

87 Characterization of the porcine interferon regulatory factor 6 (IRF6) gene: cDNA cloning, expression analysis and chromosomal localization. C. R. Farber*, N. E. Raney, and C. W. Ernst, *Michigan State University, East Lansing, MI, USA.*

Representational difference analysis (RDA) was used to isolate genetic markers from pigs differing in loin muscle area. A BLAST search revealed that RDA fragment MSURDA79 was homologous to human, mouse and sheep interferon regulatory factor 6 (IRF6). IRF6 is a member of the interferon regulatory factor family of transcription factors, which regulate the function of multiple interferon genes in a host of molecular mechanisms. Three porcine IRF6 clones were isolated from pig brain cDNA using PCR primers designed from MSURDA79 and human IRF6 mRNA sequence, and 3 rapid amplification of cDNA ends (RACE). The coding region was 92%, 91% and 90% homologous to sheep, human and mouse IRF6, respectively. RT-PCR analysis using pig specific primers amplifying a 195 bp fragment of exons 6 and 7, revealed the presence of transcripts in pig aorta, brain, duodenum, ileum, jejunum, liver, skeletal muscle and uterus. Northern blot analysis confirmed expression of 2.5-kb and 2.0-kb transcripts in pig ileum and identified expression in kidney tissue. Human IRF6 has been localized to human chromosome (HSA) 1q32.3-q41. This region of HSA1 is conserved on pig chromosome (SSC) 9q23-qter. Physical mapping, using a pig-rodent somatic cell hybrid panel, placed IRF6 in the interval of SSC9q11-q26 (risk of error less than 0.1%). Radiation hybrid (RH) mapping using the INRA-Minnesota RH panel (IMpRH) showed significant linkage between IRF6 and two markers on SSC9, SW749 (LOD=14.72) and SW1651 (LOD=14.43). To further confirm this localization, a single-stranded conformational polymorphism (SSCP) was identified in IRF6. The PiGMAP reference families were genotyped and linkage analysis was conducted using the two-point option of CRI-MAP 2.4. IRF6 exhibited significant linkage with SW749 on SSC9 (LOD=5.42, $\theta=0.00$). To our knowledge this is the first reported isolation of a gene sequence using RDA. Further analysis of IRF6 is warranted as a potential candidate gene for production traits in pigs.

Key Words: IRF6, gene expression, gene mapping

88 Ranch of origin management factors affecting the occurrence of respiratory tract lesions in feedlot steers at harvest. N. K. Grathwohl*, W. B. Epperson, B. J. Johnson, and S. W. Fausti, *South Dakota State University.*

The impact of ranch of origin management on the occurrence of respiratory tract lesions (RTL) at harvest was investigated using data from 709 steers enrolled in South Dakota State University's Calf Value Discovery Program (1998 and 1999). Preliminary observations from 1998 data suggested ranch of origin management was associated with the occurrence of RTL in feedlot steers at harvest. Groups of at least five steers from 82 owners entered the feedlots in November 1998 and November 1999. Producers completed a survey at feedlot entry, which described health and management practices at the ranch of origin. At feedlot entry, steers were vaccinated, ear tagged and weighed. Steers were marketed on a carcass basis when acceptable weight and finish standards were attained. At harvest, lungs were examined for evidence of RTL. Steers were assigned a numerical lung score based on the severity of the lesions (0=no lesions, 17=most severe). Steers with lung scores of ≥ 7 were classified as having RTL. Logistic regression of SAS was used to model factors affecting occurrence of RTL at harvest. Odds ratios (OR) were computed as estimates of risk. Cattle vaccinated with a modified-live viral vaccine at the ranch of origin prior to feedlot entry had reduced occurrence of RTL ($P<.05$, OR=.56) compared to steers not vaccinated. Steers weaned for ≥ 30 days prior to feedlot entry had a 1.59 OR of RTL compared to steers not weaned ($P<.05$). Steers known to be treated for respiratory illness in the feedlot had a 2.21 OR ($P<.05$) of having RTL at harvest compared to steers not treated. Year and days on feed also influenced the occurrence of RTL at harvest ($P<.05$). These data suggest ranch of origin management factors impact the occurrence of RTL in feedlot steers at harvest. A more thorough understanding of these factors could reduce the incidence of RTL and improve feedlot performance and carcass quality at harvest.

Key Words: Beef Cattle, Lung Lesions, Health

89 Supply of essential amino acids to the small intestine in cattle consuming restricted amounts of forage plus supplementary undegradable intake protein. E. J. Scholljegerdes*, J. Gould, B. W. Hess, and P. A. Ludden, *University of Wyoming, Laramie, Wyoming/USA.*

Eight Angus \times Gelbvieh heifers (avg. initial BW = 594 kg \pm 44.4 kg) fitted with ruminal and duodenal cannulae were used in a 4 \times 4 Latin square double cross-over designed experiment to determine the intestinal supply of essential amino acids (EAA) in heifers consuming restricted amounts of forage plus an undegradable intake protein (UIP) supplement. Heifers were fed chopped (2.54 cm) bromegrass hay (6.7% CP, 68% NDF) at 30, 55, 80, or 105% of maintenance. Heifers fed below maintenance were given increasing amounts of UIP supplement (6.8% blood meal, 24.5% feather meal, and 68.7% fish meal; DM basis) in an effort to provide an equal quantity of EAA to that of the 105% of maintenance diet. Experimental periods were 21 d in length with 17 d of adaptation followed by 4 d of intensive sample collection. True ruminal OM and NDF digestion (g/d) declined linearly ($P < 0.01$) with decreasing intake, but did not differ ($P \geq 0.31$) among treatments when expressed as a percentage of intake (54.2 \pm 2.0% and 60.7 \pm 2.6%, respectively). True ruminal N digestibility did not differ ($P = 0.40$) as intake increased from 30 to 105% of maintenance intake. Non-microbial EAA flow (g/d) was unaffected ($P = 0.07$) by treatment and averaged 182.8 \times 19.6 g. As a result of a linear increase ($P < 0.01$) in microbial EAA flow from 123.8 to 280.0 g/d, total EAA flow to the duodenum increased linearly ($P < 0.01$) from 283.9 to 477.9 g/d as intake increased from 30 to 105% of maintenance. Microbial EAA profile did not differ ($P = 0.63$) across treatments. Flow of EAA to the small intestine increased with supplementary UIP; however, total EAA flow to the small intestine decreased because bacterial EAA flow declined with intake restriction. We conclude that dietary supplementation of UIP can be used to balance supply of EAA, as long as there is an adjustment for the decreased microbial EAA flow associated with beef cattle consuming restricted amounts of forage.

Key Words: Restricted Intake, Amino Acids, Undegradable Intake Protein

90 The optimum valine:lysine ratio in nursery diets to maximize growth performance in weanling pigs. B. W. James*, R. D. Goodband, M. D. Tokach, J. L. Nelssen, J. M. DeRouche, and J. C. Woodworth, *Kansas State University, Manhattan.*

The objective of this 21-d growth assay was to determine the optimal true digestible valine:lysine ratio in diets to maximize growth performance. A total of 210 pigs (initially 8.9 kg and approximately 28 d of age, PIC C22 \times 327) were blocked by weight and allotted randomly to seven dietary treatments. Each treatment had six replicates and 5 pigs per pen. Corn, soybean meal, and spray-dried whey were analyzed for complete amino acid profiles prior to diet formulation. Crystalline L-valine was added to the 1.12% true ileal digestible lysine (TID) basal diet (14.2% CP) to provide 0.56, 0.616, 0.672, 0.728, 0.784, and 0.84% TID valine (50 to 75% of lysine). The negative control diet (Neg) contained less L-lysine HCl to provide 1.02% TID lysine and 0.84% TID valine to ensure that lysine was not above the pigs requirement in the experimental diets. Pigs fed the negative control diet gained less ($P<0.03$) from d 0 to 21 when compared with pigs fed the diet containing 0.84% TID valine with 1.12% TID lysine. Feed efficiency improved (quadratic, $P<0.01$) from d 0 to 7 and d 7 to 14 with increasing dietary valine. Increasing valine increased (quadratic, $P<0.01$) ADG and ADFI from d 0 to 7, d 7 to 14, and d 14 to 21. Overall, ADG and ADFI were maximized at the 0.672% TID valine. Feed efficiency was optimized for pigs fed diets formulated to contain 0.728% TID valine. The broken line model predicted a requirement of approximately 0.616 to 0.672% TID valine. These results suggest that the optimum TID Val:Lys ratio to maximize growth performance of 9 to 17 kg pigs is approximately 60% of lysine and is not above the requirement estimated (68% of TID lysine) by NRC (1998).

Item	% Val:Lys						
	50	55	60	65	70	75	Neg
Days 0 to 21							
ADG, g	203	341	380	379	376	366	330
ADFI, g	459	665	738	711	708	710	665
G:F	0.44	0.51	0.51	0.53	0.53	0.52	0.50

Key Words: Valine, Lysine, Weanling Pigs