It has long been known that both BLG and κ-casein (KCN) are present in the complexes formed as a consequence of heat treatment. BLG contains five Cys residues and KCN contains 2 Cys residues, and thus there is a large number of combinations of possible disulfide bondings. Reacting reduced KCN with DTNB (dithiobisnitrobenzoic acid) gives KCN molecules containing activated Cys groups. Reacting partially reduced BLG with these derivatives gave a range of products. These were separated and the fraction that contained material with a mass of about 35 KDa was hydrolyzed with trypsin. Among the products were peptides with masses corresponding the peptides BLG148-162 SS KCN87-97 and BLG148-162 SS KCN11-16. The identity of the peptides was verified by partial sequencing of both the intact peptides and the reduced peptides using ESI-MS-MS. A heated milk sample was analyzed and these peptides were identified in a trypsin-treated sample of the mixture of proteins and there was significantly more disulfide-bonded KCN87-97 than KCN11-16 in the mixture. The existence of other possible disulfide bonding patterns involving Cys 66, 106, 119, or 121 of BLG, and Cys 11 or 88 of KCN are being explored.

Key Words: Heat-Induced Complex, Whey Protein, Casein

83 Application of novel gel electrophoresis to analyze native, heat-, and pressure-treated milk protein systems. H. A. Patel[1,2], H. Singh[3], and L. K. Creamer*[1], [1]*Fonterra Research Centre, Palmerston North, New Zealand,* [2]*Institute of Nutrition, Food and Human Health, Massey University, Palmerston North,land,* [3]*Riddet Centre, Massey University, Palmerston North, New Zealand.*

The invention of gel electrophoresis presaged great advances in all protein sciences and has been particularly useful in dairy protein science. Incorporation of urea into the gels allowed clear separation of the caseins from one and reduction of the disulfide bonds allowed the clarification of the polypeptides that comprise the native α_{s2}- or κ-casein (KCN). Addition of other solutes, such as magnesium chloride or SDS, meant that the basis of separation could be changed. The advent of two-dimensional electrophoresis in polyacrylamide gels gave even greater power because the two separations could be under very different conditions; for example alkaline urea PAGE followed by SDS PAGE. The best-known 2D method uses isoelectric focussing followed by SDS PAGE, is very powerful technique and is used extensively in proteomics research. Our group has been using electrophoresis to study some particular problems, such as: Does β-lactoglobulin (BLG) bind preferentially to α_{s2}-CN or KCN during heat treatment carried out in non-native conditions? In the whey protein scene, 2D PAGE as modified by our group allowed the identification of the pathways leading to BLG and whey protein aggregation and gelation during heat treatment. These techniques, with some added refinements, have now been applied to a range of dairy protein problems of varying complexity. For example, the examination of heat and pressure treated milks which has lead to an even greater clarification of the relative roles of α_{s2}-CN or KCN in their reaction with the aggregating whey proteins

Key Words: PAGE Analysis, Protein-Protein Interaction, Caseins and Whey Proteins

84 Effects of genetic modification, pressure, and heat on the binding of various probes to β-lactoglobulin. K. A. N. S. Ariyaratne[1], G. B. Jameson[1], T. S Loo[2], G. E. Norris[2], H. A. Patel[4,3], T. Considine[4,5], H. Singh[5], L. K. Creamer*[4], and R. Jiménez-Flores[6], [1]*Institute of Fundamental Sciences, Massey University, Palmerston North, New Zealand,* [2]*Institute of Molecular Biosciences, Massey University, Palmerston North, New Zealand,* [3]*Institute of Nutrition, Food and Human Health Massey University, Palmerston North, New Zealand,* [4]*Fonterra Research Centre, Palmerston North, New Zealand,* [5]*Riddet Centre, Palmerston North, New Zealand,* [6]*Dairy Products Technology Center, California Polytechnic State University, San Luis Obispo.*

Native β-lactoglobulin (BLG) has been shown to bind a number of hydrophobic and amphipathic molecules within the central calyx. Examples are: hexane, retinol (vitamin A), cholesterol, 12 bromo-dodecanoic acid, palmitic acid, and cis-parinaric acid (CPA) but not anilinonaphthalene sulfonate (ANS). The binding of retinol and CPA can be followed by induced circular dichoism or increased fluorescence. This has allowed the determination of the displacement of CPA or retinol by dodecyl sulfate (SDS) or palmitate, but not by ANS. Heat treatment denatures the BLG, and the binding of CPA and retinol decreases in proportion with the extent of denaturation while ANS fluorescence increases. Pressure treatment has a similar effect. Addition of these ligands of BLG increases the stability of the protein under increased temperature and pressure. ANS does not have this effect. Polynucleotides were synthesized and expressed to give fusion proteins, corresponding to both the A and B variants of BLG. These were subsequently cleaved to obtain synthetic BLG A and BLG B. Modification of the polynucleotide allowed the preparation of a number of different BLG mutants. Some of these were modifications close to the binding site of retinol and the fatty acids. In particular the change of lysine to glutamic acid at residues 60 and 69 showed dramatic differences in behavior. These two residues are close spatially but the change at residue 60 prevents binding of retinol or CPA while that at residue 69 does not.

Key Words: Lactoglobulin Binding, Mutant Protein, Pressure Treatment

Nonruminant Nutrition: Finishing Pigs - Additives & Energy

85 Effect of L-lysine-HCl addition in late finishing gilts fed ractopamine HCl (Paylean®). B. W. Ratliff*[1], A. M. Gaines[1], P. Srichana[1], G. L. Allee[1], and J. L. Usry[2], [1]*University of Missouri, Columbia,* [2]*Ajinomoto Heartland LLC, Chicago, IL.*

The objective of this 21 d experiment was to evaluate the effect of L-lysine-HCl addition on growth performance of pigs fed ractopamine HCl (Paylean®). A total of 966 gilts (TR-4 × C22; 98.2 ± 0.2 kg) were randomly allotted to one of six dietary treatments with seven replicate pens/treatment and 23 pigs/pen. Dietary treatments included five levels of L-lysine-HCl that corresponded to concentrations of 0.10, 0.20, 0.30, 0.40, and 0.50% lysine, respectively. With the exception of L-threonine and Alimet® feed supplement (88% L-methionine activity), additional synthetic amino acids were not supplied to meet the minimum amino acid profile. To evaluate the effect of maintaining a minimum amino acid profile, additional synthetic amino acids (L-tryptophan, L-isoleucine, and L-valine) were supplemented to a diet containing 0.50% L-lysine-HCl. All diets were corn-soybean meal-based with 2% choice white grease formulated at a 0.93% TID lysine and contained 7 ppm Paylean®. Increasing the L-lysine-HCl inclusion resulted in a decrease (quadratic, $P < 0.04$) in ADG (1,016, 1,016, 1,016, 1,043, and 966 g/day, respectively) and lowered (quadratic, $P < 0.02$) G:F (0.352, 0.357, 0.353, 0.352, and 0.338, respectively). There were no differences ($P = 0.40$) in ADFI. Use of two slope-broken line analysis indicated a maximum L-lysine-HCl inclusion of 0.41% for ADG and 0.39% for G:F. The addition of synthetic amino acids to the diet containing 0.50% L-lysine-HCl did not restore growth performance. Collectively, these data demonstrate that up to 0.40% L-lysine-HCl can be added in Paylean® diets without compromising growth performance, provided the diets are supplemented with L-threonine and a methionine source. Furthermore, maintaining a minimum amino acid profile in Paylean® diets containing 0.50% L-lysine-HCl does not restore growth performance indicating that another nutrient may be limiting.

Key Words: Ractopamine, Lysine, Pigs

86 Threonine to lysine ratio in ractopamine treated pigs. D. M. Fernandez*[1], N. Rosas[2], A. I. Soria[1], and J. A. Cuaron[3], [1]*Universidad Nacional Autonoma de Mexico,* [2]*Patronato de Apoyo a la Investigación y Experimentacion Pecuaria en Mexico A.C. Queretaro, MX,* [3]*Instituto Nacional de Investigaciones Forestales Agricolas y Pecuarias Queretaro, MX.*

Previously we titrated the digestible lysine requirement of finishing pigs in the presence or absence of 5 ppm ractopamine (RAC). The objective of this study was to determine the threonine to lysine ratio (T:L, %) required to maximize growth performance of finishing pigs fed diets containing either 5 or 10 ppm RAC. One hundred individually penned crosbred pigs (Landrace×Duroc) were used in a 28-d trial. Initial body weight averaged 77.2±4.04. Dietary treatments included 1) a control diet (CON) formulated to .67% digestible lysine (DL) and 3.20 Mcal

ME/kg (T:L=70), 2) As 1 + 5ppm RAC (T:L=70), 3) CON supplemented with L-lysine·HCl to .82% DL and L-threonine to .47% digestible threonine (DT), and 5 ppm RAC (T:L=57), 4) As 3 + .041% DT (T:L=62); 5) As 3 + .082% DT (T:L=67), 6) As 3 plus .123% DT (T:L=72), 7) CON supplemented with L-lysine·HCL to .92% DL and and L-threonine to .53% DT, and 10 ppm RAC (T:L=57), 8) As 7 + .046% DT (T:L=62), 9) As 7 + .092% DT (T:L=67), and 10) As 7 + .138% DT (T:L=72). The experiment was conducted as a randomized complete block design with 10 replicates per treatment. Pigs were fed ad libitum twice a day and voluntary feed intake (FI) was measured. Pigs were weighed at d0, d7, d14, d21 and d28. Backfat depth, muscle depth, and loin eye area were measured between the 10^{th} and last rib 6.5 cm off the midline using real-time ultrasound at d0, d14, and d28 to calculate fat-free-lean gain (FFLG). Diets with RAC decreased FI (P<.11), but most of the effect was due to the 10 ppm dose (2.69, 10 ppm vs. 2.88 kg/d at 5 ppm). The T:L ratio at 5ppm RAC showed a quadratic effect (P<.01) in ADG: .79, .95, .90 and .77 kg/d for the 57 to 72% T:L ratio. From these data the best T:L ratio was calculated at 64% (range of 62 to 67%). The RAC effect was evident (P<.01) in FFLG and primal cuts. The RAC response in FFLG and primal cuts to the T:L ratio was only detected at 5 ppm. At 10 ppm, FFLG and primal cuts were higher in CON compared to RAC at all T:L levels.

Key Words: Pigs, Threonine, Ractopamine

87 Effects of increasing total sulfur amino acid:Lys on performance and carcass characteristics of gilts fed a ractopamine step-up program. A. Yager*, L. Wilson, K. Saddoris, L. Peddireddi, R. Hinson, M. Walsh, D. Sholly, B. Richert, A. Schinckel, and J. Radcliffe, *Purdue University, West Lafayette, IN.*

One hundred eighty crossbred (Dekalb 45 x EB) gilts (initial BW = 80 kg) were used in a 5-wk study to determine the effects of increasing total sulfur amino acid to Lys ratio (TSAA:Lys) in ractopamine fed pigs. Gilts were blocked by BW and randomly assigned to diets within block (6 pens/diet). Diets met or exceeded all nutrient requirements (NRC, 1998) except true ileal digestible (TID) TSAA. Dietary treatments were fed across two phases (P1, d 1-18; P2, d 18-35). Diets 1-4 contained 1.03/0.93% (P1/P2) TID Lys, 5/10 ppm ractopamine, and TID TSAA:Lys of 0.52, 0.57, 0.62, and 0.67, respectively. Diet 5 (control), contained TSAA:Lys of 0.67 similar to diet 4, but with lower inclusion of Lys-HCl (0.10 vs. 0.30%) and L-Thr (0.08 vs. 0.17%). Individual BW and pen feed intake were recorded on d 0, 9, 18, 27, and 35. Last and 10th rib backfat (BF) and loin eye area (LEA) were determined ultrasonically (4 pigs/pen) at d 0, 18, and 35. Gilts were harvested at the end of the experiment (BW = 117 kg), and carcass ultrasound fat depth, loin depth, and % lean estimates were recorded. The TSAA:Lys had no effects (P > 0.10) on overall ADG or G:F. Pigs fed higher levels of synthetic AA (diet 4 vs. 5) consumed less feed (P < 0.05) during P2 and overall. During P2, G:F tended to improve as TSAA:Lys increased, except for pigs fed a TSAA:Lys of 0.62, which decreased G:F (quadratic, P < 0.10). Tenth rib LEA increased to a TSAA:Lys of 0.62 (quadratic, P < 0.05) during P1, but the 0.62 ratio had the smallest increase during P2. Overall change in 10th rib LEA increased (linear, P < 0.10) 15.7, 16.3, 17, and 18 cm^2 as TSAA:Lys increased. TSAA:Lys had no effect (P < 0.10) on live ultrasound 10th rib BF thickness, carcass ultrasound fat depth, loin depth, or estimated carcass lean. Carcass ultrasound fat depth decreased (P < 0.05) and loin depth increased (P < 0.05) for pigs fed diet 4 compared to diet 5. Increasing the TSAA:Lys had minimal effects on growth and carcass traits. However, using increased TID TSAA:Lys and synthetic amino acids may improve ADFI and carcass ultrasound fat and loin depth estimates.

Key Words: Pig, Amino Acid Ratio, Growth

88 Efficacy of SUPROL® as a growth promotant for grow-finish pigs. R. C. Thaler*[1], B. D. Rops[1], B. T. Christopherson[2], and E. Cerchiari[3], [1]*South Dakota State University, Brookings,* [2]*SODA Feed Ingredients LLC, Brookings, SD,* [3]*SODA Feed ingredients Ltd., IRL.*

One hundred high lean-gain barrows weighing approximately 20 kg were utilized in a grow-finish trial to determine the efficacy of SUPROL® as a growth promotant. SUPROL ® is a microencapsulated mixture of organic acids and essential oils that is used as a natural growth promotant. Five dietary treatments were used (Control (Con); Con + SUPROL®; Con + SUPROL® + BMD; Con + Tylan; Con + Mecadox) in a 4-phase feeding program. There were 5 pigs/pen and 4 replicates/treatment. The trial was terminated at a final weight of 114 kg BW. From 20-36 kg (Grower 1), there were no differences (P>.05) in ADG, ADFI, or G/F. Midway through the Grower 1 phase, a mild PRRS outbreak occurred. However, it appeared all treatment groups were affected by it. For the Grower 2 phase (36-59 kg), pigs on the Mecadox or SUPROL® + BMD treatments consumed more feed (P<.05) than pigs fed the other dietary treatments, and pigs fed the SUPROL® or Con diets were more efficient (P<.05) than pigs fed the other 3 treatments. For the Finisher 1 (59-86 kg), and Finisher 2 (86-114 kg) periods, there were no differences in performance (P>.10). In the overall period from 20-114 kg BW, daily gain and feed intake were unaffected (P>.10) by treatment but feed efficiency was affected by treatment with the pigs fed the SUPROL® diets being the most efficient (P<.05). Based on these results, SUPROL® is an effective, natural feed additive that improves grow-finish pig performance.

Key Words: SUPROL®, Organic Acids, Essential Oils

89 Effect of wheat sample, particle size and xylanase on energy digestibility of wheat fed to grower pigs. R. T. Zijlstra*[1], T. N. Nortey[1], D. Overend[3], R. Hawkes[1], M. D. Drew[2], J. Fledderus[4], J. F. Patience[1], and P. H. Simmins[5], [1]*Prairie Swine Centre Inc., Saskatoon, SK, Canada,* [2]*University of Saskatchewan, Saskatoon, SK, Canada,* [3]*Ridley Inc., Mankato, MN,* [4]*De Schothorst, Lelystad, The Netherlands,* [5]*Danisco Animal Nutrition, Marlborough, UK.*

The DE content of wheat is variable, being caused by constraints in energy digestibility. These constraints may be reduced by feed processing, e.g., grinding and xylanase supplementation. The responses from three wheat samples (W1, high; W2, medium and W3, low DE; predicted using NDF, 20.1, 29.3, and 35.7% DM, respectively), at three particle sizes (fine, FPS; medium, MPS and coarse, CPS), to control or *Trichoderma* xylanase (2625 U/kg diet) on energy digestibility were studied in a 3 x 3 x 2 factorial arrangement. Pigs (54; 29.4 ± 2.4 kg) were fed two diets (96% wheat, 0.4% chromic oxide) each at 3-x maintenance in subsequent periods for 6 pigs per diet. Feed and feces were analyzed to determine apparent total-tract energy digestibility. Energy digestibility was affected by wheat sample, particle size, xylanase, sample x particle size, and sample x xylanase (P<0.01). Energy digestibilities were different for W1, W2 and W3 (P<0.001; 85.1, 77.4 and 76.7%, respectively) and confirmed the predicted DE ranking. Based on *in-vitro* analyses, starch in all three wheat samples was rapidly degradable (P > 0.10), indicating that NDF was not related to starch digestion. Overall, energy digestibility for FPS was 2.3 and 3.0% higher than for MPS and CPS (P<0.001; 81.1, 79.3 and 78.7%, respectively), and was 0.9% higher for xylanase than control (P<0.01). Xylanase improved energy digestibility 2.0% for W2 and 1.4% for W3 (P<0.01), but not for W1 (P>0.10), and FPS improved energy digestibility 4.8% for W2 and 3.8% for W3 compared to CPS (P<0.01), but not for W1 (P>0.10), together indicating that beneficial effects of processing depended on wheat sample. Prediction of wheat quality prior to processing and subsequent adjustments in processing may be components in a decision model to achieve consistent dietary DE content.

Key Words: Wheat, Particle size, Xylanase

90 Hydration properties of different cereal grains before and after enzymatic digestion as affected by thermal treatment and grinding. M. Anguita, E. Creus*, and J. F. Perez, *Universitat Autonoma de Barcelona, Bellaterra, Spain.*

Physicochemical properties of feed structures are nutritionally relevant during their passage in the digestive tract. Amongst these properties, the hydration capacity has been extensively studied in relation with the gastrointestinal function and microbial composition. We measured water retention capacity (WRC; Table) of three cereals (wheat, barley and oats) as the amount of water retained after centrifugation (3,500 x g) by the insoluble substrate (g water/g incubated DM). The cereals were processed by hydrothermal cooking (100C; 60 min) or extrusion (75 rpm; 70 atm; 145C), and ground in a hammer mill (0.8 and 3.0 mm). The WRC was measured using an *in vitro* model, which simulates the gastric (pepsin; pH = 2.0; 4 h; Gastric WRC) and small intestine (SI) digestion [Pancreatine (pancreas extract); pH = 7.0; 4 h; SI WRC]. Average values of WRC were similar for Gastric and SI digestion of raw and cooked ingredients, suggesting that WRC may be mainly determined by the

content of insoluble and undigested substrate (IUS). The relationship between SI WRC and IUS was: WRC = 0.0279 IUS + 0.7047 (R^2 = 0.654). On the other hand, extrusion of cereals promoted a significant increase in Gastric WRC, probably due to the gelatinization and dispersion of starch. Extrusion and grinding promoted decreases in SI WRC, which was associated with a decrease on the amount of IUS rather than a variation on the feed particle size. Further studies are required *in vivo* to evaluate the influence of processing on the physicochemical properties of digesta and the gastrointestinal microbial population.

	Wheat		Barley		Oats	
	Gastric	SI	Gastric	SI	Gastric	SI
Raw						
0.8 mm	1.4	1.7	1.9	1.9	2.4	2.5
3.0 mm	1.6	1.8	2.4	2.4	3.2	3.1
Hydrothermal						
0.8 mm	1.4	1.2	1.9	1.7	1.8	2.2
3.0 mm	1.7	1.6	2.6	2.6	2.8	2.6
Extrusion						
0.8 mm	3.5	0.9	3.6	1.1	2.6	1.9
3.0 mm	3.8	1.0	3.6	1.2	2.8	2.1
SEM	0.10	0.05	0.04	0.10	0.16	0.12
Thermal	***	***	***	***	*	***
Grinding	**	0.08	***	***	***	***
Thermal*grinding	NS	NS	***	***	0.07	NS

Values are least square means; NS, P > 0.05; * P < 0.05
** P < 0.01; *** P < 0.001.

Key Words: Processing, Cereal, Water Retention

91 Response of growing and finishing pigs to dietary energy concentration. J. F. Patience*[1], A. D. Beaulieu[1], R. T. Zijlstra[1], and N. H. Williams[2], [1]*Prairie Swine Centre Inc., Saskatoon, SK, Canada,* [2]*PIC USA, Inc., Franklin, KY.*

Achieving the full genetic potential for swine growth requires an understanding of the response to dietary energy in all phases of growth. This experiment was designed to develop an energy response curve for growing and finishing pigs. Barley and soymeal based diets were formulated with increasing wheat and canola oil to contain 3.05, 3.19, 3.33, 3.47, or 3.61 Mcal DE/kg. Separate diets were formulated with appropriate dLys:DE ratios for barrows and gilts within 3 phases of growth (25 to 50, 51 to 80 and 81 to 115 kg BW). Offspring of C22 females and L337 boars (n=300) were blocked according to gender, weight per day of age and BW and randomly assigned to treatment. Light (28.8 kg mean BW) and heavy (33.6 kg mean BW) blocks allowed the determination of differential animal response to energy according to initial weight. Pigs were weighed on d0, d14 and at the end of each phase. ADG averaged 0.97, 1.07 and 1.07 kg/d in phases 1, 2 and 3, respectively, and was unaffected by diet DE concentration (P>0.05). Lighter pigs grew 50 g/d slower than heavier pigs (P<0.001). Block by DE interactions did not exist (P>0.05). Overall feed intake decreased from 2.76 to 2.49 kg/d (linear, P<0.001) and feed efficiency improved from 0.36 to 0.42 (linear, P<0.001) as DE increased from 3.05 to 3.61 Mcal DE/kg. DE concentration did not affect lean thickness (average 61.3 mm; P>0.05), however, backfat increased from 16.8 to 19.4 mm when DE increased from 3.05 to 3.61 Mcal/kg (linear, P<0.05). In conclusion, a positive response to dietary energy concentration is confirmed for feed conversion, but not ADG. Further research is required to understand why pigs do not always respond to increased dietary energy concentration with improved growth.

Key Words: Swine, Energy, DE

92 Withdrawn by author. , .

93 Withdrawn by author. , .

94 Palm oil and hydrogenated fat as alternative oil sources for fattening pig diets. P. Medel*[1], J. I. Fernández[2], J. Peinado[1], J. C. González[1], and C. López-Bote[4], [1]*Imasde Agropecuaria, S.L. Spain,* [2]*Norel, S.A. Spain,* [3]*Universidad Complutense de Madrid, Spain.*

A total of 96 Large White × Landrace∗Large White pigs of 29.0 ± 3.2 kg of initial BW, 50 % males and females, were used to study the influence of type of fat source on productive performance and carcass quality. Feeding program consisted of three phases offered *ad libitum* (1.08 % lys from 29 to 63 kg BW, 1.03 % lys from 63 to 78 kg BW, and 0.89 % lys from 78 to slaughter at 96 kg BW). There were 4 treatments based on fat source (5 % of inclusion): T1 and T2, containing respectively lard or palm oil throughout the whole period, T3, containing soy oil from 29 to 63 kg and hydrogenated palm stearin thereafter, and T4, containing soy oil from 29 to 78 kg and hydrogenated palm stearin thereafter. Each treatment was replicated four times (12 pigs housed together), and biopsies from 2 pigs per pen were taken at every change of diet. For the whole period, feeding lard improved growth and feed conversion relative to T3, showing all the other dietary treatments intermediate results (754, 717, 670, 704 g/d and 2.56, 2.71, 2.76 and 2.70 g feed/g gain for T1 to T4, respectively, P<0.05). Fatty acid profile (FAP) was similar for T1 and T2 and presented low variation throughout the trial, with T2 showing slightly higher values for palmitic and stearic acids at the end of the trial. From 63 kg or 78 to slaughter, palmitic, oleic and stearic acids were increased in T3 and T4, respectively, reaching the T1 and T2 range for palmitic acid, but showing higher stearic and lower content of oleic and linoleic acids than control diets. Type of fat did not affect dressing percentage, backfat depth, or carcass pH and temperature. It is concluded that: i) palm oil can be used efficiently as an alternative to lard, and ii) hydrogenated fats may be used to increase fatty acids positively related to fat consistency when unsaturated fat sources has been previously fed, but administration should begin at least at 60 kg and productive performance could be affected.

Key Words: Hydrogenated Fats, Fatty Acids, Fattening Pigs

Physiology and Endocrinology: Factors Affecting Embryonic and Fetal Mortality

95 Effect of elevated systemic concentrations of ammonia and urea on amino acid concentrations in oviduct fluid in cattle. D. A. Kenny*[1], P. G. Humpherson[3], D. G. Morris[2], H. J. Leese[3], M. G. Diskin[2], and J. M. Sreenan[2], [1]*Department of Animal Science and Production, Faculty of Agriculture and Food Science, University College, Dublin, Ireland,* [2]*Teagasc Research Centre, Athenry, Co. Galway, Ireland,* [3]*Department of Biology, University of York, York, UK.*

It has been suggested that elevated systemic concentrations of urea and ammonia may compromise early bovine embryo development in the oviduct. The objective of this study was to determine the effect of elevated systemic ammonia and urea on amino acid (AA) concentrations in cattle oviduct fluid. Heifers (n=25) were allocated to one of three intravenous infusion treatments; saline (C), urea (U) or ammonium chloride (AC) at either 2 or 8 d after oestrus. Treatment solutions were infused over a 7 h period and oviduct fluid was collected during mid ventral laparotomy over the final 3 h of infusion. Oviduct and blood plasma samples were analysed for concentrations of ammonia, urea and 17 AA. There was no treatment x day interaction for any of the plasma or oviduct fluid AA measured (P > 0.05). The concentration of all AA was similar between oviducts ipsi- or contralateral to the corpus luteum. Plasma and oviductal urea were elevated by infusion with U (P < 0.001) and AC (P < 0.05). Plasma and oviductal ammonia were elevated by AC (P < 0.001) but not by U (P > 0.05). There was no effect of day on plasma concentrations of any AA (P > 0.05). Plasma and oviductal glutamine, histidine and valine were similar (P > 0.05) while the concentration of all other AA was lower in plasma than oviduct fluid (P < 0.01). Plasma glutamine was higher in animals on AC than on C (0.29 ± 0.03 v 0.19 ± 0.03; P < 0.05) while plasma isoleucine was lower in animals on AC than on C (0.04 ± 0.008 v 0.06 ± 0.008; P < 0.05). There was no effect of infusion treatment on the plasma concentration of any of the other AA measured (P > 0.05). Across treatments, oviductal isoleucine was higher on day 2 than 8 (0.06 ± 0.004 v 0.05 ± 0.004; P <