Lactation failure in crossbred Sahiwal Friesian cattle

Milk producers in Malaysia make extensive use of crossbred Sahiwal Friesian dairy cattle. These animals have, however, been found susceptible to lactation failure. A survey of cows in an experimental herd of F1 Sahiwal Friesian animals indicated that, in 30% of animals, milk yield decreased to negligible levels within the first 8 weeks post partum. Lactation failure was associated with a progressive increase in the amount of residual milk left in the udder after normal milking. By week 3 of lactation, residual milk volume was significantly greater than that in animals that, based on previous lactation history were not susceptible to lactation failure, and accounted for up to 30% of milk available at the morning milking. The cellular consequences of residual milk accumulation were evident in the activities of acetyl-CoA carboxylase, fatty acid synthetase and galactosyltransferase, key enzyme markers of cellular differentiation, which decreased in glands undergoing lactation failure and were lower than values measured in tissue of control cows. Mammary cell number, estimated by tissue DNA content, was also reduced in animals undergoing lactation failure. These indices of mammary development indicate that lactation failure is the result of premature involution in susceptible animals. Premature involution is a predictable consequence of progressive milk stasis in failing lactation, and attributable to an increase in autocrine feedback by inhibitory milk constituents. The progressive increase in residual milk is, on the other hand, unlikely to be attributable to impaired mammary development. Measurements of milk storage during milk accumulation showed no differences between control and lactation failure cows in the distribution of milk between alveolar and cisternal storage compartments. We conclude that lactation failure in Sahiwal Friesian cows is due to a failure of milk removal, and probably the result of an impaired milk ejection reflex rather than to the glands' milk storage characteristics.


Effect of cellulose on the digestibility of high starch versus high fat diets in dogs

The effects of cellulose added in three levels (7, 15 and 20% crude fibre in dry matter) to three different basal diets (a high fat diet, a high starch diet with raw starch and a high starch diet with cooked starch) on apparent digestibility were investigated in eight adult dogs. Cellulose had little effect on the apparent digestibility of fat. In the high fat diet there was no significant decrease, not even at the highest cellulose level (98.3% compared with 98.1% in the basal high fat diet). In the cooked starch diets, fat digestibility decreased from 95.1% in the basal cooked starch diet to 93.8% at the highest cellulose level. In the raw starch diets, digestibility did not decrease with increasing cellulose levels. The apparent digestibility of crude protein was considerably decreased by cellulose in all diets. Starch also decreased protein digestibility and the effects of cellulose and starch appeared to be additive (high fat diet decrease of protein digestibility from 86.7 to 83.5%, cooked starch from 81.6 to 78.6%, raw starch from 79.0 to 70.8%, basal diets to highest cellulose levels, respectively).

The apparent digestibility of nitrogen-free extract decreased from 93.9% in the basal cooked starch diet to 84.5% at the highest cellulose level. The figures for the raw starch diets were similar (decrease from 93.4 to 85.9%). Cellulose decreased the apparent digestibility of energy in all diets. This decrease was more marked in the high starch diets (cooked starch decrease from 89.1 to 69.6%, raw starch from 88.9 to 70.2%) than in the high fat diet (decrease from 90.1 to 76.1%). An evaluation of previous data showed that in general fibre has a higher impact on the apparent digestibility of energy in high carbohydrate diets than in low carbohydrate diets. The apparent digestibility of potassium, sodium and chloride was impaired by cellulose. The apparent digestibility of these minerals tended to be lower in the high starch diets, especially in the raw starch diet, and the effect of cellulose was usually more marked in those diets.

Fructosamine and glycated hemoglobin in the assessment of glycaemic control in dogs

Fructosamine and glycated hemoglobin (HbA1c) concentrations were measured simultaneously in 222 dogs (96 healthy and 126 sick dogs). The dogs were divided into 3 groups according to the glucose concentration: hypo, hyper and euglycaemic dogs. Serum fructosamine concentrations were measured by the reduction test with nitroblue tetrazolium. A turbidimetric inhibition immunoassay and specific polyclonal antibodies were used to evaluate glycated hemoglobin concentrations. A significant correlation was found between glucose concentration and either fructosamine \((r = 0.63, p < 0.0001)\) or glycated hemoglobin \((r = 0.82, p < 0.0001)\). The correlation was higher in hyperglycaemic dogs for fructosamine \((r = 0.80, p < 0.0001)\) and in hypoglycaemic dogs for glycated hemoglobin \((r = 0.91, p < 0.005)\). We found a significant correlation between serum fructosamine and glycated hemoglobin \((r = 0.65, p < 0.0005)\) when all the dogs were studied. A significant correlation was observed between serum fructosamine and glycated hemoglobin only in hyperglycaemic dogs \((r = 0.82, p < 0.0003)\). Thus, fructosamine and HbA1c may be considered for use in screening tests for diabetes mellitus in dogs and clinical tests for monitoring control and evaluation of the diabetic animal’s response to treatment. The choice of the analytical assay depends on the characteristic and analytical opportunities of the laboratory, as well as the number of serum samples to be analysed.


A comparison of the concentrations of C-reactive protein and alpha 1-acid glycoprotein in the serum of young and adult dogs with acute inflammation

The concentrations of C-reactive protein (CRP) and alpha 1-acid glycoprotein (AAG) were evaluated in 1-, 3- and 18-month-old dogs (four of each age) that had been inoculated with turpentine oil. The CRP and AAG in 3-month-old and younger dogs subjected to surgery or inoculated with either Staphylococcus aureus or a viral vaccine were also evaluated. The average CRP concentration in the sera peaked 2 days after inoculation of turpentine oil. The peak CRP concentrations in 3- and 18-month-old dogs were significantly \((p < 0.05)\) greater than those in 1-month-old dogs. The average AAG concentration in the sera peaked 4 days after inoculation of turpentine oil. No significant difference was found in AAG concentrations between any of the age groups. When experimentally inoculated with S. aureus or subjected to oophorohysterectomy, the CRP and AAG concentrations increased in 3-month-old dogs, but they increased little in 1-month-old dogs. The CRP and AAG in dogs inoculated with the viral vaccine did not increase. In dogs with fractures or subjected to percutaneous gastroscopy, the CRP and AAG concentrations correlated with the condition of dogs.


Adverse reactions to FMD vaccine

A case of adverse post-vaccination allergic reactions, which occurred in a dairy cattle herd 8 days after the annual foot-and-mouth disease (FMD) Vaccination, is described. The dermatologic lesions observed in these cattle included: urticaria, exudative and necrotic dermatitis, along with oedema and vesicles on the teats. These reactions occurred in 11.3% of the heifers, in 10% of the first lactating cows and in 14.6% of the adult cows. The average loss of milk production for an affected cow on this farm was 21.5% per day, for seven consecutive days. The extent of the lesions was apparently related to concurrent diseases such as bovine virus diarrhea - mucosal disease complex (BVD-MD) and Johne’s disease and, to a lesser degree, correlated with the age or breed.


Quantitative analysis of microfilarial periodicity of Dirofilaria immitis in cats

Microfilarial periodicity of Dirofilaria immitis in the venous blood of infected cats was analyzed by a trigonometric model. Cats were infected by subcutaneous transplantation with 120-day-old juvenile D. immitis. Microfilariae in the blood were first observed 98 days after transplantation. Blood was collected at 4h intervals for a 24h period, and examinations were repeated five times in two cats. The calculated periodicity index was 75.1 and 50.3 in these two cats. The estimated hour of peak microfilarial density ranged from 1.00 to 2.84h. Thus, the periodicity of microfilariae of D. immitis in the blood of cats was characterized as nocturnally sub-periodic.

Pathophysiological effects of low dietary phosphorus in pigs

The homeostasis of inorganic phosphate (Pi) is regulated by parathyroid hormone (PTH), 1,25-dihydroxyvitamin D [1,25(OH)₂D], and Pi itself in the intestine, kidney, and bone in all the mammalian species studied. Determinations of the serum concentrations of PTH, 1,25(OH)₂D and osteocalcin were done in 82 southern Romanian Landrace pigs originating from three herds with dietary Pi deficiency. Serum Pi concentrations were negatively correlated with those of 1,25(OH)₂D. In lactating animals and sucklings, the linear relationships between Pi and 1,25(OH)₂D were not present. Serum Pi concentrations were positively correlated with those of PTH. In lactating animals and young pigs, the linear relationships between Pi and PTH were not evident. PTH and 1,25(OH)₂D concentrations were negatively correlated. The serum concentrations of 1,25(OH)₂D and osteocalcin were positively correlated. Milk Pi concentrations ranging from 3.10 to 7.49 mmol/L were correlated positively with urinary Pi concentrations ranging from 0.26 to 11.37 mmol/L. In conclusion, similarly to other species Pi homeostasis is achieved in pigs by feedback mechanisms between Pi, PTH and 1,25(OH)₂D and osteocalcin production is induced by 1,25(OH)₂D. The effect of lactation on Pi homeostasis remains to be explored.


Presence of immune-complexes, and absence of antinuclear antibodies, in sera of dogs naturally and experimentally infected with *Ehrlichia canis*

Antinuclear antibodies (ANA), immunoglobulin G (IgG) concentrations and circulating immune-complexes (CIC) were measured, over a period of 3 years, in 6 dogs experimentally infected with *Ehrlichia canis*, and in 10 dogs naturally infected with the rickettsia. No ANA were detected in any of the samples tested. The IgG concentrations were shown to be higher in the infected dogs when compared to the control dogs. CIC were detected in 2 of 10 naturally and 2 of 6 experimentally infected dogs, during both the acute and the subclinical phases of the disease. The results of this study suggest that ANA do not play a role in the pathogenesis of CME. It is however suggested that some manifestations in canine ehrlichiosis are immune-complex mediated.


Effects of dietary chromium picolinate supplementation on performance and plasma concentrations of insulin and corticosterone in laying hens under low ambient temperature

This experiment was conducted to evaluate the effects of chromium (chromium picolinate) on performance and plasma concentrations of insulin and corticosterone of laying hens (Ross Brown) under a low ambient temperature (6.9 degrees C). One hundred and twenty laying hens (46 weeks old) were divided into four groups, 30 hens per group. The laying hens were fed either a control diet containing 710.3 p.p.b. chromium or the control diet supplemented with 100, 200 or 400 microgram chromium/kg diet. Increasing supplemental chromium increased live weight change (p < or = 0.001, linear) and egg production (p < or = 0.001, linear) and also improved feed efficiency linearly (p < or = 0.001). Live weight change and egg production also had quadratic responses (p < or = 0.001) to increasing chromium supplementation. Plasma insulin concentration increased linearly (p < or = 0.001), whereas corticosterone concentration decreased linearly (p < or = 0.001) as dietary chromium supplementation increased. The results of this study indicate that supplemental dietary chromium, 200 p.p.b. in particular, had a positive effect on performance and increased the plasma insulin concentration of laying hens under cold stress.

Calculation of gross energy in pet foods: new data on heat combustion and fibre analysis in a selection of foods for dogs and cats

Seven pectin samples, six galactomannan sources, five carrageen samples, four alginate samples, one sample of gum tragacanth, agar agar and gum arabicum, two xanthan samples, two inulin samples and a galacto oligosaccharide, 22 cellulose samples, six lignin samples, four starch samples, nine protein samples, six isolated fats, three meat samples, two lung samples, two samples of skimmed milk powder, 12 prepared complete dry dog foods, 21 moist dog foods, nine dry and 25 moist cat foods and 10 faecal samples were analysed for heat combustion (adiabatic bomb calorimetry), crude nutrients, acid detergent fibre (ADF), and acid detergent lignin (ADL). Some of the non-starch polysaccharides which gave low levels of crude fibre and ADF were also analysed for total, insoluble and soluble fibre. The heat combustion of cellulose ranged between 17.0 and 17.5 kJ/g organic matter (OM). The variation was somewhat larger for other non-starch polysaccharides (pectin, galactomannan sources, carageen, alginate, gums, xanthan, inulin) where heat combustion ranged between 14.0 and 18.2 kJ/g OM. The heat combustion of lignin averaged 25.5 kJ/g OM with considerable variation (17.0-29.2 kJ/g OM). Starch had a narrow range (17.2-17.3 kJ/g OM). Heat combustion of protein samples varied between 22.0 and 24.6 kJ/g, and of fat samples varied between 38.0 and 39.6 kJ/g OM. When cellulose was analysed for crude fibre only between 62 and 85% OM was detected. ADF analyses of cellulose ranged between 75 and 93% OM. The crude fibre content of all other non-starch polysaccharides did not exceed 13% OM, with the exception of pectins (ADF 0.7-3.7% OM) and alginates (ADF 39-66% OM), the ADF content was also below 13% in these samples. In contrast the total fibre content was above 80% OM in all non-starch noncellulose polysaccharides and the percentage of soluble fibre was high (25-93% OM). Unprocessed lignin gave high readings for crude fibre (39-61% OM) and ADF (96-99% OM), while processed lignin had low crude fibre content (<1% OM) and low ADF content (<32%). ADL determined unprocessed lignin (78-91% OM), but again processed lignin was analysed incorrectly (<29%). Pectin and alginate gave false positive ADF readings of up to 31% OM, while all other non-starch polysaccharides were not determined by ADL. When gross energy was calculated with the factors (kJ/g) 24 for protein, 38 for fat and 17 for all carbohydrate, including fibre, there was a good correlation between calculated gross energy and heat combustion in 67 pet foods as well as in meat, lung and skimmed milk powder. In contrast to this the same factors underestimated heat combustion of faeces by around 8%.


Rapid detection and identification of *Clostridium chauvoei* by PCR based on flagellin gene sequence

We developed a one-step polymerase chain reaction (PCR) system that specifically detects *Clostridium chauvoei*. Oligonucleotide primers were designed to amplify a 516-bp fragment of the structural flagellin gene. The specificity of the PCR was investigated by analyzing 59 strains of clostridia, and seven strain of other genera. A 516-bp fragment could be amplified from all the *C. chauvoei* strains tested, and no amplification was observed by using DNAs from the other strains tested, including *Clostridium septicum*. Similarly, this PCR-based method specifically detected *C. chauvoei* DNA sequences in samples of muscle and exudate obtained from mice within 12h of inoculation. In tests using samples of muscle or liver, the limit of detection was about 200 organisms per reaction. These results suggest that the one-step PCR system may be useful for direct detection and identification of *C. chauvoei* in clinical specimens.


Epidural analgesia in the dog and cat

A brief outline of the history of epidural analgesia is followed by a review of the anatomy of the epidural space with particular reference to epidural block. The technique of epidural injection in the dog is described as are the indications for the technique. These include the provision of anaesthesia for such procedures as orthopaedic surgery of the hind limb and caesarean section. The cardiovascular effects of epidural block are discussed and suggestions are made for the prevention of hypotension. The various drugs and their combinations which may be used for epidural administration are outlined. The commonest used local anaesthetic agents are bupivacaine and lidocaine. Epidural administration of opioid drugs is a relatively new technique which is used to provide intra- and post-operative analgesia. Morphine is the drug of choice for this indication. The use of other classes of drugs, such as the alpha 2 agonists and ketamine, are also considered. A variety of side-effects, contra-indications and complications are described together with methods for reducing their incidence and effects.

Factors influencing the food preference of cats

Four individual preference tests were carried out using the same 10 castrated adult cats. The main questions investigated were: (i) do the cats prefer diets having one dominant taste or diets made from a relatively wide range of compounds of animal origin and (ii) can the preference be connected to one taste? In test 1 a dry diet (K) made by a world-renowned company having a beef taste was compared with four others (I, II, III, IV) dry foods prepared at the authors' institute in order to prevent any one of the mixtures having a predominant taste. In test 2 diets I, II, III and IV were compared with each other in the absence of diet K. In test 3 another four diets with different dominant tastes (fish, liver, poultry with fat addition and poultry without fat addition) were investigated. In test 4 the same three tastes (beef, fish and poultry) were compared with each other by using diets of three world-renowned companies. From the results the following conclusions can be drawn. Cats undoubtedly use smell in the detection and selection of food. If cats find the odour of a certain food is significantly more attractive than that of the other, they will consume it exclusively and without tasting the less attractive food. If none of the diets are especially attractive, according to smell, cats will also taste the foods and make their decision on the basis of both senses. Diets having one dominant taste result in a higher feed intake than that reached by diets without a dominant taste. If a diet is manufactured well, its dominant taste may have less effect on diet consumption. Food preference does not seem to be connected to one exclusive taste but is significantly influenced by other factors connected to the manufacturing of the diets.


Enhanced lipid peroxide levels in the erythrocytes of calves with haemoglobinuria

Eight 6-9 month old calves, showing clinical signs of intermittent haemoglobinuria, even after treatment with an antipiroplasmal drug (4,4-diamidinodiazamino-benzene diacetate), were examined for oxidative damage to their erythrocytes and the presence of hemoproteozoa in blood smears. Four calves without signs of haemoglobinuria served as controls. The blood smears from three of the eight calves contained piroplasms for *Theileria annulata*. Irrespective of the presence of piroplasms in their blood smears, the calves with haemoglobinuria had significantly (p < 0.01) lower haemoglobin concentrations (Hb) and packed cell volumes (PCV). The lipid peroxide level in the erythrocytes, but not in the plasma, of calves with red urine was significantly (p <0.05) higher than that for the controls. It is concluded that haemoglobinuria, irrespective of the presence of piroplasms in blood smears, is associated with oxidative stress to erythrocytes and peroxidation of polyunsaturated fatty acids of cell membrane.


Reduction in serum lecithin:cholesterol acyltransferase activity in natural cases of pneumonia in calves

In experimental calf pneumonia induced by inoculations of *Pasteurella haemolytica* or bovine herpes virus-1, lipoprotein lipid concentrations and lecithin:cholesterol acyltransferase (LCAT) activity decrease. The purpose of this study was to examine whether similar changes in lipoproteins occur in natural cases of calf pneumonia. When monitored in a time-course study, the activity of LCAT, and the concentrations of free cholesterol, cholesteryl esters, phospholipids and triglycerides were steadily decreased. No significant decreases in LCAT activity or lipid concentrations were detected in sera from cows with mastitis. These results, coupled with the previous findings on experimental calf pneumonia, indicate that, while decreases in LCAT activity and the LCAT-related lipid concentrations are involved in the pathogenesis of calf pneumonia, this is not the case for all inflammatory diseases.