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Universities Federation for Animal Welfare  
Science in the Service of Animal Welfare

## INVITED LECTURES

### Housing and Management for Milk-Fed Dairy Calves

**Weary, D.M.\***

\*Co-authored with Von Keyserlingk, M.A.G.

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Methods of housing and managing the milk-fed dairy calf have changed considerably in recent years. We review key developments and how these affect calf welfare. Limit feeding of milk is recognized as both a welfare and production risk. Conventional limit feeding methods (i.e. approximately 10% BW/d) result in signs of chronic hunger, abnormal behavior, poor weight gains and poorer lifetime performance. A series of studies have shown benefits of feeding at least 20% BW/d (i.e. > 8L/d of whole milk). Calves benefit most from increased rations when these are fed earlier in life (at less than 4 wk of age) when they are less able to digest solid feed. High milk rations earlier in the milk-feeding period can be followed by a step-down procedure (after 4 wk) that provides less milk and encourages solid feed intake. Such procedures allow for excellent calf performance before and after weaning from milk. Feeding high volumes of milk, especially by a teat that slows drinking speeds, reduces the risk of cross sucking and other abnormal behaviors, and thus facilitates social housing. Calves receive multiple benefits from social housing during the milk feeding period, including reduced neophobia, improved cognitive abilities, increased solid feed intakes before weaning and reduced responsiveness to management stressors. Groups should be kept small (as small as 2 or 3 calves) to minimize the risk of disease and to aid management. In summary, calves benefit from increased milk rations, improved weaning methods, and housing in small groups.

### Benchmarking Animal Welfare: Engaging Producers and Improving Practice

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Our research group has worked for some 20 years to identify methods of improving the welfare of dairy cows. We have become interested in developing better ways of closing the gap between science and changed practice on farms. In this talk we argue that benchmarking should be increasingly applied to welfare relevant measures,

as an effective in getting farmers interested in problems. We have found that benchmarking welfare measures provides veterinarians a way to get their clients interested in specific issues, and to help their clients develop tailored solutions to the problems. We review work on lameness and calf care showing how benchmarking outcomes results in increased farmer interest in these problems and facilitates discussion with veterinarians and other dairy industry professionals that enable implementation of management changes that lead to measurable improvements on farms. In summary, benchmarking can be applied to specific welfare outcomes as an effective way of redirecting producer interest and management efforts towards these issues.

## Environmental Enrichment of Dairy Cows and Calves in Indoor Housing

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In recent years, an increasing number of farmers are choosing to keep their cows indoors throughout the year (i.e. “zero-grazing” systems). Indoor housing of dairy cows and calves is associated with various challenges for the animals. These include abiotic environmental sources of stress (e.g. exposure to loud and aversive sound) and confinement-specific stressors (e.g. restricted movement and maintenance in abnormal social groups). Environment enrichment is defined as a modification to the management or surroundings of the animal that demonstrably improves biological functioning, or other validated measures of welfare (i.e. those measures that are correlated with valenced experiences) over and above what is achieved by following minimum management standards (e.g. European Union guidelines). Here, we review recent findings on the effect of social, occupational, physical, sensory, and nutritional enrichment on dairy cows and calves, and we assess the appropriateness and practicality of implementing different enrichment practices on commercial dairy farms. We show that the process of enrichment can be achieved by adding certain aspects to the environment (e.g. providing cows with a secluded area to calve; rearing young calves in pairs rather than in isolation; feeding calves with milk through a nipple), but also by removing certain aspects (e.g. exposure to loud music in the milking parlor). Several of the methods described here will, in time, be integrated into the minimum raising standards of cattle, whereas others will remain under the scope of enrichment.

## What happens when the legislation is not science-based?

**Ben-Dov, D.**

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## ABSTRACTS: ANIMAL WELFARE

## Brushing Activity as an Indicator of Lameness in Dairy Cows

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Lameness in cattle is a common welfare problem with significant economic implications. All too often, appropriate treatment is delayed or neglected due to insufficient detection of lame cows. Brushing activity, as an expression of grooming, is considered to be a “low resilience” activity (i.e. activities that typically decrease when energy resources are limited or when the cost involved in the activity increases), and is likely to be reduced in cases of sickness or pain. The aim of this study was to evaluate the efficacy of monitoring brush usage as an early indicator of lameness. Locomotion scores of 231 lactating Holstein dairy cows were collected individually once a week, for 14 weeks, using a 5-point scoring system. Brushing activity was collected automatically from six brushes, three installed next to the feed-bunk, and three on the opposite side of the cowshed. Data on daily milk yield and rumination was collected from the farm database. Locomotion scores were negatively associated with daily duration of brush usage and daily milk yield, but not with daily rumination. Severally lame cows (locomotion score 4-5) used the brush considerably less than non-lame cows (7.5 sec/d compared to 91.2 sec/d). In addition, brushes located away from the feed-bunk were found to be more indicative of lameness than brush installed next to the feed-bunk. The results of this study suggest that on-farm monitoring of low-resilience behaviours, together with existing systems that monitor core behaviors (e.g. activity milk yield), may potentially serve as an improved method for detecting animal welfare compromising events.

## Assessing Pain Relieving Methods During Caustic Disbudding

**Honig, H.,<sup>1</sup> Shabtay, A.,<sup>2</sup> Adin, G.,<sup>2</sup> Malka, H.,<sup>2</sup> Peleg, G.,<sup>3</sup> Weyl-Feinstein, S.<sup>4</sup> and Factor, G.<sup>4</sup>**

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There are several methods for disbudding and dehorning: burning the bud (electricity or gas), caustic paste and dehorning. The aims of this study were evaluation of pain during disbudding with caustic paste, and comparing several analgesic methods. At that research we observed the influence of pain relief in two age groups on the level of pain following disbudding with caustic paste. The first age group (8-14 days) was divided into three sub-groups: the first was treated with NSAID (16 calves), the second was treated with NSAID and local anesthetic (16 calves), and the third was not treated (control; 16 calves). The second age group (0-7 days) was divided into two sub-groups: the first was treated with local anesthetic (16 calves), and the second was not treated (control; 16 calves). In both age groups there were 8 naïve (no disbudding) calves. The parameters evaluated were: number of steps, behavioral video movies and level of cortisol in the blood. At the group 0-7 days, calves with no pain relief, stepped more than the naïve. In the group 7-14 days, the local anesthesia group stepped less in the first hour than the other groups. The cortisol level in the blood of the untreated group was higher than the treated animals in both age groups. Increase in steps indicates discomfort that the calf presenting after disbudding. Calves treated with NSAID and local anesthetic suffered less from disbudding procedure.

## Observation of Certain Parameters with Animal Welfare Implication in Performing Shechita in Cattle

**Pozzi, S.,<sup>1</sup> Geraisy, W.<sup>2</sup> and Perry Markovich, M.<sup>1</sup>**

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<sup>2</sup> Chief Veterinary Inspector, “Tnuva Bakar” slaughter plant, Beit Shean, Israel.

During slaughter without stunning, the European Food Safety Agency (EFSA) considers several welfare aspects, as recently investigated in 7 European slaughterhouses on 331 slaughters. In Israel 140-150,000 cattle heads are yearly slaughtered without stunning according to ritual “shechita” or “dabcha”. The objectives were to compare the supervised slaughters in Israel to EFSA recommendations with regard to individual distress situations, and address corrective measures to avoid unnecessary pain, and minimize distress. The study took place in one slaughterhouse with capacity of 30 heads/hour; inverted restraint with chin-lift; 5 slaughterers; 125 observed animals; over 4 working days. Parameters investigated: weight; breeds; prodding; bellowing; time from restraint to cut; number of cut moves; cut of both carotids; time to tongue prolapse; total restraint time; carotids occlusion; blood inspiration in trachea; cut position with respect to cricoid cartilage. The average weight 548±75 kg; 5 breeds/hybrids; 0 prodding; 5,6% animals bellowing; 9,7 sec’ average time head restraint to cut; 2,9 average cut moves; 98,4% carotid arteries cut (97,6% of animals); 31,4 sec’ average time from cut to tongue prolapse (92,8% of animals); 41 sec’ average restraint time; 13,6% Carotid arteries occlusion (22,4% of animals); 11,2% blood in trachea; 9,4 cm, cut position down to cricoid cartilage. Compared to the EU study: bellowing, and cut movements were similar; carotid arteries cut was higher; restraint times, Carotid occlusions, blood in trachea were lower. Moreover, differences were found among slaughterers about promptness to cut, cut moves; among animals: time to tongue prolapse/supposed unconsciousness. The results of delayed cuts, several cut moves, failures in carotid arteries cut, carotid occlusions, and delayed tongue prolapse times, suggest that back-up measures should be performed.

## Determining Stress in Poultry – Development of Uniform Parameters to Determine Physiological Stress

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Increased awareness of poultry welfare has made it necessary to determine the birds’ response to stress, with minimal harm and maximum reliability. Several methods to determine the response to physiological stress were developed throughout the years to identify stressors and to measure stress in poultry. The most commonly used are plasma corticosterone levels and the peripheral blood heterophil/lymphocyte ratio. However, the value of these markers to determine a state of stress has been questioned in several instances, as the parameters are increased during the process of bird handling and blood sampling irrespective of the state of stress. Due to these limitations, it appears that the classic stress indicators might be sub-optimal in evaluating stress in poultry, particularly those encountered in high-stress environments. Thus, there is a continuing need for stress indicators, preferably indicators that are quantitative, highly repeatable, not influenced by handling and sampling, determined in peripheral blood, represent an initial response to the stressor and do not fluctuate daily. As the immune system has been shown to rapidly respond to stress, we assessed pro-inflammatory gene expression in

peripheral leukocytes as an indicator for stress. We initially show that while corticosterone plasma levels and the H/L ratio were responsive to handling and blood sampling, pro-inflammatory gene expression (lysozyme, IL-1 $\beta$ , IL-6 and HSP-70) was not. We then determined the expression of the same pro-inflammatory genes during acute stress (transit) in layer pullets (hen and turkey) and during chronic stress (different stocking densities of layers) and found that the expression of these genes was responsive to stress. We propose to use pro-inflammatory gene expression in peripheral blood cells to measure responses to stress in poultry.

## Feeders of Free-Roaming Cats: Personal Characteristics, Feeding Practices, and Data on Cat Health and Welfare in an Urban Setting of Israel

**Gunther, I.,<sup>1</sup> Raz, T.,<sup>1</sup> Even Zor, Y.,<sup>2</sup> Bachowski, Y.<sup>1</sup> and Klement, E.<sup>1</sup>**

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<sup>2</sup> Veterinary Municipal Department, Rishon-Lezion, Israel.

Cat feeders serve as an important source of available food for free-roaming cats (FRCs) and can play a central role in providing data on FRC distribution, welfare and health. The current study surveyed 222 FRC feeders in the city of Rishon-Lezion. Feeders were divided into four groups according to the number of cats they reported to feed per day (group-1: fed up to 5 cats, group-2: fed 6-10 cats, group-3: fed 11-20 cats, and group-4: fed  $\geq$ 21 cats). Most feeders were women (81%), with a median age of 58 years. The feeders reported an overall feeding of 3337 cats. Feeders of group 4 comprised 15.31% (n = 34) of all feeders but fed 56% (n = 1869) of the FRCs. "Heavy" feeders (group-3 and 4) reported that they traveled significantly longer distances in order to feed the cats. Interestingly, "heavy" feeders were usually singles, had on average fewer offsprings, a clear preference for owning cats as pets, and lived in lower income neighborhoods. Feeders reported to feed 69.7% (2325/3337) neutered cats and 11.8% (395/3337) kittens. Moreover, 1.6% (54/3337) of the cats were limping, 2% (67/3337) suffered from a systemic disease, 4% (135/3337) had skin lesions, and 3.9% (130/3337) were suffering from a chronic disability. Kittens and morbidity rate were significantly and negatively associated with neutering rate. Collaboration by the authorities with these heavy feeders, who represent a small number of FRC feeders and feed substantial FRC numbers, may be significant for the control and monitoring of FRC populations and their resources.

## Israeli Veterinary Students' Attitudes Towards Farm Animal Welfare During Veterinary Training – A Longitudinal Study

**Meri, T.,<sup>1</sup> Otniel, D.<sup>2</sup> and Landau, R.<sup>3</sup>**

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The knowledge base and attitudes of veterinary students toward farm animal welfare may influence their treatment of animals. These attitudes reflect the students' demographics, perceptions of mental (cognitive and emotional) capabilities of farm animals, and their training. We administered a multiple-choice questionnaire to veterinary students (1st year $\times$ 2, 2nd year, 4th year). We included all the students who began their training

in 2011 at the Koret School of Veterinary Medicine and finished in 2014 (n=65). 159 questionnaires were collected. The following attitudes were surveyed: 1. Degree of farm animals' entitlement to the "Five freedoms". 2. View of animal production food industries (APFI); 3. Attribution of mental capabilities to farm animals; 4. The ethical view of the use and treatment of animals. During their studies the students expressed less agreement with the current production systems for dairy cows and swine, they agreed more with the need to provide farm animals with their behavioral needs, and they expressed a growing concern with practices in use in APFI, and they attributed higher capabilities of boredom to cattle, swine, birds and rodents. Several independent variables showed significant relationships with the attitudes: Gender and attitudes 2 and 3; nutrition and attitudes 2-4; religiosity and attitudes 1-4. There were no significant relationships between political views and attitudes, nor between main residence in childhood and attitudes. The observed pattern of increased awareness to animal welfare and higher criticism of APFI is unique to Israeli students and was not found in other countries where these subjects were studied.

## Justice is The Missing Link in Ethical Discussions on One Health

**Lysaght, T.,<sup>1</sup> Capps, B.,<sup>2</sup> Bailey, M.,<sup>3</sup> Bickford, D.,<sup>4</sup> Coker, R.,<sup>5</sup> Lederman, Z.,<sup>1</sup> Watson, S.<sup>1</sup> and Anantharajah-Tambyah, P.<sup>6</sup>**

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Singapore is one of many countries to embrace the One Health (OH) framework for the prevention and control of Emerging Zoonotic Diseases (EZD). We conducted a mixed methods study using 11 semi-structured interviews and a modified Delphi technique with a panel of 32 key opinion leaders in Singapore. Panellists rated conceptions of OH and priorities for EZD preparedness planning using a series of scenarios developed through the study. Interview data were analysed qualitatively using thematic analysis techniques. Panellists agreed that OH is a cross-disciplinary collaborative effort between the veterinary, medical, and ecological sciences and the relevant government agencies encompassing animal, human, and environmental health policy and research. Human health was the most important priority in EZD planning. However, qualitative analysis suggested that consideration of non-human animal health and welfare as well was very important, and that effective pandemic planning demands regional leadership and international cooperation. Findings suggest that affluent urban states, such as Singapore, need to take on greater regional responsibilities and leadership roles in managing EZDs, especially those with potential global health impacts. Findings also suggest that culling is not an ethically viable response to EZDs. EZD planning under an OH approach would benefit greatly from an ethical framework that accounts for wider considerations of justice.

# A New Approach to End Feral Cats Nuisance in a Medical Institute

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Feral cats' presence in medical institutions could harm patients health. A 6-months intervention plan of the district health office and the hospital was developed in 2016 aiming to reduce total cat population around the hospital grounds while maintaining the cats' welfare. Objectives were regulating cat population in health care facilities and monitoring the success of the intervention. Principles of Operation: Closure of potential entrances for cats into hospital buildings, placement of signs throughout the hospital, emphasizing the prohibition of feeding cats on hospital property in a letter dispatched to all hospital workers with their paycheck. Increased enforcement of hospital sanitarians activities to ensure removal of feeding stations placed by hospital workers or visitors.

Monitoring Feral Cat Population: hospital area was drawn on a grid map which showed the location and number of cats with the start of and during the intervention. Map marking the location included cats, specifying unique identification, spay / neuter and group size. During the six months intervention, the observations which were held monthly at regular intervals by a team of inspectors show cat population reduction from 10 to 0. This number also remains two months after the intervention. The monitoring results indicate a significant decline in feral cats' presence in hospital territory. The number of complaints from staff and patients decreased. All these results were low cost, and with the cooperation of various parties and support of institution's administration. This program can be applied to other public institutions.

# Equine Welfare Assessment Measurement Protocol Construction

**Rosenblatt, R.,<sup>1</sup> Idan, B.,<sup>1</sup> Collins, J.<sup>2</sup> and Sutton, G.A.<sup>1</sup>**

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Valid and reliable measurement protocols are needed for authorities to decide whether to confiscate horses under Equine Welfare Acts worldwide. Protocols have been published, but they have been based on the literature and personal opinion. The aim of this study was to select indicators of equine welfare based on consensus of a panel of experts utilizing a modified Delphi method. The study was divided into two parts. The first part focused on indicators requiring direct observation of the horse and the second on management conditions. Primarily authors of research articles on equine welfare or members of equine welfare committees were approached by email. Experts from the United States, the United Kingdom, Ireland, Romania and Israel participated, 30/96 in the first study and 28/92 in the second study. Indicators gleaned from the literature were presented to the panel and participant-initiated indicators were added as they arose. Experts graded the importance of the indicator for assessing equine welfare on a five (2nd study) or 7 point scale (1st study). In repeated rounds, experts reconsidered their grades based on anonymous results of the previous round, until each indicator was stable (less than 15% of panel members changed their grades), or at least 90% agreement was obtained (only the second part). Four rounds were completed for each study. Indicators chosen were of the two highest levels of importance with agreement of over 60% of experts. Thus, the indicators were reduced to 17/38 for the first study. Results are presently pending for the second study.

## ABSTRACTS: OTHER TOPICS

## Partial Wing Amputation in Fruit Bats (*Rousettus Aegyptiacus*) Using a Novel Hemostatic Technique

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Bat wings are prone to traumatic injuries due to their relatively large size and the thinness of the metacarpals (MC) and phalanges (PH). Treatment of these injuries using wing fixation and secondary intention healing is impossible since non-ventilated wing membranes quickly deteriorate or heal by creating a fold. Moreover, the thinness of the wing bones precludes placement of intramedullary pins. Partial amputation is therefore recommended for bone fractures of wing extremities, often allowing full flight recovery. However, amputation is associated with persistent bleeding since membrane anatomy does not allow a simple vessel ligation. We developed a new hemostatic technique that allows amputation of MC and PH bones without bleeding. In June 2016, 31 bats with combined fractures in wing extremity MC and PH bones of different severity (uni- or bilateral) were treated by partial wing amputation at our bat laboratory. Among 10 bats undergoing amputation using electrocautery, silver nitrate, and application of constant pressure, (50%) continued bleeding for over 30 minutes after the amputation, and one died. We then used a novel technique - ligation of the blood vessel to the bone prior to the amputation using a double surgical knot proximal to the amputation site - on 21 consecutive bats. There was no hemorrhage after amputation or arousal and all bats survived. Out of 31 bats, 20 (64 %) were released back to nature after recovery. In conclusion, we describe a simple and effective hemostatic technique for partial wing amputation, allowing flight recovery in most bats.

## Kidney Specific Urinary Clusterin is a Sensitive Marker of Acute Kidney Injury in Dogs

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Acute kidney injury (AKI) is associated with high morbidity and mortality in both humans and animals, possibly, among other reasons, due to delayed diagnosis of the disease. In recent years, interest is growing in the utility of biomarkers as early diagnostic tools for AKI. One shortcoming of the biomarkers investigated thus far is their abundance in many tissues, rendering them unspecific for the kidney. The study aimed to assess the utility of a kidney specific urinary marker, clusterin, with its sensitivity and specificity in various urinary tract conditions in dogs. Dogs presented to the hospital were prospectively enrolled and classified into the following groups: 1) healthy; 2) lower urinary infection (LUTI); 3) stable chronic kidney disease (CKD); 4) acute kidney injury (AKI). The study included 40 dogs. Urinary clusterin differed significantly ( $P < 0.001$ ) among the study groups. The median urinary clusterin to creatinine concentrations ratio (ng/mg) of the healthy controls, UTI, CKD and AKI groups were 40.2 (3-157), 42.7 (12-6189), 1740 (391-11834) and 6937 (102-69855), respectively. The area under the receiver operator characteristics curve of urinary clusterin:creatinine ratio (when healthy controls and dogs with AKI included) was 0.96 (CI95% 0.88-1.0), and a cutoff point of 80 pg/mg was associated with sensitivity and specificity of 100% and 80%, respectively. This study demonstrated that urinary clusterin is a potential biomarker of AKI. Further studies will need to assess if it is also a marker of early AKI.



## Sleeping and Resting Respiratory Rates in Dogs and Cats with Medically-Controlled Left-Sided Congestive Heart Failure

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Sleeping and resting respiratory rates (SRR and RRR, respectively) are commonly used to monitor dogs and cats with left-sided cardiac disease and to identify animals with left-sided congestive heart failure (L-CHF). Dogs and cats with subclinical heart disease have SRRmean values <30 breaths/min. However, little is known about SRR and RRR in pets with L-CHF that is well controlled with medical therapy. In this study, 8-10 consecutive SRR and RRR values were measured at the home environment by the owners of 51 dogs and 22 cats with stable, well controlled CHF. Median canine SRRmean was 20 breaths/min (7–39 breaths/min); eight dogs were ≥25 breaths/min and one dog only was ≥30 breaths/min. Canine SRRmean was unrelated to pulmonary hypertension or diuretic dose. Median feline SRRmean was 20 breaths/min (13–31 breaths/min); four cats were ≥25 breaths/min and only one cat was ≥30 breaths/min. Feline SRRmean was unrelated to diuretic dose. SRR remained stable during collection in both species with little day-to-day variability. The median canine RRRmean was 24 breaths/min (12–44 breaths/min), 17 were ≥25 breaths/min, seven were ≥30 breaths/min, and two were >40 breaths/min. Median feline RRRmean was 24 breaths/min (15–45 breaths/min); five cats had RRRmean ≥25 breaths/min; one had ≥30 breaths/min, and two had ≥40 breaths/min. These data suggest that most dogs and cats with CHF that is medically well-controlled and stable have SRRmean and RRRmean <30 breaths/min at home. Clinicians can use these data to help determine how best to control CHF in dogs and cats.

## Global Hemostasis in Healthy Bitches During Pregnancy and at Different Estrus Cycle Stages: Evaluation of Routine Hemostatic Tests and Thromboelastometry

**Klainbart, S., Slon, A., Kelmer, E., Bdolah-Abram, T., Raz, T., Segev, G., Aroch, I. and Tal, S.**

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The present study assessed the global hemostasis (including prothrombin time [PT], activated partial thromboplastin time [aPTT], antithrombin activity, fibrinogen and d-Dimer concentration, platelet count, plateletcrit and thromboelastometry) in healthy pregnant bitches comparing the results with those of healthy bitches at different estrous cycle stages (anestrus, diestrus, proestrus/estrus), as well as assessed whether hemostatic changes during pregnancy are associated with serum progesterone concentration or the presence of fetuses in utero. The results show that pregnant bitches have higher fibrinogen concentration, platelet count and plateletcrit, and fibrin and clot formation occurs faster than in non-pregnant bitches at different estrous cycle stages. Additionally, the clot strength was higher in pregnant bitches than in non-pregnant ones. There were no differences in PT, ATA, and D-dimer concentration between all study groups. The aPTT was significantly

shorter in bitches at week 4 of pregnancy and last pregnancy week compared to the anestrus group and was shorter, in both the fourth and last pregnancy weeks groups compared to diestrus group. These results all support a hypercoagulable state in healthy pregnant bitches. The hemostatic test results were unassociated with progesterone concentration.

## Retrospective Evaluation of 140 Dogs Involved in Road Traffic Accidents

**Klainbart, S., Bibring, U., Strich, D., Chai, O., Bdolah-Abram, T., Aroch, I. and Kelmer E.**

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Road traffic accidents (RTA) are frequent cause of injury to dogs worldwide, accounting for 30-91% of blunt trauma in dogs presented to emergency clinics. The present retrospective study evaluated population characteristics, injury type, emergency diagnostic testing, animal trauma triage (ATT) score and outcome in dogs sustaining RTA in Israel. Data were retrospectively collected from the medical records, including the case history, clinical signs at presentation, an emergency laboratory analyte (CBC, PCV, total plasma protein concentration, glucose, and electrolytes), radiographs evaluation, ATT score, treatments, complications, diagnoses, length of hospitalization and the outcome. The study included 140 dogs. The survival rate was 83.2% (114/137 dogs). Younger dogs sustained more lung contusions and limb fractures, while larger dogs suffered more limb fractures, and smaller dogs and older dogs sustained more pelvic fractures and sacroiliac luxations, ( $P < 0.05$  for all). Dogs sustaining orthopedic injuries required longer hospitalization ( $P < 0.001$ ). Dogs unable to walk ( $P < 0.001$ ) and those with neurologic abnormalities ( $P < 0.001$ ), spinal fracture ( $P = 0.035$ ), abnormal body temperature ( $P = 0.001$ ), hyperglycemia ( $P = 0.026$ ) or hypoproteinemia ( $P = 0.04$ ) at presentation showed decreased survival. The number of injured body systems was significantly ( $P < 0.001$ ) associated with survival. In a multivariate logistic regression model for survival, age, neurologic deficits and the ATT score were associated with survival ( $P = 0.042$ ,  $P = 0.05$  and  $P = 0.006$ , respectively). In conclusion: Dogs surviving initial RTA to presentation to the emergency clinic have a good prognosis for recovery to discharge. Possible prognostic indicators in such dogs are older age, high ATT score and presence of abnormal body temperature, neurological deficits, hyperglycemia and hypoproteinemia, and multi-organ trauma.

## Morphology of the Cricoid Cartilage in Brachycephalic Dogs

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The cricoid cartilage supports both the thyroid and arytenoid cartilages and may play a role both in brachycephalic airway obstruction syndrome (BOAS), and in laryngeal collapse. The aim of this study was to characterize the shape of the cricoid cartilage in three common brachycephalic canine breeds and compare it to the shape of the cricoid cartilage in normocephalic dogs. A total of 31 brachycephalic dogs were included in this study and were divided, by breed, into Chinese pugs ( $n = 10$ ), Pekingese ( $n = 10$ ), French bulldogs ( $n = 11$ ). The control

group comprised 11, weight matched, non-brachycephalic dogs. All dogs underwent computer tomography (CT) scans of the head and neck area for reasons unrelated to this study. Two to 3 CT images of the cricoid cartilage were collected from each dog and analyzed using ImageJ software. The area, circumference, and longitudinal and transverse diameters of the cricoid cartilage were measured on each image. All parameters were compared between controls and the brachycephalic dogs groups. Brachycephalic dogs had significantly more elliptical cricoid cartilage conformation when compared to control ( $P < 0.001$ ) dogs. In the post-hoc analysis the difference between the groups was found to be mainly due to the Chinese pugs and French Bulldogs. There were no significant differences among the brachycephalic dogs groups with regard to cricoid shape. These results suggest an additional element increasing the airway resistance in brachycephalic dogs exposing them to further progressive respiratory deterioration and laryngeal collapse. A narrower cricoid may be a new component of BOAS.

## Outbreak of *Pasteurella Multocida* in 2015-2016 in Cattle: an Old-New Syndrome in Israel?

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In August 2015, an outbreak of disease, characterized by rapid death following severe dyspnea, or sudden death without clinical signs, mainly of calves at the age of 2-5 months, was detected in beef cattle herds in the Golan Heights. Main post-mortem signs were pulmonary edema, poliserositis and bleeding. In the bacteriology laboratory in the Kimron Veterinary Institute, the bacterium *Pasteurella multocida* was isolated in all cases from all the organs (sepsis). In general, no other pathogens were found in outbreak cases. Isolates of *P. multocida* were serotyped by PCR, showing that the outbreak strain belongs to serotype B:2,5. This serotype is known to cause Hemorrhagic Septicaemia (HS), an OIE listed disease that causes high mortality in cattle, buffalo and wild animals in endemic areas in Asia and Africa. The only report of HS in Israel dates from 1927, in the Hula Valley. In the last outbreak, in 2015-2016, 35 farms were affected, with an average 8% mortality (1- 25%) rate. A screening of *P. multocida* isolated across Israel showed that B:2,5 is not common in the country, being found only in the Golan Heights and only in cases suspected of HS. Isolates from different herds showed an identical molecular pattern in ERIC-PCR. It is possible therefore that the outbreak resulted from introduction of a new strain of *P. multocida* in Israel.

# Determining Prevalence and Risk Factors for Colonization with Extended-Spectrum Beta-Lactamases Producing Enterobacteriaceae (ESBL-E) in Hospitalized Neonate Foals

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Multidrug-resistant strains of bacteria, including Enterobacteriaceae, are becoming a worldwide concern in human and veterinary medicine. In human neonates, ESBL-E are known as a cause of infections outbreaks. In neonatal foals, bacterial infection, leading to sepsis, is a major cause of death. Thus, aggressive early treatment with appropriate antimicrobials is crucial. Aims were to determine prevalence and risk factors for ESBL-E colonization in neonatal foals on admission to the hospital and 72 hours following hospitalization. ESBL-E were recovered from enriched rectal swabs, after plating onto CHROMagarESBL plates. Bacterial species and antibiotic susceptibility profiles were determined using Vitek2. Medical records were collected and assessment of risk for individual variables was performed by univariate analysis (SPSS). 59 foals were samples on admission, most of them were re-sampled following hospitalization. On admission, 37% of foals carried at least one ESBL-E. Following hospitalization, 80% of foals were carriers. Colonization of foals was found to be significantly connected to umbilical infection on admission ( $P=0.026$ ). On admission, the main specie obtained was *E. coli*. Following hospitalization, main species were *E. coli*, *Klebsiella pneumoniae* and *Enterobacter cloacae*. Resistance rates to antibiotics were diverse and increased following hospitalization for some antibiotics. The study substantiates the occurrence of ESBL-E colonization in neonatal foals, which might be connected to clinical signs and pathogenic bacteria.

# Effect of Zuclopenthixol Acetate on Stress in Feral Pigeons (*Columba Livia*)

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Medical treatment and human proximity constitutes major stress to wild animals, thus, it may impede their mental and physical condition. Hence, finding safe and effective ways to reduce stress during hospitalization is of uttermost importance. Zuclopenthixol (ZPTA) is a neuroleptic drug widely used in mammals such as ungulates, utilized mainly to enhance acclimatization to new environment. Currently, there is no data regarding ZPTA in avian species. The goal of this study was to assess the effects of ZPTA on physiological and behavioral stress parameters in feral pigeons (*Columba livia*). First phase: the effect of different doses of ZPTA was tested on 4 groups of 3 pigeons. The doses were 0 (saline), 10, 30 or 50 mg/kg via intramuscular injection. Second phase: the optimal dose was tested on a group of 12 pigeons versus a control group of 12 pigeons administered with saline. Parameters tested were heart rate (HR), respiratory rate (RR), cloacal temperature (T), and weight.

Stress level evaluation was based on behavioral parameters (scale 1-3; 1=low, 3=high). In the first phase, 50 mg/kg was selected as optimal. In the second phase, the treatment group exhibited, significantly lower stress levels 6-72 hours following injection, and significantly reduced T 6-24 hours post injection. In addition, the treatment group exhibited lower HR and RR at 72 hours post injection. One pigeon died 5 days post ZPTA injection, and another had diarrhea 4 days post injection. More research is required to assess ZPTA safety and effectiveness before clinical use.

## Neuropathy of the Colon Ganglions in a 2-Month Old Female Cat Resulting in Megacolon

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The underlying cause of megacolon is rarely diagnosed. Here, we described a case of a megacolon in a cat with a visceral neuropathy. The cat was presented with a diarrhea. Vital signs were normal and the cat was dewormed. Two days later the cat developed constipation and megacolon was palpated and radiographed. Enema was performed. The constipation reoccur and the cat was operated and the non-motile colon was removed. After 10 days the condition reoccured and the cat was euthanized. On necropsy the remains of the colon appeared generally dilated and severely hypertrophied. Histology showed severe muscle hypertrophy (circular and longitudinal) and lymphocytic infiltration was found around the ganglia of the enteric neuronal plexus (Meissner's and Auerbach's). Ganglion cells of the plexuses were almost absent. The few remain ganglia showed shrinkage and degeneration with necrosis. The mucosa was mildly inflamed and the number of Goblet cells was increased. The diagnosis was primary visceral neuropathy with secondary muscular hypertrophy and enteritis. Visceral myopathy and visceral neuropathy are the two main syndromes causing megacolon in humans. In the veterinary literature there is no clear case of a cat secondary to visceral neuropathy, therefore, the diagnosis is based on the human criteria. In the cat the possible diagnosis is Feline dysautonomia, however, the cat did not show general signs compatible with this disease. Megacolon in the cat is diagnosed when the underlying cause cannot be identified anymore. This case may represent a clue to a possible cause of megacolon in the cat.