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Infertility in lactating dairy cows has been attributed to metabolic stress during the transition period. Potential metabolic alterations that dysregulate ovarian functions have not been completely cataloged. Our objective was to characterize metabolic parameters of dairy cows during the transition period. First, we examined the metabolic profiles in circulation to pinpoint time points of major changes. We collected weekly blood samples from Holstein cows ($N = 15$) from 3 wk before to 12 wk after calving. Glucose levels reduced during pre-calving weeks to reach a nadir at 3 wk post-calving ($P < 0.05$), and the first increase in glucose concentration occurred at 10 wk post-calving ($P < 0.05$). Also, β-hydroxybutyric acid levels increased from calving until week 3 of lactation ($P < 0.05$) and subsequently returned to baseline. Levels of triglycerides decreased during pre-calving weeks, while significant increase occurred at 5 wk post-calving ($P < 0.05$). Total cholesterol concentrations increased from the third to seventh week post-calving ($P < 0.05$). Oxidative stress indicator, glutathione, decreased to reach a nadir by 7 wk in lactation ($P < 0.05$). Thus, post-calving weeks 3 to 7 are associated with major alterations in metabolic indicators in circulation. In the second experiment, we evaluated changes in hepatic and granulosa cell (GC) mRNA levels and circulating metabolic indicators during the periods of major metabolic changes listed above. We collected blood and liver biopsies from Holstein cows at 3 wk pre-partum, during calving week, and 7 wk post-partum; this last liver sample accompanied collection of GCs from the dominant follicle by follicular aspiration. Cows were separated into two groups, where Group 1 ($N = 4$) consisted of cows that lost less than 0.75 body condition score (BCS) during the sampling trial and Group 2 ($N = 4$) consisted of cows that lost equal to or greater than 0.75 BCS. Lipid metabolism and oxidative stress were evaluated in hepatic tissue by qPCR. Transcript abundance revealed a decrease in *CYP7A1* ($P < 0.05$) and tendency for decrease of *LDLR* ($P < 0.1$) in cows from Group 2 at 3 wk pre-partum. Transcript abundance of

Table 119.

	STTD P, %							Probability, $P <$	
Item[1]	0.26	0.30	0.33	0.38	0.43	0.48	0.53	Linear	Quadratic
ADG, g	513	510	533	532	566	563	573	0.001	0.718
ADFI, g	782	764	776	780	818	824	828	0.004	0.603
G:F, g/kg	656	667	687	682	692	684	693	0.001	0.067

[1]SEM for ADG, ADFI, and G:F were 11.57, 19.44, and 7.36, respectively.