



FOOD SECURITY

Challenges and Opportunities for Animal Science

**The UK's Premier
Animal Science Conference**

**Organised by the
British Society of Animal Science,
BBSRC Animal Science Forum,
World Poultry Science Association (UK Branch),
and the Association for Veterinary Teaching and Research Work**

PROGRAMME

**University of Nottingham, UK
4-5 April 2011**

**Additional papers are at the back of the programme that do not
appear in the proceedings**

ANNUAL CONFERENCE - 4 - 5 April 2011
Jubilee Campus, Nottingham
FOOD SECURITY - Challenges and Opportunities for Animal Science

Room	LT3 (300)	LT2 (200)	LT1 (100)	B40 (40)	A32 (75)	B43 (40)	C3, C33 or Foyer	
Sunday	3 April 2010							
Student Programme 13:30 - 18:00					Student Programme		Posters up throughout the meeting	
Monday	4 April 2010							
Student Programme 09:00 - 10:00					Student Programme		C3, C33, Foyer	
SESSION 1 10:30 - 12:30	Interplay between Immunity, Endocrinology and Nutrition	Global Food Security	Developments in National Genetic Evaluations	Equine Exotic Diseases: potential risk and prevention measures in the UK in a climate changing world	Wellcome Research Papers	Veterinary Education	Room C3	
12:00 - 13:30	Lunch							
SESSION 2 13:30 - 15:30	Availability of Feed Resources	Dairy Cattle	Orig Comms and short orals 13:00-15:00	Equine Performance, Nutrition and Health	Diagnostics Epidemiology	Pig Health and Disease	Highlights Red 12:55 - 13:30	
15:00 - 16:00	Tea/Coffee							
SESSION 3 16:00-17:00	Hammond Lecture Prof Sir John Beddington Food Security in the 21st Century							
17:00 - 17:15	short break							
17:15 - 18:15	Gordon Memorial Lecture Prof Marion Dawkins Commercial Scale Assessment of Poultry Welfare							
18:15 - 19:30	AGM BSAS							Sheep
18:30 - 19:30	Ask the Presidents							Nutrition
20:00	Conference Dinner							
Tuesday	5 April 2010							
08:30 - 09:00				AGM WPSA			AGM AVTRW	
SESSION 4 08.45 - 10:40	Presidents Session			Orig Comms 09:00 Industry 09:30	Ruminant Health and Disease			
10:30 - 11:00	Tea/Coffee							
SESSION 5 11:00 - 12:30	The Gut Microbiome - ASF/WPSA/BSAS *	Sheep	* see	Behaviour and Welfare	Ruminant Health and Disease	Meat Quality	Room C3	
12:30 - 13:30	Lunch							
SESSION 6 13:30 - 15:00	Application of Molecular Genetic Tools to Animal Science	Methane	Original communications	Pigs I	Companion Animal Health and Disease			
15:00 - 15:30	Tea/Coffee							
SESSION 7 15:30 - 17:00	Understanding Health Disease Traits	Beef Cattle Nutrition	WPSA Original Communications Presidents Prize 16:45	Pigs II	Pathogens - Host Interactions			
SESSION 8 17:00 - 17:30	An Overview of the Developments in Animal Studies over the last 20 years Prof Quinton McKellar							
	ASF/BSAS invited sessions		WPSA sessions	BSAS invited sessions	AVTRW Sessions			
	ASF/BSAS Submitted sessions							

STUDENT SUNDAY/MONDAY PROGRAMME 2011
BSAS/AVTRW/ASF CONFERENCE
3/4 APRIL 2011

Sunday

Room A32, Dearing Building

- 13:30-13:55 Registration/coffee
- 13:55-14:00 Welcome
- 14:00-14:30 Submitting papers & understanding resources for literary reviews Dr Lucy Waldron
(Journal Editor WPSA)
- 14:30-15:30 Overcoming the challenges of writing your thesis Profs. Nigel Scollan and Jamie Newbold (IBERS)
- 15:30-15:45 Break
- 15:45-16:45 Statistics (ANOVA and Regression techniques) Prof Phil Garnsworthy, (University of Nottingham).
- 16:45-17:00 Break
- 17:00-18:00 Careers Panel discussion – a forum to ask questions about your career Afternoon speakers plus Mike
Wilkinson (DEFRA), Dr.Nia Ball (Scottish Government) Dr Grant Walling (Industry)
- 19:00 Dinner, informal evening, practice talks, socialize and network (Atrium and Newark Hall Bar)

Monday

Room A32, Dearing Building

- 09:00-09:15 Showcase Murray Black Award (Alice Barrier PhD Student, SAC)
- 09:15-10:00 BSAS Scholarships for students – writing quality applications
(Dr. Eileen Wall, BSAS scholarships committee)
- 16:00-18:00 hours (BSAS Conference Desk open for registration)

THEATRE SESSIONS ROOM LT3

MONDAY 4 APRIL 2011

09:00 Registration Opens
10:00 Tea/Coffee (Exchange Foyer)

INTERPLAY BETWEEN IMMUNITY, ENDOCRINOLOGY AND NUTRITION

Chair: Dr Pete Kaiser

10:30 - 12:30

10:30 227 New strategies on targeting host response to inflammation by novel dietary means for the purpose of reducing growth promoting antibiotics
M Cook, J Sand, University of Wisconsin-Madison, USA

11:00 228 Endocrines and host-pathogen interactions
T J Humphrey, National Centre for Zoonosis Research, University of Liverpool

11:30 241 Immune-endocrine interactions in the chicken.
P Kaiser, Roslin Institute and R(D)SVS, University of Edinburgh, UK,
S. Shini, Schools of Veterinary Science & Animal Studies, University of Queensland, Australia

12:00 Lunch - Atrium
12:55-13:30 Highlights Red - Room C3

AVAILABILITY OF FEED RESOURCES

Chair Dr Peter Williams

13:30-15:00

13:30 Raw Materials: an assessment of what is available and an outlook of what is coming
P Rowlinson, University of Newcastle, B Cottrill, ADAS

14:00 242 A feed compounders view
T Bell, BOCM PAULS Ltd

14:30 229 EU Feed legislation : What can we change?
T L Franck, Food Standards Agency, UK

15:00 Tea/Coffee Room C33 and Foyer

HAMMOND LECTURE

Chair Prof Nigel Scollan

16:00-17:00 Food Security in the 21st Century
Prof Sir John Beddington, The Government Chief Scientific Adviser, UK

GORDON MEMORIAL LECTURE

17:15-18:15 Commercial scale assessment of poultry welfare
Prof Marian Dawkins, University of Oxford

18:15-19:30 BSAS AGM (Room LT2)

19:30 Reception (Atrium -BSAS/ASF/AVTTRW)
20:00 BSAS/ASF/AVTRW Conference Dinner (Atrium)

THEATRE SESSIONS ROOM LT2

MONDAY 4 APRIL 2011

GLOBAL FOOD SECURITY

10:30-12:15 Chair: Prof Bob Webb

- 10:30 243 GM crops and global food security
J Roberts, Professor of Plant Biology and Head of Biosciences, University of Nottingham
- 10:45 244 Breeding crops for maximum nutritional value to animals
I King, Professor of Cereal Genomics, University of Nottingham
- 11:00 245 Production efficiency and environmental impact of dairy systems
P C Garnsworthy, Professor of Dairy Science, University of Nottingham
- 11:15 New and emerging diseases – risks and opportunities
P Barrow, Professor of Veterinary Infectious Diseases, University of Nottingham
- 11:30 Pharmaceutical challenges in tackling global food security
A Foster, Pfizer Animal Health
- 11:45 246 Towards understanding the molecular basis of meat quality and innate disease resistance in skeletal muscle
Kin-chow Chang, Professor of Veterinary Molecular Medicine, University of Nottingham
- 12:00 230 Continuous housing of dairy cows: challenges and opportunities
J M Wilkinson, P C Garnsworthy, J N Huxley
- 12:15 Lunch (Atrium) 12:55-13:30 Highlights Red - Room C3

DAIRY CATTLE

13:30- 15:25 Chair: Dr Karen Wonnacott

- 13:30 1 Fatty acid composition of milk produced under systems of different intensity and milking practices in the North East of England
S Stergiadis, C Leifert, C J Seal, M D Eyre, G Butler
- 13:45 2 Concentration of β -casein variants in UK retail milk
PC Aikman, R H Brown, T M Gibson, K E Kliem, D I Givens
- 14:00 3 Persistency of the effect of dietary milled rapeseeds on the milk fatty acid composition of lactating cows fed maize silage-based diets
K E Kliem, K J Shingfield, A K Jones, D I Givens
- 14:15 4 Effect of rumen boluses containing iodine, selenium and cobalt administered to dry Holstein dairy cows on the circulating concentration of immunoglobulin G in the calves
M T Rose, T D Cratchley, S Pearson
- 14:30 5 Effect of concentrate build-up strategy in early lactation on production performance, health and fertility of high-yielding dairy cows
R A Law, S McGettrick, C Ferris
- 14:45 6 Effect of exogenous long chain fatty acids on cytosolic triacylglycerol content of bovine mammary epithelial cells
E Vargas-Bello-Pérez, A M Salter, J J Loor, P C Garnsworthy
- 15:00 7 Calving ease and the subsequent fertility and calving performance of the dairy cow: retrospective analysis from a UK farm
A C Barrier, M J Haskell
- 15:15 8 Predisposing factors for culling in first lactation Holstein-Friesian heifers
D Chiumia, M G G Chagunda, D J Roberts, A I MacRae
- 15:20 9 The response of grazing dairy cows to a 'flat rate' or a 'feed-to-yield' concentrate allocation strategy
A J Dale, C P Ferris, S McGettrick

THEATRE SESSIONS ROOM LT1
MONDAY 4 APRIL 2011

DEVELOPMENTS IN NATIONAL GENETIC EVALUATIONS

10:30-12:05 Chair: Dr Andrew Cromie

- 10:30 10 The benefits of Computed Tomography (CT) scanning in UK sheep flocks for improving carcase composition
K Moore, K Mclean, L Bunger
- 10:45 11 Use of farmer recorded mastitis data to improve the genetic evaluation of udder health in UK dairy cattle
T Pritchard, M Coffey, R Mrode, K Moore, E Wall
- 11:00 12 Use of national cattle movements data to enhance the genetic evaluation of lifespan in UK dairy cattle
C Duthie, T Pritchard, R Mrode, M Coffey, E Wall
- 11:15 13 Genetic relationship of lameness with milk yield, body condition score and reproductive traits in primiparous Holstein cows
A Kougioumtzis, G Oikonomou, G Arsenos, G Banos
- 11:30 14 Genetic correlations between calving ease and fertility traits in UK Holstein Friesian heifers
S A E Eaglen, J A Woolliams, M P Coffey, E Wall
- 11:45 15 A model for deriving economic weights for calving ease in UK dairy cattle
E Wall, M Coffey, A Sadeghi-Sefidmazgi, P Amer
- 11:55 16 Threshold analysis of type traits in dairy cattle
S Chandran, S Brotherstone, I M S White
- 12:00 17 Genetic and non-genetic factors influencing *Fasciola hepatica* antibodies in milk in UK Holstein Friesian cattle
C Hayhurst, AB Forbes, DJL Williams, MD Royal
- 12:05 Lunch - Atrium
- 12:55-13:30 Highlights Red - Room C3

THEATRE SESSIONS ROOM B40 DEARING BUILDING
MONDAY 4 APRIL 2011

EQUINE EXOTIC DISEASES: POTENTIAL RISK AND PREVENTION MEASURES IN THE UK
IN A CLIMATE CHANGING WORLD

10:30 - 12:00 Chair: Dr Debbie Nash

- 10:30 231 The risk of exotic disease and the threat to the equine industry
P Jepson, The Horse Trust, UK
- 11:00 232 West Nile Virus
D Hannant, School of Veterinary Medicine and Science, University of Nottingham
- 11:30 233 African Horse Sickness
J Castillo-Olivares, Institute for Animal Health, UK
- 12:00-13:30 Lunch (Atrium)
12:55-13:30 Highlights Red - Room C3

EQUINE PERFORMANCE, NUTRITION AND HEALTH

13:30-15:05 Chair: Catherine Hale

- 13:30 234 Welfare issues for horses competing in international equestrian competitions
C Roberts, University of Cambridge, UK
- 14:00 18 Review of current knowledge of equine demography and movements within Great Britain
J Yates, T D H Parkin, M Casey, D J Mellor, R R Kao, L A Boden
- 14:15 19 Determination of the sorption and desorption isotherms of donkey hoof horn
L Hopegood, S N Collins, J D Reilly
- 14:30 20 The validation of infrared thermography as a non-invasive tool to assess welfare in the horse (*Equus caballus*)
K Burton, C Hall, C Wells, E Billett
- 14:45 21 Comparison of the zonal moisture content of the *Stratum medium* of donkey hoof horn to the zonal moisture content of the *Stratum medium* of horse hoof horn
L Hopegood, S N Collins, J D Reilly
- 14:50 22 Identification of the influence of moisture content on the mechanical properties across the *Stratum medium* of donkey hoof horn
L Hopegood, S N Collins, J D Reilly
- 14:55 23 A comparison between industry standard method of semen analysis and the use of SpermVision™ for the evaluation of the measureable parameters of chilled stallion spermatozoa
T Coop, A Mills
- 15:00 24 A comparative antibody study of the potential susceptibility of Thoroughbred and Non-Thoroughbred horse populations in Ireland to equine influenza virus
S Gildea, S Arkins, A Cullinane
- 15:05 Tea/coffee C33 and Exchange Foyer

AVTRW PROGRAMME - THEATRE SESSIONS ROOM A32 DEARING BUILDING

MONDAY 4 APRIL 2011

WELCOME RESEARCH PAPERS

10:30 - 12:15

- 10:30 247 One Health: the role of wildlife in the emergence of viral diseases
T Kuiken, Professor of Comparative Pathology, Erasmus MC, The Netherlands
- 11:00 25 Mechanical loading and the bisphosphonate risedronate have an additive effect on cancellous bone mass in mice
L Meakin, T Sugiyama, G Galea, L Lan;yon, F Ebetino, G Russell, J Price
- 11:15 26 Modulation of endothelial cell signalling and function by parstatin, a putative anti-angiogenic peptide
C E Farrar, E Garonna, N Kirkby, T Warner, C P D Wheeler-Jones
- 11:30 27 Muscle fibre profile number and size distribution changes with age in mdx mice
R L Terry, D J Wells
- 11:45 28 Mechanical strain regulates the expression of the Sclerostin gene product Sost by a mechanism that involves prostaglandins and MAP kinase signalling
G Galea, A Sunters, L Lanyon, J Price
- 12:00 29 Proteomic analysis of the early osteoarthritic equine cartilage secretome
M Peffers, R Beynon, P Clegg
- 12:15 Lunch

DIAGNOSTICS

- 13:30 30 Validation of a real-time PCR to detect *Coxiella burnetii* in placenta and abortion samples from ruminants, and application of the PCR as a tool to monitor an infected UK goat herd
R M Jones, D F Twomey, S Hannon, J Errington, G C Pritchard, J Sawyer
- 13:45 31 Acute phase protein measurements in metabolic profiles in UK dairy herds
A Macrae, E Burrough, J Forrest, T Parkin, E McCulloch, P D Eckersall
- 14:00 32 A metabolomic investigation of milk in bovine mastitis
R Mansor, K Burgess, D Barrett, P Whitfield, D Eckersall
- 14:15 33 Newly emerging veterinary diagnostic technologies: exploring attitudes, behaviours and wider social impacts
A Bruce
- 14:30 34 Estimating diagnostic accuracy of the tuberculin skin test and abattoir meat inspection from bovine tuberculosis surveillance data
M L Bermingham, I G Handel, E J Glass, J A Woolliams, B M de Clare Bronsvort, R A Skuce, A R Allen, S W J McDowell, S H McBride, S C Bishop

EPIDEMIOLOGY

- 14:45 35 The prevalence of helminth infestations in hedgehogs admitted to wildlife centres across England
S Orton, B Heayns, E Martin
- 15:00 36 A cross sectional study on the point prevalence and risk factors for *Habronema* in working equids in central Ethiopia
G Chaters, M Getachew, S Reid
- 15:15 37 Assessment of risk factors for antimicrobial resistance diversity in dairy cattle
A E Mather, W M Sischo, D T Haydon, D J Mellor, S W J Reid
- 15:30 Tea/Coffee - Exchange Foyer
- 16:00-17:00 Hammond Lecture - Prof Sir John Beddington (Room LT3 - Exchange Building)
- 17:15-18:15 Gordon Memorial lecture , Marian Dawkins (Room LT3)
- 18:30-19:30 Ask the Presidents (Room LT1)
- 19:30 Reception (Atrium)
- 20:00 BSAS/ASF/AVTRW Conference Dinner (Atrium)

AVTRW PROGRAMME - THEATRE SESSIONS ROOM B43 DEARING BUILDING
MONDAY 4 APRIL 2011

VETERINARY EDUCATION (AVTRW)

- 10:30 38 The influence of interview on the selection of students into a veterinary medicine degree programme
N P H Hudson, S M Rhind, D J Shaw, G M Giannopoulos, C E Bell, G T Pearson, C A Phillips,
R J Mellanby
- 10:45 39 Predictors of success on the veterinary undergraduate course: evaluating variables within the student
intake and correlating with performance
N P H Hudson, R J Mellanby, D J Shaw, G M Giannopoulos, C E Bell, G T Pearson, C A Phillips, L
Dalziel, S M Rhind
- 11:00 40 What are our final year veterinary students seeing? Finding the evidence
M L Brennan, R S Dean
- 11:15 41 The use of a blackboard wiki as a tool for teaching evidence-based veterinary medicine
M Steele, N P Crabb, L J Moore
- 11:30 42 Development of the Animal Welfare Associated Reflective Exercise (AWARE): a self-directed
learning tool to promote ethical reflection in pre-clinical veterinary students
C Batchelor, D C J Main, V Dale, D E F McKeegan
- 11:45 43 Measuring ethical reasoning ability in first year veterinary students using the Defining Issues Test
C Batchelor, D E F McKeegan
- 12:00 Lunch (Atrium)

PIG HEALTH AND DISEASE (AVTRW)

- 13:30 44 Ten years of Post-weaning Multi-systemic Wasting Syndrome in England: retrospective study on
morbidity, breeds used and farmers' perception
P Alarcon, M Velasova, K D C Stärk, D U Pfeiffer, D Werling, B Wieland
- 13:45 45 Pigs and the H1N1 pandemic: innate immune responses in experimentally infected pigs
G A White, S P Dunham, S M Brookes, A Germundsson, F Garcon, A Núñez, K-C Chang,
I H Brown, COSI Consortium
- 14:00 46 Epidemiological investigation of the efficacy of PCV2 vaccination on PMWS severity in English pig
farms
M Velasova, P Alarcon, D Werling, Y Chang, A Nevel, B Wieland
- 14:15 47 Dynamics of herd infection: multiple enteric pathogens in young pigs
H E Davies, L Hancox, C E R Dodd, S Töttemeyer, J Wiseman, K H Mellits
- 14:30 48 British Pig Health Scheme: use of slaughterhouse data to inform infectious disease control in pig
farms
H Holt, P Alarcon Lopez, M Velasova, D Pfeiffer, B Wieland
- 15:00 Tea/Coffee - Exchange Foyer
- 16:00-17:00 Hammond Lecture - Prof Sir John Beddington (Room LT3 - Exchange Building)
- 17:15-18:15 Gordon Memorial lecture , Marian Dawkins (Room LT3)
- 18:30-19:30 Ask the Presidents (Room LT1)
- 19:30 Reception (Atrium)
- 20:00 BSAS/ASF/AVTRW Conference Dinner (Atrium)

THEATRE SESSIONS ROOM LT3

TUESDAY 5 APRIL 2011

PRESIDENT'S SESSION - FOOD SECURITY

08:45- 10:45 Chair: Prof Nigel Scollan

- 8:45 235 Food security - challenges and opportunities for animal science
A Bell, CSIRO, Australia
- 9:15 236 The new food security challenge:à balancing agriculture, health and environmental sustainability
M Winter, University of Exeter, UK
- 9:45 248 Future education of animal and veterinary students: skills
L A Sinclair and J Powles, Harper Adams University College, UK
- 10:15 Challenge to the industry relating to food security
J Gilliland, Rural Generation Ltd, Belfast, UK
- 10:45 Tea/coffee C33 and Exchange Foyer

THE GUT MICROBIOME

11:00-12:40 Chair: Dr Mike Bedford

- 11:00 237 Human metagenomics in the gut
J Marchesi, Cardiff University, UK
- 11:25 238 Rumen microbial ecology and itsàrole in cattle feed efficiencyà
L Guan, University of Alberta, Canada
- 11:50 239 Non-ruminant - host microbial interaction in the gut
I. E Mulder, Rowett Institute of Nutrition and Research
- 12:15 249 Intestinal microbiota of the chicken and intestinal health
R A Bailey, Aviagen Ltd, UK
- 12:40 Lunch - (Atrium)
- 12:55-13:30 Highlights Blue (Room C3)

THEATRE SESSIONS ROOM LT3

TUESDAY 5 APRIL 2011

APPLICATION OF MOLECULAR GENETIC TOOLS TO ANIMAL SCIENCE

13:30-15:10 Chair: Dr Sinead Waters

- 13:30 49 Finding the mutation causing early calf mortality in a pedigree breed of cattle as the basis for a genetic test to identify carriers of an autosomal recessive condition
G E Pollott, D C Wathes, J S Brickell, A M Clempson, S Hill
- 13:45 52 A meta-analysis of public microarray datasets reveals the transcriptional immune response to multiple pathogens in the chicken
G Weaver, M Watson, P Kaiser
- 14:00 50 Polymorphisms in mitochondrial transcription factor A (TFAM) are associated with growth and fertility in dairy cows
A Clempson, G E Pollott, J S Brickell, N E Bourne, N Munce, D C Wathes
- 14:15 55 Characterisation of a disease resistance QTL in Atlantic salmon using next-generation sequencing
R D Houston, J W Davey, S C Bishop, K Gharbi, J C Mota-Velasco, A E Tinch, J E Bron, J B Taggart
- 14:30 51 Results of genotyping UK dairy bulls with a high density DNA array
G Banos, E Wall, R Mrode, M P Coffey
- 14:45 53 Use of non-invasive methods to collect DNA for genome wide analysis from companion animals
A T French, R Ogden, C Eland, G Hemani, B Corcoran, K M Summers
- 15:00 54 Genome wide analysis of mitral valve disease in Cavalier King Charles Spaniels
A T French, R Ogden, C Eland, G Hemani, R Pong-Wong, B Corcoran, K M Summers
- 15:05 56 Genome-wide Association using a 60k SNP chip to explore the genomic control of boar taint in pigs
S J Rowe, B Karacaoren, DJ de Koning, I Velander, C S Haley, A L Archibald
- 15:10 Tea/coffee C33 and Exchange Foyer

UNDERSTANDING HEALTH DISEASE TRAITS

15:30-16:50 Chair: Chris Warkup

- 15:30 57 Bayesian modelling to estimate the sensitivity of the Immuno-Magnetic Separation (IMS) method of detecting *Escherichia coli* O157 in bovine faecal samples
M Nath, G T Innocent, G J Gunn, I J McKendrick
- 15:45 58 The impacts of climate change on *Fasciola hepatica* risk in the UK
N J Fox, P C L White, C J McClean, G Marion, A Evans, M R Hutchings
- 16:00 59 Implications of host genetic variation on the risk and prevalence of infectious diseases transmitted through the environment
A B Doeschl-Wilson, J Conington, R Davidson, T Roughsedge, M R Hutchings, B Villanueva
- 16:15 60 Seeking missing genetic variance in disease resistance
D Lipschutz-Powell, J A Woolliams, P Bijma, A B Doeschl-Wilson
- 16:30 61 Investigating within-farm and between-farm disease transmission interactions: implications for the control of British poultry diseases
S Nickbakhsh, L Matthews, S W J Reid, R R Kao

AN OVERVIEW OF THE DEVELOPMENTS IN ANIMAL STUDIES OVER THE LAST 20 YEARS

17:00-17:30 Prof Quinton McKellar Principal, RVC, London

THEATRE SESSIONS ROOM LT2

TUESDAY 5 APRIL 2011

SHEEP

- 11:00-12:35 Chair: Dr Liam Sinclair
- 11:00 63 An evaluation of the effects of maturity of maize at harvest, grass silage feed value and concentrate feed level on finishing lamb performance
T W J Keady, J P Hanrahan
- 11:15 64 Genotype by environment interactions (GxE) in Scottish Blackface lambs
A McLaren, N R Lambe, S Brotherstone, J Conington, R Mrode, L Bünger
- 11:30 65 Trans-generational effects of nutrient restriction during early and mid-pregnancy on reproductive function in Scottish Blackface and Suffolk sheep
C J Ashworth, C M Dwyer, C O Hogg, S L Etherington, N Itani, K Landers, J A Rooke
- 11:45 62 Effect of the Texel muscling quantitative trait locus (TM-QTL) on fore quarter, hind quarter and saddle weights, weight distribution and carcass composition in purebred Texel lambs
J M Macfarlane, N R Lambe, K A McLean, B T Wolf, W Haresign, L Bünger
- 12:00 66 Effects of the Texel muscling quantitative trait locus (TM-QTL) on carcass and VIA traits in purebred Texel lambs
A Y Masri, J M Macfarlane, N R Lambe, W Haresign, L Bunger
- 12:05 67 Effect of the Texel muscling quantitative trait locus (TM-QTL) and sex on meat quality parameters of the semimembranosus muscle of purebred Texel lambs
C R Craigie, N R Lambe, J M Macfarlane, C A Maltin, S T Morris, R Roehe, L Bunger
- 12:10 68 A comparison of growth and carcass characteristics of hill lambs finished on a selection of forage-based diets
R W Annett, A F Carson
- 12:15 69 Breed and sex effects on spine characteristics in sheep
C L Donaldson, N R Lambe, J M Macfarlane, K A McLean, C A Maltin, L Bunger
- 12:20 70 Incorporation of fluorescent markers into lamb finishing rations to aid detection of faecal contamination in the abattoir
S Sagataram, H R Fleming, V Theobald, M R F Lee
- 12:25 71 The effects of beta-adrenergic agonist (BA) and growth hormone (GH) on factors involved in determining skeletal muscle fibre type in growing lambs
Z C T R Daniel, P J Buttery, T Parr, J M Brameld
- 12:30 72 The effects of beta-adrenergic agonist (BA) and growth hormone (GH) on lamb growth characteristics and muscle proteolytic systems
Z C T R Daniel, E Pouliot, P J Buttery, J M Brameld, T Parr
- 12:35 Lunch (Atrium)
- 12:55-13:30 Highlights Blue - Room C3

THEATRE SESSIONS ROOM LT2

TUESDAY 5 APRIL 2011

METHANE

- 13:30-15:10 Chair: Prof Jamie Newbold
- 13:30 73 Remote measurement of enteric methane from dairy cows under different activities
M G G Chagunda, A Bagnall, D Bell, D J Roberts
- 13:45 74 Variation in methane emissions measured during milking for individual dairy cows under commercial conditions
P C Garnsworthy, J Craigon, J H Hernandez-Medrano, N Saunders
- 14:00 75 Effect of feeding milled rapeseed on methane emission and milk fatty acid composition in lactating dairy cows
L A Crompton, J A N Mills, K E Kliem, C K Reynolds
- 14:15 76 Effect of herd expansion and reduced inorganic fertiliser use on the global warming potential of four divergent dairy production systems
S A Ross, M G G Chagunda, C F E Topp, R A Ennos
- 14:30 77 Effect of ranking on phenotypic residual feed intake (RFI) and diet type on ruminal methanogenic populations in beef heifers
C A Carberry, D A Kenny, A K Kelly, C J Creevey, S M Waters
- 14:45 78 Will extended lactations in dairy systems result in a reduction in greenhouse gas emissions?
G E Pollott, E Wall, M P Coffey
- 15:00 79 Predicting methane emissions from beef cattle on different grasslands - does the prediction equation matter?
P Ricci, A Waterhouse
- 15:05 80 Effect of spice supplementation on *in vitro* degradability, gas and methane production from two forages
M Mehedi Hasan Khan, A Shakoor Chaudhry
- 15:10 Tea/coffee C33 and Exchange Foyer

BEEF CATTLE NUTRITION

- 15:30-16:55 Chair: Dr Jimmy Hyslop
- 15:30 81 An analysis of BCMS data to determine the breed composition of the UK beef herd
D L Todd, J A Woolliams, T R Roughsedge
- 15:45 82 Effect of concentrate feed level on the performance of maize silage fed dairy-bred bulls
S P Marsh
- 16:00 83 Protein availability of different co-products from bio-ethanol processing to dairy cattle
Arash Azarfar, Peiqiang Yu
- 16:15 84 An evaluation of crimped maize grain for finishing beef cattle
S P Marsh, T H Bletcher, M Vickers
- 16:20 85 Effect of early weaning concentrate pellet size on the performance of artificially reared dairy-bred bull calves
S P Marsh, T Lingham
- 16:25 86 The relationship between physical and chemical characteristics of maize silage and its whole tract apparent organic matter digestibility and *in situ* degradability
C Rymer, D J Humphries, J S Blake, D I Givens

BEEF CATTLE NUTRITION

15:30-16:55

- 16:30 87 Near infrared reflectance spectroscopy (NIRS) as a tool for understanding the differences in molecular structure of dry matter: dried distiller's grains with solubles (DDGS) as a feed model
Arash Azarfar, Peiqiang Yu
- 16:35 88 Effects of maturity stage at harvest and dietary inclusion rate of whole-crop maize silage on intake, feed utilization and performance of growing dairy bulls
K Zaralis, E Nadeau, S Johansson, C Helander, P Nørgaard, M Murphy
- 16:40 89 Carcass pH, temperature and colour changes during the first 48 hours post slaughter in Aberdeen x Limousin and Limousin x Aberdeen Angus steers and heifers
J J Hyslop, D W Ross, E A Navajas, N Prieto, R Roehe, G Simm
- 16:45 90 Effect of feeding plant oil rich in stearidonic acid on growth and meat quality of Charolais crossbred steers
E J Kim, R I Richardson, K Gibson, N D Scollan

THEATRE SESSIONS ROOM B40 (DEARING BUILDING)

TUESDAY 5 APRIL 2011

BEHAVIOUR AND WELFARE

11:00-12:35 Chair: Dr Emma Baxter

- 11:00 91 Achieving animal welfare and sustainability benefits by implementing existing knowledge: case examples in pigs and dairy cattle
D C J Main, H R Whay
- 11:15 92 The early detection of acute and chronic health challenges in beef cattle from changes in behaviour
O Szyszka, B Tolkamp, S A Edwards, I Kyriazakis
- 11:30 93 Establishing the extent of adverse behavioural reactions in dairy cattle to a leg mounted activity monitor
J R D MacKay, M J Haskell
- 11:45 94 The influence of housing dairy heifers with multiparous cows prior to calving on welfare and productivity during the post calving period
A R Boyle, C P Ferris, N E O'Connell
- 12:00 95 Ewes treated with lipopolysaccharide as neonates bear offspring that are more resilient to pain caused by castration and / or tail docking Evidence for cross-generational effects of perinatal programming?
C Clark, M Mendl, J Murrell
- 12:15 96 The effect of two dietary regimes on ruminating and lying behaviour of Belgium Blue cross heifers housed over winter
A Tibbott, R Cooke, H Scott-Browne, N Blackie
- 12:30 97 The effect of a two step weaning method on the behaviour of six month old Belgian Blue crossbred beef calves
H Stevens, N Blackie, J R Amory
- 12:35 Lunch (Atrium)
- 12:55-13:30 Highlights Blue - Room C3

PIGS I

13:30-14:55 Chair: Dr Jos Houdjik

- 13:30 98 The Green Pig survey: constraints of using peas and faba beans in growing and finishing pig diets
L A Smith, J G M Houdjik, I Kyriazakis
- 13:45 99 Nitrogen excretion during the growing-finishing period and its relationships with daily feed intake, feed conversion ratio and production traits in commercial pigs
M Shirali, A Doeschl-Wilson, P W Knap, C Duthie, E Kanis, J A M van Arendonk, R Roehe
- 14:00 100 Efficacy of β -glucanase and xylanase blend in mixed grains and grain co-products-based diets for growing/finishing pigs
E Kiarie, A Owusu-Asiedu, P H Simmins, C M Nyachoti
- 14:15 102 The effect of increasing soyabean level and phytase addition on the performance of newly weaned pigs
P Toplis, I J Wellock, H M Miller
- 14:30 101 Trial site influences optimal soyabean inclusion level in piglet starter diets
I J Wellock, P Toplis, A Stewart, H M Miller
- 14:45 103 Post-weaning performance of pigs offered varying allowances of starter diets
E Magowan, M E E Ball
- 14:50 104 The effect of group gender and diet on finishing pig performance and carcass characteristics
E Magowan, M E E Ball

THEATRE SESSIONS ROOM B40 (DEARING BUILDING)
TUESDAY 5 APRIL 2011

PIGS II

15:30-17:00 Chair: Dr Mick Hazzeldine

- 15:30 107 Effect of altering maternal feed allowance in early gestation on sow and piglet performance at farrowing
P D Cottney, E Magowan, M E E Ball
- 15:45 106 The influence of pre-service weather conditions on farrowing rate in outdoor sows
A LeMoine, R D Boyle, H M Miller
- 16:00 105 Can enthalpy and rate of change provide useful practical indices of the thermal loads experienced by livestock in transit?
M A Mitchell, P J Kettlewell, M Villaroel, P Barreiro, M Farish
- 16:15 108 The effects of supplementing various levels of chitosan on performance, selected microbial populations and volatile fatty acid concentration in the weaned piglet
A M Walsh, T Sweeney, J J Callan, B Bahar, J V O'Doherty
- 16:30 109 Acute phase proteins as markers for subclinical disease in young pigs
S Athanasiadou, J G M Houdijk, P D Eckersall, C L Low, I Kyriazakis
- 16:45 110 Genetic associations of feed intake behaviour traits with piglet survival and litter size
R Roche, E M Baxter, P W Knap, A B Lawrence

AVTRW PROGRAMME - THEATRE SESSIONS ROOM A32 DEARING BUILDING
TUESDAY 5 APRIL 2011

RUMINANT HEALTH AND DISEASE (AVTRW)

- 09:00 111 Is sheep BSE of greater risk to humans than cattle BSE?
C Plinston, P Hart, A Chong, N Hunter, J Foster, P Piccardo, J C Manson, R M Barron
- 09:15 112 Developments in goat transmissible spongiform encephalopathy (TSE) research
W Goldmann, A Bossers, J Langeveld, O Andreoletti, F Lantier, F Barillet, J-M Torres, C Acin,
M Groschup, P-L Acutis, U Agrimi, R Nonno, T Sklaviadis, J Grassi
- 09:30 113 Early pre-clinical infection of peripheral tissues in sheep with experimental bovine spongiform
encephalopathy
N Hunter, J Foster, M Bruce
- 09:45 114 Caprine prion gene polymorphism (I142M) associated with low scrapie susceptibility shows high
allele frequency in British goat herds
K Ryan, P Stewart, J Foster, D Parnham, A Bossers, W Goldmann
- 10:00 115 Listeriosis in farmed animals identified through Veterinary Laboratories Agency scanning surveillance
over the last 9 years
A Otter
- 10:15 116 Reservoir hosts of Leptospirosis excrete urinary IgG specific for *Leptospira*
R Bonilla-Santiago, J Nally
- 10:30 Tea/Coffee - Exchange Foyer
- 11:00 117 Pathogen-specific inhibition of the innate immune response during bovine mastitis
N Patterson, T Coffey, D Werling
- 11:15 118 A probabilistic elicitation of expert veterinarians' beliefs regarding vaccination against bovine viral
diarrhoea virus in dairy cattle and the effect on herd fertility performance
H M Higgins, S Brister, M Green
- 11:30 119 An emerging haemorrhagic syndrome in young calves in Europe: pathology and pathogenesis
S Scholes
- 11:45 120 Evaluation of the reliability, sensitivity and specificity of animal-based indicators of sheep welfare
C J Phythian, P J Cripps, N Toft, E Michalopoulou, P H Jones, D H Grove-White, M J Clarkson,
A C Winter, J S Duncan
- 12:00 121 Consequences of plant protein source on the periparturient resistance to parasites in ewes
P Sakkas, J G M Houdijk, S Athanasiadou, I Kyriazakis
- 12:15 122 An improved understanding of bacterial population dynamics in the development of ovine footrot
L A Witcomb, L E Green, E M W Wellington, J Kaler, A Ul Hassan, L A Calvo Bado,
R Grogono Thomas, G F Medley
- 12:30 Lunch (Atrium)

**AVTRW PROGRAMME - THEATRE SESSIONS ROOM A32 DEARING BUILDING
TUESDAY 5 APRIL 2011**

COMPANION ANIMAL HEALTH AND DISEASE (AVTRW)

13:30- 15:15

- 13:30 240 Management of obesity in dogs and cats – maximising success
A J German, University of Liverpool, UK
- 14:00 123 Management of over-weight and obese equids in a charitable trust setting: measures of success and failure
B Freer, T Hollands, D S Gardner, A Mostyn
- 14:15 124 Acute zinc intoxication in a dog - clinical and pathological findings
R Blundell, F Adam
- 14:30 125 Paravertebral malignant schwannoma in a Horse
G Nikolaou, M de Bonont, U Heitzel
- 14:45 126 Neonatal canine staphylococcal dermatitis
A Philbey, D Taylor, H Thompson
- 15:00 127 Gastric lymphangioma in a dog
C Richardson
- 15:15 Tea/Coffee - Exchange Foyer

PATHOGENS - HOST INTERACTIONS (AVTRW)

15:30-16:30

- 15:30 128 Novel SNPs in sheep and cattle TLR5: potential biomarkers for disease resistance and susceptibility?
S A Smith, O C Jann, D Haig, D Werling, R D Emes, E J Glass
- 15:45 129 Eliciting expert perceptions of the efficacy and practicality of pathogen control measures: *E coli* O157 and human health
P Cross, D Rigby, G Edwards-Jones
- 16:00 226 Differences in SPI gene expression in *Salmonella enterica* in macrophages differentiates systemic serovars from those restricted to enteritis
A Imre, A Bukovinski, Xiangmei Zhou, P Barrow
- 16:15 133 Apparent effects of post-natal infection with *Mycobacterium avium* on the susceptibility of sheep to copper toxicity one year later
N Suttle

ROOM LT3

AN OVERVIEW OF THE DEVELOPMENTS IN ANIMAL STUDIES OVER THE LAST 20 YEARS

17:00-17:30

Prof Quinton McKellar Principal, RVC, London

17:30 End of conference

THEATRE SESSIONS ROOM B43 (DEARING BUILDING)

TUESDAY 5 APRIL 2011

MEAT QUALITY

11:00-12:45 Chair: Kim Matthews

- 11:00 134 Improving fatty acid profile in beef muscle
N D Scollan, R I Richardson, E J Kim
- 11:15 135 Carcasses of Belgian Blue culled cows and growing fattening bulls: 2 meat quality and fat and fatty acids composition in meat pieces
V Robaye, O Dotreppe, J L Hornick, L Istasse, I Dufrasne
- 11:30 136 Application of near infrared hyperspectral imaging to the prediction of meat quality
B W Moss, M Whitworth, A J Gordon, A Chau, K Matthews, A Fearon
- 11:45 137 Application of hyperspectral imaging to predict intramuscular fat and fatty acid profiles of beef Longissimus dorsi muscle
A Fearon, M Whitworth, B Moss, A Beattie, A Chau, A Gordon, K Matthews
- 12:00 138 Contribution of ruminal protozoa to the duodenal flow of polyunsaturated fatty acids following feeding on low and high chloroplast-containing diets
S A Huws, A H Kingston-Smith, E-J Kim, M R F Lee, J K S Tweed, M B Scott, N D Scollan
- 12:15 139 Finishing lambs on chicory increases killing out percentage and carcass conformation score without detrimental effects on sensory meat eating quality
J G M Houdijk, A Baker, E A Navajas, R I Richardson, D W Ross
- 12:20 140 Stearidonic acid biohydrogenation by the mixed rumen microbial population *in vitro*
M R G Maia, C A S Correia, S P Alves, A J M Fonseca, A R J Cabrita
- 12:25 141 Comparison of wheat- versus corn-based dried distillers' grains with solubles on muscle fatty acid composition of feedlot cattle
N Aldai, M E R Dugan, J K G Kramer, J L Aalhus, A R Mantecón, J J McKinnon, T A McAllister
- 12:30 142 Physical qualities, proximate chemical composition and fatty acid profiles of three freshwater fish species harvested from upstream and downstream locations
A S Chaudhry, F Jabeen
- 12:35 143 Meat quality of bulls, heifers and steers sampled at a commercial abattoir
B Moss, A Fearon, M Whitworth, A Chau, E Tolland, D Devlin, E Tollerton, A Gordon, K Matthews
- 12:40 144 Meat quality characteristics from lambs and sheep produced in the mountainous and the semi-mountainous area in North Greece
A Zervos, E Kasapidou, L Papaloukas, E Sinapis

Strategy Report Workshop - Room B43 (Dearing Building)

12:55-13:30

HIGHLIGHTS RED SESSIONS ROOM C3

MONDAY 4 APRIL 2011

12:55-13:35 Chair: Dr Peter Rowlinson

- 13:00 145 Effects of dietary potassium diformate on feed intake, weight loss and backfat reduction in sows: pre-farrowing till weaning
C Lückstädt
- 13:03 146 Seasonality and heterogeneity in live fish movements and their implications for Scottish aquaculture
M Werkman, L A Munro, D M Green, A G Murray, J F Turnbull
- 13:06 147 A study on possibility of using sugar beet molasses in honey bee nutrition
J Modarresi, M Bashtani, A R Fazaeli, H Farhangfar, P Rowlinson, M Ashrafi Gol
- 13:09 148 The effect of *Vernonia amygdalina* leaf extract on Alloxan induced diabetic rats
P Ekeocha, A Ekeocha, T Fasola, K Afolabi
- 13:12 149 Carcasses of Belgian Blue culled cows and growing fattening bulls: 1 characteristics of the cuts
V Robaye, O Dotreppe, JL Hornick, L Istasse, I Dufrasne
- 13:15 150 Assessment of cut-off points during tuberculin skin test for the diagnosis of bovine tuberculosis in Cameroonian cattle
J Awah-Ndukum, C A Kudi, G Bradley, G S Bah
- 13:18 151 Effects of stearidonic acid supplementation on methane production evaluated *in vitro*
P Amaro, M R G Maia, R J Dewhurst, A J M Fonseca, A R J Cabrera
- 13:21 152 A comparison of two dietary regimes on weights and two morphometric characteristics of Belgian Blue-cross beef cattle over the winter housed period
H Scott-Browne, N Blackie, A Tibbott, R Cooke
- 13:24 153 Evaluation of moist co-products for finishing dairy-bred bulls
S P Marsh, C W Manley, R Wynn
- 13:27 154 Evaluation of skim and whey based milk replacers on the performance of artificially reared dairy-bred bull calves
S P Marsh, D T Boyd
- 13:30 155 Comparison of manual and Video Image Analysis classification systems for the prediction of yield and composition of the loin joint in commercial cattle
C R Craigie, C A Maltin, R W Purchas, D W Ross, L Bungler, S T Morris, R Roehe

HIGHLIGHTS BLUE SESSIONS ROOM C3
TUESDAY 5 APRIL 2011

- 12:55-13:30 Chair: Dr Caroline Rymer
- 13:00 156 Changes in equol concentrations during technological processing of control and isoflavone-enriched milk
L Krizova, A Vesely, V Gencurova
- 13:03 157 Recurrent exertional rhabdomyolysis - prevalence and possible dietary risk factors in Thoroughbred racehorses
R Mundy, T Hollands, R Piercy, K Verheyen, L Salonen
- 13:06 158 Oleic acid supplementation favours basal prostaglandin E₂ production and antagonizes the effect of oxytocin in uterine endometrial cells isolated from late gestation ewes
Z Cheng, D C Wathes, D R E Abayasekara, M Elmes, S Kirkup
- 13:09 159 The effects of replacing traditional inorganic zinc supplements with organically chelated zinc (Bioplex® Zn) supplements on performance in sheep
M K Cave, A M Mackenzie, R G Wilkinson, L A Sinclair
- 13:12 160 Footrot and other foot conditions in hill and lowland sheep: effects of flock, ewe breed, age and litter size
C O Lynch, J P Hanrahan
- 13:15 161 Evaluation of fresh wet brewers grains as a replacement in a conventional fattening ration: intake, digestibility and nitrogen balance in goats
T S Sgwane, B J Dlamini, M Dlamini
- 13:18 162 Preliminary study of Balangu, an Intermediate Moisture Meat, made from beef compared, with mutton and chevon, for food security
P Fakolade
- 13:21 163 The effects of environmental and physiological factors on the incidence of lameness in dairy sheep
A I Gelasakis, G Arsenos, G E Valergakis, G Banos
- 13:24 164 The peroxide value and thiobarbituric acids profiles of palm oil decanter meal kept over extended time
M Afdal, Kasim Azhar, A Razak Alimon, Norhani Abdullah

POSTERS WILL BE DISPLAYED IN EITHER ROOM C3, C33 OR FOYER

SHEEP

- 165 Effects of substituting sesame oil for barley grain on rumen fermentation parameters and blood metabolites in lambs
H Ghafari, A A Khadem, M Rezaeian, A Afzalzadeh, S D Sharifi
- 166 *In vitro* rumen fungi growth in medium containing sugarcane pith treated with low temperature steam and acid using QC-PCR assay
M Chaji, T Mohammadabadi
- 167 The effect of soaking and urea treatments on the chemical composition of wheat straw
A Shirif, A Chaudhry, K Ben Hage
- 168 Effects of whole cottonseed on small intestine morphology of Chaal fattening male lambs
M Absalan, A Afzal zadeh, D Sharifi, A A Khadem, D Ghandi, A GH Zenouri
- 169 The effect of Samanea saman and Stylosanthes hamata supplementation on intake of Nerica 1 rice straw basal diet and NDF digestibility in Djallonké sheep
V Attoh-Kotoku, E L K Osafo
- 170 Effect of Holotrich protozoa on sheep methane emissions
A Belanche, A I Martín García, J M Moorby, C J Newbold
- 171 Effect of n-3 fatty acids supplementation on semen characteristics in Moghani rams
Mostafa Fouladi, F Mirzaei, M Shakuri, A Tohidi, Shahryar Kargar
- 172 Effect of sesame oil supplementation on fatty acid composition of tail fat and meat of Chaal lambs
H Ghafari, M Rezaeian, A A Khadem, S D Sharifi, A Afzalzadeh

NUTRITION

- 173 The effects of yeast on the performance and welfare of heifers fed an organic finishing diet
N D MacKintosh, K J Hart, C J Newbold
- 174 The role of tlr2 and dectin-1 in phagocytic and inflammatory response to antigen expressed on yeast surface
R Patterson, P Dalby, Hans Martin S, D Werling
- 175 An investigation of the role of Insulin-Like Growth Factor 1 (IGF-1) in determining adult height of the horse
R Reader, C Morgan, M Hegarty, N McEwan, W Powell, D Nash
- 176 A preliminary characterisation of the ecology of gut anaerobic fungal populations in horses
R Birch, J Edwards, H Worgan, B Macias, P Rees Stevens, C Newbold, D Nash
- 177 *In vitro* kinetic characterization of inhibition of acetylcholinesterase by organophosphorus and carbamate compounds in food animals
K Abass Askar, A John Moody, A Caleb Kudi
- 178 Dogslife, a web-based epidemiological research project for prospective analysis of risk factors affecting the health of domestic dogs
D N Clements, M Bronsvort, I Handel, D Querry, E Rose, K M Summers
- 179 Effect of *Aspilia africana* leaves on the reproductive potentials of rabbit bucks
M A Oguike, C O Igwe, I E Odika, E O Onyekweodiri
- 180 Effects of chicory / perennial ryegrass swards compared with perennial ryegrass swards on the faecal egg counts of grazing beef steers
C L Marley, R Fychan, J W Davies, R Sanderson, E Genever, A B Forbes

- 181 The effect of feeding pomegranate seed pulp on dry matter intake and performance of Iranian crossbred goats
J Modarresi, MH Fathi Nasri, O Dayyani, L Rashidi, M Danesh Mesgaran, H Farhangfar
- 182 Improved extraction method for archaeol in faeces - a potential biomarker for methanogenic Archaea in the ruminant gastro-intestinal tract
C A McCartney, R J Dewhurst, R P Evershed, R D Pancost, I D Bull
- 183 Relationships between stage of growth and chemical composition of grass
Haopeng Jiao, Tianhai Yan, D Wills
- 184 Histochemical localization of acetylcholinesterase in liver of food animals
Kasim Abass Askar, A John Moody, A Caleb Kudi
- 185 A kinetic characterization of acetylcholinesterase and butyrylcholinesterase in the tissues of food animals
Kasim Abass Askar, A John Moody, A Caleb Kudi
- 186 Silage fermentation end products and microbial populations and their relationships to silage quality of orange pulp
S Lashkari, A Taghizadeh
- 187 Effects of supplementation of rice straw with readily digestible fiber on populations of fiber-associated ruminal microbes by real-time quantitative PCR *in vitro*
Xiaolian Chen, Jianxin Liu, Jiakun Wang
- 188 Effect of chemically processing using alum solution on *in vitro* gas production parameters of barley grain
E Abdi Ghezeljeh, M Danesh Mesgaran, A R Vakili, H Nassiri Moghaddam
- 189 the effect of milking season on milk yield and composition of khuzestan water buffalo
A Masoudi, M Chaji, M Bojarpour, H Albomohsen, S Rouzegar, S Rahimnahal
- 190 The effect of the low temperature steam (142, 130 and 90 °C) and sulphuric acid on *in vitro* gas production parameters of sugarcane pith
T Mohammadabadi, M Chaji
- 191 Loss of activity of the putative protein protectant polyphenol oxidase (PPO) occurs as a result of preservation of red clover forage samples by freeze-drying
G E O'Keeffe
- 192 Effects of various Iranian native essential oils on *in vitro* ruminal methane emission and feed fermentation efficiency
H Jahani-Azizabadi, M Danesh Mesgaran, A R Vakili, K Rezayazdi, A R Heravi Moussavi, S Motazhary

DAIRY

- 193 Seasonal variation of milk production, fat and protein percentage in Iranian Holstein dairy cows
J Faryadimehr, S Khalajzadeh, M Bagher Sayyadnezhad
- 194 The characteristics of extended lactations in the UK dairy herd
G E Pollott
- 195 Effect of dietary starch source and alfalfa hay particle size on chewing time and ruminal pH in mid-lactation Holstein dairy cows
S Mahmoud Nasrollahi, M Khorvash, G R Ghorbani
- 196 Effect of N underfeeding and energy source on milk production and N partition in dairy cows
A Fanchone, M Doreau, P Nozière
- 197 Effect of N underfeeding and energy source on ruminal digestion and protein metabolism in dairy cows
A Fanchone, P Nozière, J Portelli, B Chauveau-Duriot, V Largeau, M Doreau
- 198 Effects of dry period length on the subsequent performance of lactating Holstein cows
R Jafari Jafarpoor, A R Heravi mousavi, M Danesh Mesgaran, A R Vakili

- 199 Evaluation of the inclusion of intact or physically broken flaxseed to extruded soya seed on Holstein lactating dairy cow performances
R Jafari Jafarpoor, M Danesh Mesgaran, S Gohari, S Danesh Mesgaran, M R Ghaemi
- 200 A study of secondary follicles development in Iranian Raeini cashmere goat kids
S M Syeed Moumen, M V Tokasi, M Shamsaddini Bafti, N Karegar
- 201 Effects of probiotic and prebiotic on performance and plasma IgG1 concentration of dairy calves
N Dabiri, P Mohamadi, A Mahdavi, Ahmad Zare
- 202 Incremental effects of a novel calcium salt of *cis*-monounsaturated fatty acids product on milk fatty acid composition
K E Kliem, C K Reynolds, D J Humphries, R Kirkland, D I Givens
- 203 Resumption of cyclicity: its associations with metabolic profiles during the early *postpartum* period, body condition score and first service conception rate in a spring calving dairy herd
C O Lynch, D A Kenny, M G Diskin
- 204 Effects of replacing barley grain with starch processing wastage on production performance in Holstein dairy cows
M Rezaeian, J Honarзад, S S Mousavi
- 205 The effect of silage and concentrate type on milk fatty acids and the occurrence of subacute ruminal acidosis in dairy cows
E Colman, B Vlaeminck, S Abrahamse, J Dijkstra, V Fievez
- 206 Effect of dietary copper sulphate or organically complexed copper (Bioplex® Cu) fed either without or with dietary Cu antagonists on the intake, performance and mineral status of early lactation dairy cows
K J Hart, A M Mackenzie, L A Sinclair
- 207 Effect of level of inclusion of copper sulphate and organically complexed copper (Bioplex® Cu) on indicators of Cu status, performance and milk fatty acid profile in dairy cows
K J Hart, A M Mackenzie, L A Sinclair
- 208 Calving ease and the subsequent occurrence of mastitis and lameness in dairy cows: retrospective analysis from a UK farm
A C Barrier, A I Macrae, M J Haskell

GENETICS

- 209 Use of farmer recorded lameness data to improve the genetic evaluation of lameness in UK dairy cattle
T Pritchard, M P Coffey, R Mrode, K Moore, E Wall
- 210 Estimated genetic parameters of calving performance in UK Holstein-Friesian cattle, using a multitrait animal model
S A E Eaglen, J A Woolliams, M P Coffey, E Wall
- 211 The genetics of wool shedding in a composite breed of sheep
G E Pollott, P L Baber
- 212 Known mutations with large effects on ovulation rate not involved in the prolificacy of Finnish Landrace sheep
M P Mullen, J P Hanrahan
- 213 Estimation of (Co)variance components for economical traits in Moghani sheep
M Bayeriyar, A Asghar Aslaminejad, H Farajiarogh, F Bahri Beinabaj, M Danesh Mesgaran
- 214 Genetic and environmental parameters for ewe productivity in Moghani sheep
S Savar Sofla, A Nejati Javaremi, M A Abbasi, R Vaez Torshizi, M Chamani, B Taheri Dezfuli
- 215 Estimation of variance components for reproductive traits of Zandi sheep
H Mohammadi, M Moradi shahrehabak, M Sadeghi

- 216 Statistical comparison of partial regression coefficients of weaning weight on birth weight and weaning age in Iranian Holstein calves
F Bahri Binabaj, H Farhangfar, P Rowlinson, H Faraji Arogh
- 217 Gibbs sampling optimization in Bayesian estimation of genetic parameters for some production traits of Iranian Holstein dairy cattle
S Alijani, M Jasoori, N Pirani, M B Sayadnejad
- 218 Estimates of genetic trend for reproductive traits in Iranian Holstein dairy cows
M Honarvar, H Ghiasi
- 219 Fixed or random effect of contemporary group for estimating heritability of monthly test day milk yield in Iranian primiparous Holsteins
H Farhangfar, M Jafari Tarbaghan, P Rowlinson, M Bashtani, M Hassan Fathi Nasri
- 220 Study of Genotype by environment interaction for milk and fat yield in Iranian Holstein dairy herds
S Savar Sofla, B Taheri Dezfuli, H R Seyedabadi

FREE COMMUNICATIONS

- 221 Can bioelectrical impedance analysis (BIA) be used as a method to measure muscle percentage in the live pig?
A E Taylor, S Jagger, P Toplis, I Wellock, H M Miller
- 222 Surveillance for potential mosquito viral vectors in the UK
W Chadwick, R Blunt, J Daly
- 223 Comparative chemokine response to influenza virus infection between key primary human and pig cells
G A White, S P Dunham, R K Nelli, I H Brown, S V Kuchipudi, K C Chang
- 224 Dilution effects on acetylcholinesterase and butyrylcholinesterase activities in the tissues of food animals
Kasim Abass Askar, A John Moody, A Caleb Kudi
- 225 Defective viral replication and lack of pro-inflammatory cytokine response contribute to innate host resistance in H5N1 influenza virus infected primary pig cells
R K Nelli, S V Kuchipudi, G A White, S P Dunham, I H Brown, Kin-Chow Chang
- 130 Comparison of host pathogen interactions in two and three dimensional tissue culture systems: *Clostridium difficile* and porcine intestinal epithelial cells
K Hillier, M Lovell, P Barrow, S Totemeyer
- 131 Molecular insights into the innate immune response of bovine endometrial cells to the zoonotic abortifacient pathogen *Leptospira*
H Collett, E Wood, C Pfarrer, W Wapenaar, S Totemeyer, P Barrow
- 132 Characterisation of a porcine small intestinal epithelial cell line (IPEC-J2), as a model to study host response to the probiotic *Lactobacillus rhamnosus*
M King, K Hillier, P Barrow, S Totemeyer

Immune-endocrine interactions in the chicken

P. Kaiser¹ and S. Shini²

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²Schools of Veterinary Science & Animal Studies, University of Queensland, Gatton, Queensland, Australia

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Avian Immunology research has made great progress over the last decade, accelerated by the availability of the chicken genome sequence. We have an ever increasing set of reagents and assays which allow interrogation of most aspects of the avian immune response, particularly to infectious pathogens. However, there remains little literature on interactions between the chicken's immune and endocrine systems.

Currently, we are investigating immune and endocrine interactions in the chicken, in particular the cells and molecules that are known to be involved in such interactions in mammals. We have evaluated the effects of corticosterone administration in drinking water on peripheral lymphocyte and heterophil cytokine and chemokine gene profiles. In particular, there seem to be effects on cytokine and chemokine mRNA expression levels in both lymphocytes and heterophils, especially expression of the proinflammatory cytokines interleukin (IL)-1 β , IL-6, and IL-18, and chemokines, CCL11, CCL2, CCL5, CCL16, CXCL1 and CXCL2, which are initially upregulated and are potentially involved in modulating the adaptive immune response. A chronic treatment with corticosterone downregulates proinflammatory cytokines and chemokines, suggesting that the delayed effects of chronic stress can suppress the immune response. It appears that the balance between T helper (Th) 1 and Th2/Treg cytokine production is altered in conditions associated with significant changes in plasma corticosterone concentration. Experiments are underway to decipher the cytokine and chemokine responses to vaccination and bacterial challenge on the background of stress-induced immunosuppression.

Availability of Feed Resources – A Feed Compounder’s View

Tony Bell, Raw Material Director, BOCM PAULS LTD

Email: Tony.Bell@bocmpauls.co.uk

A feed compounder’s objective is to supply its customers with a nutritionally balanced feed which will enable economic and efficient livestock production. A competitive, viable livestock production sector in the UK is in the best, long term interests of everyone involved in the supply chain

As feed and nutrition suppliers we spend considerable money on research and development to not only look at the performance of feeds, but also to understand the value of raw materials. This is to make the most efficient use of raw materials and it also reduces waste.

Our aims have been difficult to achieve in the last year where we have seen increased volatility in raw material markets. Wheat prices have more than doubled from just over £100 per tonne to just over £200 per tonne. Protein prices have also increased sharply, again increasing by £100 per tonne in the past year.

This is increasing the feed cost for our customers who need higher livestock prices to cover their increased costs. We are also seeing significantly increased volatility in markets and daily price movements greater than seen previously in a year. What has been driving the increased volatility is reduced production of major commodities particularly of wheat. Demand rationing has been occurring in feed supplies whereas there is still a growing demand for cereals, wheat and maize, to be converted into ethanol.

In the USA now close to a third of the maize/corn production is going into ethanol production. This figure is similar to the level that is used in animal feed. The livestock industry’s concern is that bio-fuel levels are mandatory. Food and feed demand, therefore, has to be rationed by high prices in order to balance supply and demand in years of low production.

At the same time we are seeing more raw materials that are being burnt in order to fulfil the renewable energy requirements. This is utilising lower valuable materials like wood pulp, bedding waste and paper. The volumes that are being burnt are huge. There are major quantities of valuable feed materials being burnt. In the UK this peaked at over ½-million tonnes in 1 year. This burning, being a major competition to feed compound buyers and for the livestock industry.

Increased volatility has also been affected by investment Funds who can make more in commodities than they can in other traditional investment vehicles. Over the last 4-years we have seen an explosion in the quantity of money being invested in commodities.

The skill of the compounder and, indeed the origins of the business, is utilising By-products and Co-products. The skill of the compounder is to understand the value of these raw materials. Compounders are also looking to utilise surplus food raw materials that are out of specification or not required and are put into landfill.

In summary the availability of feed resources is become more constrained with demand increasing not only for food and feed supplies, but also for bio-fuels. Stocks in the EU have been reduced with the requirement to reduce Intervention stocks and, therefore, in a year of low production, price volatility is much greater.

Compounders have to deal with this increased volatility and our customers need to see higher livestock product prices for them to be able to pay the increased costs of raw materials.

Compounders use increased research and development into using a wider range of bi-products and co-products, in a world of higher demand for cereals and protein crops.

GM crops and global food security

Jerry Roberts, Plant and Crop Sciences Division, School of Biosciences, University of Nottingham

'Global food security' is the challenge of ensuring that the world's population has access to adequate amounts of safe, nutritious food to meet its needs. The world already faces difficulties in ensuring food security for its population with over 1 billion individuals suffering from chronic malnourishment and nearly 200 million children being severely underweight. These problems are expected to become even more acute in the coming decades as the world's population increases and the demand for food may double. The Royal Society report 'Reaping the Benefits' and the recent Foresight publication 'The Future of Food and Farming' both advocate Genetic Modification (GM) as a valuable tool to assist in the development of new varieties of crops to help us achieve our GFS targets. The aim of this presentation is to consider how GM strategies might lead to the delivery of beneficial traits and explore ways by which new technologies can be debated in open forum to promote rational discussion.

Breeding Crops for maximum nutritional value to animals

I King, Professor of Cereal Genomics, University of Nottingham

Food security is becoming a critical issue both in the UK and worldwide due to rapid population expansion (i.e. an increase from 6 to 9 billion people by 2040), dietary changes, climate change and declining stocks of fossil fuels. The UN has calculated that food production worldwide has to increase by 70% by 2040 in order to maintain our current standards of nutrition, which even at present levels still includes 1 billion malnourished and 100 million people at near starvation level. At present, 11% of the world's surface is under crop production with an additional 22% under pasture. Up to a further 10% of marginal land may be available for limited agricultural production. Thus, future increases in production will have to be generated primarily by increases in crop and animal productivity rather than by expansion of the area under cultivation. In order to achieve this, it will be necessary to exploit and develop both existing and new agricultural technologies and germplasm resources.

The wild relatives (alien species) of wheat provide a vast and largely untapped reservoir of genetic variation (for traits such as animal nutrition, tolerance to abiotic and biotic stress, biomass, yield and photosynthetic potential). This variation provides an important resource that can be exploited for the development of new high yielding varieties adapted to animal nutrition, climate change and environmentally friendly agricultural practises.

Production efficiency and environmental impact of dairy systems

Phil Garnsworthy, Animal Sciences Division, School of Biosciences, University of Nottingham

Production efficiency is the ratio of product yield to inputs of resources. At the system level, inputs might include land, feed, animals, replacements and labour. Production efficiency can be improved by increasing yield, reducing inputs, or both. In dairy systems over the past 40 years, milk yield per cow has increased so that the same national milk supply is now produced from just over 50% of the number of cows. This tremendous increase in production efficiency has reduced environmental impact per litre of milk because there are proportionately less excretions and emissions associated with maintenance requirements of cows. Further progress is hampered, however, by increasing levels of wastage due to involuntary culling of cows for infertility and disease. This increases the number of youngstock on farms and reduces lifetime efficiency of individual cows. At the system level, it threatens sustainability. The aim of this presentation is to highlight these issues in the context of Global Food Security.

Towards understanding the molecular basis of meat quality and innate disease resistance in skeletal muscle

Kin-Chow Chang, Professor of Veterinary Molecular Medicine, University of Nottingham

Farm animal production is governed by two basic output criteria: product (such as meat) quantity and quality. Production that takes into account the health and well-being of its animals deserves special recognition. To meet growing global demand for quality meat and animal products, greater efficiency and higher standards of production are needed. Undoubtedly these are enormous challenges and require concerted national and international cooperation and collaboration. At the scientific level, the maintenance of muscle quality for the well being of animals and subsequently meat quality at post mortem are of paramount economic and welfare importance. This presentation will explore the molecular mediators of muscle quality and quantity in pigs, and strategies (genetic and pharmacological) to exploit favourable meat traits. It will highlight the tantalising potential of harnessing the role of skeletal muscle, which makes up about 40% of body mass, as an innate immune organ that can be manipulated to confer disease resistance to infections.

One Health: the role of wildlife in the emergence of viral diseases

T Kuiken Professor of Comparative Pathology, Erasmus MC, The Netherlands

There is increasing interest in viral diseases of wildlife, not only in Europe, but world-wide, and veterinary medicine has an important role to play in this field. The main reason for this increased interest is the recognition of the role that non-human animal species play as a potential reservoir for emerging viral diseases like SARS and influenza in humans: 75% of the causative viruses are zoonotic, with the majority originating from wild animals. However, domestic and wild animal populations also may suffer from viral diseases that have a reservoir in wildlife, e.g., classical swine fever and phocine distemper.

Veterinary medicine has an important role to play both in the discovery of emerging viral diseases and in its surveillance. The etiology of diseases like SARS, West Nile fever, and dolphin morbillivirus infection was determined thanks in part to the involvement of veterinarians. Veterinarians, and veterinary pathologists in particular, also are in the front line of passive surveillance of viral diseases in wildlife, which are often first recognized in a new area based on unusual morbidity or mortality in wildlife.

In this presentation I will illustrate the role of wildlife in emergence of viral diseases with examples of Newcastle disease in wild waterbirds, phocine distemper in seals, and highly pathogenic avian influenza H5N1 virus in felids. I also will highlight some recently emerging viruses in wildlife of particular concern, such as ranavirus in amphibians, African swine fever virus in wild boar, and Nipah virus in bats.

Future education of animal and veterinary students: skills

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Introduction: The market for students with animal based skills has changed considerably over the last 25 years. The agricultural livestock industry still dominates, but there has been an increasing importance of alternative careers in animal care, veterinary nursing, equine and less obvious professions including care and welfare of laboratory animals (Fig 1). In addition to these, there are also opportunities for animal and veterinary science graduates in support industries including animal/pet feeds and animal health, as well as with organisations such as the RSPCA and RSPB. These employment markets are reflected in the range of animal related courses now available at further and higher education establishments. Apart from veterinary science, there has also been an increase in the delivery by further rather than higher education establishments in these subject areas (HEFCE 2007). There is also a distinction between skills needed by industry and how these skills are recognised by government, namely qualifications. For example, 25% of workers in the agricultural livestock industry have no formal qualifications (Lantra 2010), but there is a high appreciation amongst employers that these skills are acquired in large part on-the-job. Additionally, the main cause attributed by employers for skills gaps amongst their employees is a lack of experience. The delivery of animal related skills can be regarded as domain specific i.e. they are useful for a particular job, which can range from animal handling, administering anaesthetic or foot-trimming to laboratory skills; these are considered most often to be in need by employers. Domain general, or transferable skills include communication, time-management, people management and leadership; these are also frequently cited as being important by employers, but are often overlooked in training programmes. These softer skills have, however, been specifically recognised by the veterinary profession as being of particular importance. For example, over 80% of cases dealt with by the Veterinary Defence Society in 2001 related to poor communication with clients, and veterinary students now receive formal training in these skills, although the method of delivery of these skills can have a tremendous effect on their subsequent effectiveness.

Within the world of education there have also been considerable developments in the theory and application of skills to students. Strategies in teaching which encourage undergraduates to become more actively involved in the learning process will develop their intellectual and transferable skills. Relatively few studies have been conducted that have focussed specifically on animal or veterinary science, but many of the principles involved are cross-disciplinary and applicable. The focus recently is on how knowledge is constructed from experiences, beliefs and situations. This encourages deep learning by building an understanding from what is already known. In the animal health and agricultural sector students will have different prior life experiences upon which education can provide the scaffolding to facilitate the learning process. Teaching methods should therefore be used to maximise all potential learning styles (Coffield et al, 2004). Students may be left brain learners which are verbal sequential or serialist learners and prefer structured, well planned, evaluation type exercises or right brain learners which are visual, holistic and kinaesthetic learners (Petty, 2006). It has been shown that the delivery of graduate skills, both domain specific and general should incorporate a variety of teaching methods for each learning objective. If students are encouraged to work on their weak styles they produce more varied and interesting work.

To promote active learning the didactic lecture should be replaced with novel pedagogies which achieve greater learning with the support of inexpensive technology. The incorporation of visual images, practicals, interactive activities and personal response systems are just a few practices now being used in education to support the learning of skills and encourage motivation and engagement of students. Traditional 'recipe style' laboratory classes are being replaced with project based group work, which not only teaches the essential core skills but also transferable skills such as team work, management, evaluation and presentation skills. Problem based learning is becoming widely used in the development of skills as students learn to critically evaluate and use the lecturer less as a source of knowledge and more as a facilitator of learning. The integration of e-learning into the curriculum can also enhance teaching of domain specific skills by demonstration with video clips, simulations and animations, as well as providing learning elements such as discussion boards, self-assessment quizzes and the use of online resources. These have particular relevance to continued professional development and distance learners.

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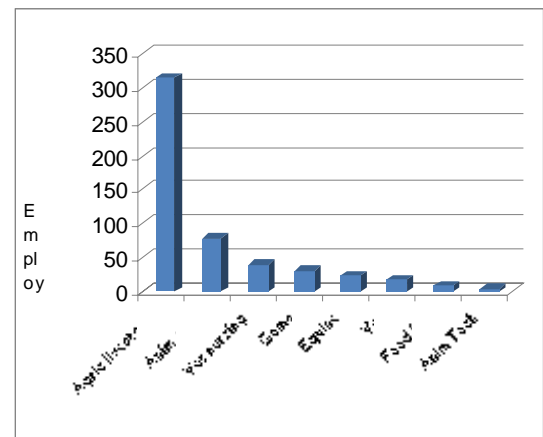


Fig 1. Some of the major employment markets for animal and veterinary students (adapted from Lantra 2010)

Intestinal microbiota of the chicken and intestinal health.

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The key aim with all food producing animals is to obtain good growth rates and performance through feed conversion efficiency: Intestinal health is essential for this. Intestinal health is heavily reliant upon the acquisition and maintenance of a balanced intestinal microbiota, this has become one of the key topics in European poultry husbandry. Bacteria reside in all known habitats therefore animals have had to evolve in a world full of bacteria, viruses, fungi, archaea and protozoa; part of the evolutionary process has resulted in the symbiotic relationships between an animal and its microbial residents. The intestinal microbiota of an animal is a complex community of microbes dominated by bacteria. The composition of which is highly dynamic and there are spatial shifts in population along each region of the intestinal tract in relation to the change in environmental conditions of each compartment. With total bacterial cell numbers outnumbering the host's own cell number by ten to one; it is not surprising that the intestinal microbiota plays a vital part in the health and wellbeing of all animals. The mechanisms by which the microbiota promotes host health are multifactorial. It has been found that the intestinal microbiota aids digestion, protects against pathogens, produces nutrients and plays a role in the development and maturation of the immune system. With the advent of culture independent DNA based technologies, the knowledge of the composition of the intestinal microbiota has improved greatly. Using these techniques it has been suggested that the intestinal microbiota of the chicken is comprised of around 640 species of bacteria from 150 different genera (2). The increased application of molecular methods revealed that culture based methods had vastly underestimated the complex community of bacteria within an animal's intestinal microbiota. Culture independent techniques combined with '-omics' technologies have allowed microbiologists to learn more about the relationship between the host and its resident microbiota. It has been demonstrated that the composition of the intestinal microbiota is affected by factors such the sex, age, dietary intake and health status of the host. The exact relationship between the host and its resident microbiota is still an active area of research and it is becoming more apparent that the intestinal microbiota is highly influential in terms of host health and immunity.

There is a delicate balance between the host, the intestinal microbiota, the intestinal environment and dietary compounds. If there is an imbalance in this relationship then the composition of the intestinal microbiota can alter. The shift in microbial populations can have a negative effect on the host leading to poor growth and poor performance – this is seen in cases of dysbacteriosis. Dysbacteriosis is a digestive condition of poultry and has been broadly described as an overgrowth of the intestinal microbiota leading to non-specific enteritis. Onset is usually between 20 – 30 days of age and it is thought to be triggered by changes in diet, poor management and overcrowding. Typically dysbacteriosis is treated using antimicrobial therapy; however increasing pressure on veterinarians and poultry producers to reduce the level of antimicrobials used there is a need to find alternatives to promote good intestinal health and prevent intestinal upset. The management of intestinal health without antimicrobials is a wide area of research. The use of a probiotic supplement is a popular approach, they have been found to boost enteric health by inhibiting the growth and/or attachment of less favourable bacteria in the intestinal tract or by modulating the composition of the intestinal microbiota towards a more favourable community. Intestinal bacteria derive most of their energy from dietary compounds; therefore diet has a major influence over the bacterial populations and it is possible to modulate the microbiota by altering the diet and including specific components (essential oils, oligosaccharides, enzymes and specific carbohydrate sources). Deciding on the best approach is not easy as individual results from intervention studies can vary. The key to the maintenance of intestinal health is by understanding how the intestinal microbiota changes at key points through out a bird's life and how it is possible to prepare the bird for these changes. The combination of practical field from poultry producers and veterinarians with laboratory research into the relationships between the host and its microbiota is likely to reveal further ways by which enteric health can be improved.

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