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83. Novel Data Sharing Agreement to Accelerate Big Data Translational Research Projects in the One Health Sphere/ **Staley, Joshua; Mazloom, Reza; Lowe, Paul; Newsum, CT; Jaber-Douraki, Majid; Riviere, Jim; Wyckoff, Gerald J.** Topics in Companion Animal Medicine. ISSN:1938-9736 (2019) v.37 p.100367Topics in Companion Animal Medicine

DOI: 10.1016/j.tcam.2019.100367

Link: <http://www.sciencedirect.com/science/article/pii/S1938973619301047>

Abstract: When conducting translational research, the ability to share data generated by researchers and clinicians working with for-profit companies is essential, particularly in cases that involve “one health” data (i.e., data that could come from human, animal, or environmental sources). The 1DATA Project, a collaboration between Kansas State University and the University of Missouri, has examined and overcome some of the barriers to sharing this information for “big data” projects. This article discusses some of the obstacles we encountered, and the ways those obstacles can be surmounted via a novel form of Master Sharing Agreement. Developed in collaboration with industry partners, it is presented here as a template for expediting future one health work.

Keyword: translational research; big data; data analysis; data sharing; legal issues; one health; public-private partnership

84. Acute pain responses in dairy calves undergoing cornual nerve blocks with or without topical anesthetic/ **Jimenez, Reyna E.; Adcock, Sarah J.J.; Tucker, Cassandra B.** Journal of Dairy Science. ISSN:0022-0302 4(2019) v.102 p.3431-3438Journal of Dairy Science

DOI: 10.3168/jds.2018-15445

Link: <http://www.sciencedirect.com/science/article/pii/S002203021930147X>

Abstract: ABSTRACT Dairy calves are routinely administered medicines, vaccines, and anesthesia via injection. Although injections are painful, little is known about methods to alleviate this pain. The aim of this study was to determine whether lidocaine–prilocaine cream, a topical anesthetic, reduced calves' pain response to a subcutaneous injection around the cornual nerve. Calves were assigned 1 of 2 treatments: lidocaine–prilocaine cream at the sites of injection (n = 10) or no cream (n = 9). Thirty minutes after treatment, calves received a subcutaneous injection of 2% buffered lidocaine hydrochloride around the left and right cornual nerves. Contrary to our hypothesis, calves that received anesthetic cream beforehand displayed more escape behaviors during the injections than control calves. Both treatments had similarly low amounts of head-related behaviors afterward. Maximum eye temperature did not differ between the calves that received anesthetic cream and control calves, although eye temperature increased over time for both treatments. Heart rate increased during the 30 s following the first injection in both treatments. There were no treatment differences for any heart rate measures over the 5-min period after the first injection (mean heart rate, root mean square of successive differences, high-frequency power, and the ratio of low-frequency power to high-frequency power). These results suggest that cornual nerve blocks with buffered lidocaine are painful and that a lidocaine–prilocaine cream was not only ineffective in reducing this pain but that it may also worsen it.

Keyword: animal welfare; injection; lidocaine–prilocaine cream; local anesthesia

85. Pork quality after electrical or carbon dioxide stunning at slaughter/ Marcon, Adila V.; Caldara, Fabiana R.; de Oliveira, Geysane F.; Gonçalves, Liliane M.P.; Garcia, Rodrigo G.; Paz, Ibiara C.L.A.; Crone, Carla; Marcon, Alex. Meat Science. ISSN:0309-1740 (2019) v.156 p.93-97Meat Science

DOI: 10.1016/j.meatsci.2019.04.022

Link: <http://www.sciencedirect.com/science/article/pii/S0309174018303140>

Abstract: A total of 172 pigs were randomly allocated to two stunning treatments: carbon dioxide (CO₂) and electrical stunning at a commercial abattoir. The Longissimus lumborum (LL) muscle was used to evaluate the effects of stunning methods on pork quality and financial losses of carcasses and viscera condemnation was also determined following by sanitary inspection. There was no effect due to stunning method on quality parameters ($P > .137$) of pH 24, drip or thaw loss, lipid oxidation, myofibrillar fragmentation index, shear force or PSE / DFD meat incidence. The LL muscle of the electrically stunned pigs had a higher L * value ($P < .05$), higher cooking loss ($P < .001$) and lower pH 45 ($P < .05$) compared to those stunned with CO₂. CO₂ stunned pigs had fewer carcasses condemned due to fractures / lesions ($P < .05$), hepatic and renal congestion ($P < .05$). CO₂ stunning can be beneficial from an economic point of view because it has reduced losses through condemnation at the slaughterhouse.

Keyword: Carcass; Condemnation; Congestion; Fracture; Viscera

86. Opening of T-type Ca²⁺ channels and activation of HCN channels contribute in stress adaptation in cold water immersion stress-subjected mice/ Kaur, Simranjot; Singh, Nirmal; Jaggi, Amteshwar Singh. Life Sciences. ISSN:0024-3205 (2019) v.232 p.116605Life Sciences

DOI: 10.1016/j.lfs.2019.116605

Link: <http://www.sciencedirect.com/science/article/pii/S0024320519305314>

Abstract: Aim The present study was designed to investigate the possible role of T-type Ca²⁺ channels and HCN channels in the development of stress adaptation in cold-water immersion stress-subjected mice. Material and methods The mice were subjected to cold-water immersion stress by placing them individually in a water tank (depth = 15.5 cm; temperature = 15 ± 2 °C) for 5 min. The mice were subjected to single episode of cold-water immersion stress for inducing acute stress; while for inducing stress adaptation, mice were subjected to repeated episodes of homotypic stressor (5 min) for 5 consecutive days. Animals were administered with ethosuximide (100 and 200 mg/kg, i.p.) and ivabradine (5 and 10 mg/kg, i.p.) before subjecting them to stress for five days. The stress-related behavioral alterations were assessed using the actophotometer, the hole board, the open field and the social interaction tests. The plasma corticosterone levels were quantified as a biochemical parameter of hypothalamic-pituitary-adrenal (HPA) axis activation. Results Acute stress altered the behavioral and biochemical parameters of the animals. However, repeated stress significantly restored the behavioral and biochemical alterations signifying the development of adaptation. Administration of ethosuximide and ivabradine abolished the restoration of behavioral and biochemical changes in the animals subjected to repeated stress. Conclusion The ethosuximide and ivabradine mediated attenuation of stress adaptation demonstrates that the opening of T-type Ca²⁺ channels and activation of HCN channels are involved in inducing stress adaptation in repeated stress-subjected animals.

Keyword: Behavioral changes; Corticosterone; Ethosuximide; Ivabradine; Stress adaptation

87. Intrahippocampal 5-HT1A receptor antagonist inhibits the improving effect of low-frequency stimulation on memory impairment in kindled rats/ **Gharib, Alireza; Komaki, Alireza; Manoochehri Khoshinani, Hamed; Saidijam, Massoud; Barkley, Victoria; Sarihi, Abdolrahman; Mirnajafi-Zadeh, Javad.** Brain Research Bulletin. ISSN:0361-9230 (2019) v.148 p.109-117Brain Research Bulletin

DOI: 10.1016/j.brainresbull.2019.03.007

Link: <http://www.sciencedirect.com/science/article/pii/S0361923018306567>

Abstract: In addition to its anticonvulsant effect, low frequency stimulation (LFS) improves learning and memory in kindled animals. In the present study, the role of 5-HT1A receptors in mediating LFS' improving effect on spatial learning and memory was investigated in amygdala-kindled rats. Amygdala kindling was conducted in a semi-rapid kindling stimulations (12 stimulations per day) in male Wistar rats. LFS (4 trains of 0.1 ms pulse duration at 1 Hz, 200 pulses, 50–150 μ A, at 5 min intervals) was applied after termination of kindling stimulations. NAD-299 (a selective 5-HT1A receptor antagonist; 2.5 and 5 μ g/ μ l) was microinjected into the hippocampal CA1 before applying LFS. The Morris water maze, and novel object recognition tests were conducted after the last kindling stimulation. Hippocampal samples were also prepared, and 5-HT1A receptor gene expression levels were assessed using quantitative RT-PCR. In kindled animals, LFS reduced impairments in spatial learning and memory in the Morris water maze and novel object recognition tests. Microinjection of NAD doses of 5 μ g/ μ l reduced the effects of LFS on learning and memory. The gene expression level of 5-HT1A receptors increased significantly in the hippocampus of amygdala-kindled rats. However, LFS applied after kindling stimulations inhibited this effect. It seems that activation of 5-HT1A receptors in the CA1 field is necessary for LFS' improving effects on spatial learning and memory in kindled animals; although surprisingly, LFS application prevented the elevation in gene expression of 5-HT1A receptors in kindled animals.

Keyword: Learning and memory; Seizure; 5-HT receptor; Deep brain stimulation

88. Use of naturally sourced feed additives (lactobacillus fermentation products and enzymes) in growing and finishing steers: Effects on performance, carcass characteristics and blood metabolites/ **Ran, T.; Gomaa, W.M.S.; Shen, Y.Z.; Saleem, A.M.; Yang, W.Z.; McAllister, T.A..** Animal Feed Science and Technology. ISSN:0377-8401 (2019) v.254 p.114190Animal Feed Science and Technology

DOI: 10.1016/j.anifeedsci.2019.05.013

Link: <http://www.sciencedirect.com/science/article/pii/S0377840119300872>

Abstract: An experiment was conducted to evaluate the use of naturally sourced feed additives that consisted of lactobacillus fermentation products (LFPs), plant based enzymes and prebiotics as alternatives to antibiotics in the diets of growing and finishing beef steers. The feed additives were two commercial products: Bio-Lac Plus (BL) and Boviglo (BG). During growing, 75 crossbred steers (initial body weight, 279 ± 4.9 kg) were blocked by weight and randomly allocated into five treatments: control; implant (IM; Elanco-Component TE-100 with Tylan); implant + antibiotics (330 mg monensin +110 mg chlortetracycline/steer/d; IMAT); implant + BL (30 g/steer/d BL; IMBL); and BG (5 mL/steer/d). Steers were fed a basal diet consisting of 600 g/kg corn silage, 350 g/kg dry-rolled barley grain, and 50 g/kg protein, vitamin and mineral supplement (dry matter [DM] basis). When the 112 d growing period finished, steers were maintained on the same treatments and gradually adapted to finishing diet within one month. Steers were not implanted during the 112 d finishing period. The finishing diet consisted of 100 g/kg corn silage, 870 g/kg dry-rolled barley grain, and 30 g/kg vitamin and mineral supplement (DM basis). Steers were housed in individual pens with feed intake measured individually over the 224 d experiment. During the growing period, no

treatment effect on DM intake was observed; however, final body weight, ADG and G:F were highest ($P < 0.05$) with IM, IMAT and IMBL, intermediate with BG and lowest with control. A treatment $\times$ day on feed interaction ($P < 0.05$) occurred for ADG, which was higher ($P < 0.01$) with IMBL than control or other treatments during first 14 days on-feed. Feeding BG improved ($P < 0.01$) ADG and G:F versus control animals. In addition, the need to use therapeutic antimicrobials was lower ($P < 0.01$) for all treatments, in particularly with BL versus control. During finishing, s neither BL or BG effected growth performance or carcass characteristics. Greater ($P < 0.05$) antioxidant capacities were observed in steers fed IMAT than steers fed IMBL and BG. These results indicate that supplementation of BL or BG improved ADG and feed efficiency during the stressful, early portion of the growing phase, but had no effect during finishing. The results suggest that both BL and BG have the potential to be fed as alternatives to antimicrobial growth promoters in growing steers.

Keyword: Probiotics; Enzymes; Antibiotics; Growth performance; Steers; Carcass characteristics

89. Responses to genotoxicity in mouse testicular germ cells and epididymal spermatozoa are affected by increased age/ **Taylor, J.D.; Baumgartner, A.; Schmid, T.E.; Brinkworth, M.H.**. Toxicology Letters. ISSN:0378-4274 (2019) v.310 p.1-6Toxicology Letters

DOI: 10.1016/j.toxlet.2019.04.013

Link: <http://www.sciencedirect.com/science/article/pii/S0378427419300980>

Abstract: The increased number of cell divisions undergone by spermatogonia of older fathers cannot fully account for the observed increase in germline genetic damage. Studies have shown that the mechanisms induced in germ cells in response to oxidative damage varies with age, that DNA repair efficiency declines, and both sperm DNA damage and spontaneous mutations increase. However, it is not known whether the altered response with age is a cause, or consequence, of an age-associated change in cell susceptibility to genetic damage. Following a single 150 mg/kg dose of cyclophosphamide (CP), young (8-weeks old) and aged (17-month old) male mice were examined 24 h later for induced genetic damage in epididymal spermatozoa using the alkaline comet and sperm chromatin stability assays. Apoptosis among testicular cells was examined on tissue cross-sections using the TUNEL assay. Sperm showed no significant increase in DNA strand breaks with age (detected by the comet assay) and no change in sperm chromatin stability (detected by the SCSA assay). Following CP treatment, there was no effect on DNA-strand breakage but sperm chromatin instability was significantly higher. Furthermore, it was also significantly elevated in old treated, compared with young treated, animals suggesting that increased age affects the sensitivity of epididymal sperm to chromatin damage. There was no difference in apoptosis in testicular germ cells from either young or old control animals, while CP administration resulted in a significant increase in apoptosis among young animals but not old animals. Following genotoxin exposure, an increase in chromatin instability in the spermatozoa of old animals and a decrease in the ability of their testicular germ cells undergo apoptosis suggests an age-related decrease in genome protection mechanisms. Since those germ cells are only transiently present in the testis, it is likely that this age-related deterioration originates in the spermatogonial stem cells. The findings are also evidence that the safety evaluation of reproductive genotoxins should consider young and old individuals separately.

Keyword: Spermatogenic; Spermatozoa; Apoptosis; Ageing; Genotoxic; Susceptibility

90. Molecular epidemiology of infectious bronchitis virus and avian metapneumovirus in Greece/ Andreopoulou, Marianna; Franzo, Giovanni; Tucciarone, Claudia M; Prentza, Zoi; Koutoulis, Konstantinos C; Cecchinato, Mattia; Chaligianni, Ilias. Poultry Science. ISSN:0032-5791 11(2019) v.98 p.5374-5384Poultry Science

DOI: 10.3382/ps/pez360

Link: <http://www.sciencedirect.com/science/article/pii/S0032579119457404>

Abstract: ABSTRACT Respiratory diseases like infectious bronchitis virus (IBV) and avian metapneumovirus (aMPV) have been held accountable for major losses for poultry production. Nevertheless, scarce information was present dealing with the prevalence and molecular epidemiology of these infections in Greece and the efficacy of currently applied control strategies. To fill this gap, a specific epidemiological study was designed. A total of 106 broiler and layer farms, including 10 backyard and 96 commercial flocks, were sampled between March 2016 and May 2017, and the obtained tracheal swabs were tested for IBV and aMPV using RT-PCR based techniques followed by sequencing. For each farm, data regarding production type, flock features, clinical signs, and vaccination program were also recorded. Different associations between vaccination protocol, production type, animal category, birds density, age, presence of clinical signs, and IBV and/or aMPV infection were tested. Both IBV and aMPV field strain prevalence were proven high, approximately 20 and 30%, respectively, being the GI-19 lineage (14 out of 19; 73.6%) and B subtype (30 out of 30; 100%), the most commonly detected IBV and aMPV genetic types. Infection with IBV field strains was significantly associated with clinical sign presence (odds ratio = 8.55 [95CI = 2.17–42.90]). Remarkably, only the vaccination protocol involving a double vaccination at 1 D of age was proven protective against IBV-induced symptomatology, with the odds of developing disease being 4.14 [95CI = 1.34–14.51] times lower. No association was demonstrated between aMPV infection and clinical outbreaks or between aMPV and IBV detection, suggesting the marginal role of the former pathogen in poultry farming. Globally, the present study provides the first detailed investigation of the epidemiological scenario of 2 viruses traditionally considered of pivotal relevance in poultry farming and demonstrates that remarkable benefits could be obtained with just minor adjustments in vaccination protocols.

Keyword: vaccination; epidemiology; Greece; avian metapneumovirus; infectious bronchitis virus

91. Effect of 17 β -estradiol on estrogen receptor negative breast cancer cells in an osteolytic mouse model/ Cohen, D. Joshua; Patel, Vaidehi; Verma, Anjali; Boyan, Barbara D.; Schwartz, Zvi. Steroids. ISSN:0039-128X (2019) v.142 p.28-33Rapid Responses to Steroid Hormones

DOI: 10.1016/j.steroids.2017.10.010

Link: <http://www.sciencedirect.com/science/article/pii/S0039128X17301903>

Abstract: 17 β -Estradiol (E2) promotes metastasis of triple negative breast cancer cells to bone. Recent studies show many triple negative breast cancer cell lines lacking the 66 kDa estrogen receptor (ER) alpha (ER α 66) or its splice variant ER α 46, express another splice variant, ER α 36 associated with membrane-mediated rapid actions of the hormone. qPCR and western blot confirmed that MCF7 cells possessed ER α splice variants ER α 66, ER α 46 and ER α 36, while ER-negative breast cancer cells MDA-MB-231 possessed only ER α 36. MDA-MB-231 breast cancer cells were implanted into medullary canals of ovariectomized female athymic nude mice femurs (N = 8 mice/treatment). To examine the effect of E2 on osteolysis, mice were treated with 0.72 mg E2 or placebo via 60 day release osmotic pumps implanted subcutaneously. Legs were examined by Faxitron through the course of the study, and by microCT and histology after 8 weeks. Greater occurrence of osteolysis and pathologic fracture was observed in E2-treated animals compared to placebo, and microCT demonstrated less bone volume remaining in MDA-MB-231 treated legs

compared to contralateral control legs, as well as E2-treated animals compared to placebo. E2-treated animals had significantly greater tumor volume compared to placebo. Large nests of anaplastic tumor cells with eroded cortical margin were observed in E2-treated animals compared to placebo. MDA MB 231 breast cancer cells positive for ER α 36 but negative for ER α 46/66 had enhanced osteolysis, pathologic fractures, and tumor volume in an in vivo osteolytic mouse model when treated with 17 β -estradiol compared to placebo, demonstrating a role for ER α 36 in bone tumor progression.

Keyword: Animal model; Breast cancer; ER α 36; Osteolysis

92. Comparison of the timing of development of immunity in Romney lambs from resistant and resilient selection lines/ **Hamie, J.C.; McAnulty, R.W.; Logan, C.M.; Lundberg, S.; Greer, A.W.**. Veterinary Parasitology. ISSN:0304-4017 (2019) v.270 p.49-55 Veterinary Parasitology

DOI: 10.1016/j.vetpar.2019.04.014

Link: <http://www.sciencedirect.com/science/article/pii/S0304401719300883>

Abstract: Variation in the timing of development of immunity to gastro-intestinal nematode parasites was assessed in resistant and resilient Romney selection lines exposed to mixed natural infection. From weaning, at mean 92 days-of-age, animals (n = 53) were sampled for faecal egg count (FEC) expressed as eggs per gram of faeces (epg), saliva for immunoglobulin (IgG and IgA) determination and fasted live weight (LW) every 10 days until 351 days-of-age. Overall, mean back-transformed FEC were consistently low for resistant animals (<200 epg) whereas resilient counterparts' FEC increased with time to reach a peak of 1400 epg at day 230 for females and 1800 epg for males at day 280 before declining to less than 500 epg by day 300, respectively (P < 0.001). Resistant lambs reached a threshold for *Trichostrongylus colubriformis* L3-specific IgG which was indicative of the presence of immunity earlier at 220.6 $\pm$ 8.8 days-of-age compared with resilient-line animals which reach this threshold 40 days later at 263.4 $\pm$ 6.9 days-of-age (P < 0.001). In addition, resistant females reached sexual maturity earlier compared with their resilient counterparts viz. 263.5 $\pm$ 3.7 c.f. 274.4 $\pm$ 3.4 days-of-age, respectively, (P = 0.048). Mean fasted live weight (LW) showed a selection line by time interaction (P < 0.001) which reflected greater LW in the early phase of the study in resilient males but increasing for all groups until day 280 before declining and being similar for all groups from day 330. In summary, differences appear to exist in the timing of immune development between these Romney lines, with resistant animals developing immunity earlier and these resistant-line animals also appear to be more physiologically mature at the same chronological age than resilient animals. These observations have implications on the timing of identification and selection of resistant animals.

Keyword: Selection; Resistance; Immunity; Resilience; Gastro-intestinal nematode; Romney sheep

93. Negotiating voices through embodied semiosis: The co-construction of a science text/ **Taylor, Roberta**. Linguistics and Education. ISSN:0898-5898 (2019) v.53 p.Linguistics and Education

DOI: 10.1016/j.linged.2019.06.005

Link: <http://www.sciencedirect.com/science/article/pii/S0898589818302341>

Abstract: This article presents a rich description of an everyday, paired learner interaction in class. In contributing to debates on collaborative classroom interaction, this article presents a micro-analysis of the work of embodied modes

employed in face-to-face interaction. Through ethnographically-contextualised Multimodal Discourse Analysis (ECMDA), a partial understanding of the ways in which two learners interact through embodied semiosis is reached. The originality of this article lies with the insights gained from multimodal discourse analysis which show how (in textual terms), even in a less creative space, learners negotiate personal, individual 'ownness' alongside academic genres in the co-construction of a science text. Three key aspects to paired classroom interaction are identified, namely: multiple voices, multimodal inference and modal synchrony. Through exploring the intricacies of social interaction, we can recognise the detailed multimodal contributions of individuals engaged in collaborative construction of text.

Keyword: Material haptics; Modal synchrony; Multimodal inference; Multimodal interaction; Multiple voices

94. Handling uncertainty in citizen science data: Towards an improved amateur-based large-scale classification/
Jiménez, Manuel; Triguero, Isaac; John, Robert. Information Sciences. ISSN:0020-0255 (2019) v.479 p.301-320Information Sciences

DOI: 10.1016/j.ins.2018.12.011

Link: <http://www.sciencedirect.com/science/article/pii/S0020025518309538>

Abstract: Citizen Science, traditionally known as the engagement of amateur participants in research, is showing great potential for large-scale processing of data. In areas such as astronomy, biology, or geo-sciences, where emerging technologies generate huge volumes of data, Citizen Science projects enable image classification at a rate not possible to accomplish by experts alone. However, this approach entails the spread of biases and uncertainty in the results, since participants involved are typically non-experts in the problem and hold variable skills. Consequently, the research community tends not to trust Citizen Science outcomes, claiming a generalised lack of accuracy and validation. We introduce a novel multi-stage approach to handle uncertainty within data labelled by amateurs in Citizen Science projects. Firstly, our method proposes a set of transformations that leverage the uncertainty in amateur classifications. Then, a hybridisation strategy provides the best aggregation of the transformed data for improving the quality and confidence in the results. As a case study, we consider the Galaxy Zoo, a project pursuing the labelling of galaxy images. A limited set of expert classifications allow us to validate the experiments, confirming that our approach is able to greatly boost accuracy and classify more images with respect to the state-of-art.

Keyword: Citizen science; Classification; Astroinformatics; Data analysis; Galaxy morphologies; Uncertainty

95. Nearshore survey and cleanup of benthic marine debris using citizen science divers along the Mediterranean coast of Israel/ **Pasternak, Galia; Ribic, Christine A.; Spanier, Ehud; Ariel, Asaf; Mayzel, Boaz; Ohayon, Sarah; Zviely, Dov.** Ocean & Coastal Management. ISSN:0964-5691 (2019) v.175 p.17-32Ocean & Coastal Management

DOI: 10.1016/j.ocecoaman.2019.03.016

Link: <http://www.sciencedirect.com/science/article/pii/S0964569118308007>

Abstract: Information on marine debris along the Mediterranean coast of Israel, especially on the seafloor, is limited. Many recreational divers are enthusiasts of marine conservation and can thus contribute to data collection which does not require highly specialized training. The Society for the Protection of Nature in Israel together with The Israeli Diving Federation established the diver volunteer program "Sea Guard" ("Mishmar Hayam" in Hebrew), which supports marine conservation through citizen science. The divers were trained in marine ecology and survey methods

to conduct independent surveys and lead underwater cleanups. For the first time, we have described the patterns of benthic debris density and composition in the nearshore environment of the southeastern part of the Mediterranean Sea. We found that benthic marine debris in the nearshore along the Israeli Mediterranean coast is primarily plastic, likely originating from the use of local beaches. Fishing, boating and domestic activities also play an important role as sources for marine debris. The currents' regime prevented the debris from accumulating on the seafloor in the nearshore environment, with the exception of several "debris traps". Our findings will be useful for the development of programs to improve coastal waste management.

Keyword: Environment; Plastic; SCUBA diving; Underwater litter monitoring

96. Biomarkers of oxidative stress in saliva of sheep: Analytical performance and changes after an experimentally induced stress/ **Rubio, Camila Peres; Contreras-Aguilar, Maria Dolores; Quiles, Alberto; López-Arjona, Marina; Cerón, José Joaquín; Martínez-Subiela, Silvia; Hevia, Maria Luisa; Escribano, Damián; Tecles, Fernando.** Research in Veterinary Science. ISSN:0034-5288 (2019) v.123 p.71-76Research in Veterinary Science

DOI: 10.1016/j.rvsc.2018.12.015

Link: <http://www.sciencedirect.com/science/article/pii/S0034528818316229>

Abstract: Oxidative stress can affect animal's health and the quality of its final products. The oxidative status can be evaluated by the measurement of both oxidant and antioxidant biomarkers. The use of saliva as a sample is preferable to blood, as individuals with limited training can collect it easily and non-invasively with minimal stress to the animal. The aim of this study was to perform an analytical validation of automated assays of the ferric reducing ability of plasma (FRAP), the cupric reducing antioxidant capacity (CUPRAC), the Trolox equivalent antioxidant capacity (TEAC) and uric acid as antioxidant biomarkers and of the advanced oxidation protein products (AOPP) and hydrogen peroxide (H₂O₂) as oxidant biomarkers in saliva samples of sheep, and to evaluate their possible changes after stress induced by shearing. All assays produced acceptable results in the analytical validation, from which it can be concluded that oxidative stress biomarkers such as FRAP, CUPRAC, TEAC, uric acid and AOPP and H₂O₂ can be measured in sheep saliva. In addition, acute stress due to shearing could produce an oxidative stress response in sheep and subsequently increase antioxidants in order to protect cells from damage.

Keyword: Sheep; Oxidative stress; Saliva

97. How citizen science boosted primary knowledge on fungal biodiversity in Denmark/ **Heilmann-Clausen, Jacob; Bruun, Hans Henrik; Ejrnæs, Rasmus; Frøslev, Tobias Guldberg; Læssøe, Thomas; Petersen, Jens H..** Biological Conservation. ISSN:0006-3207 (2019) v.237 p.366-372Biological Conservation

DOI: 10.1016/j.biocon.2019.07.008

Link: <http://www.sciencedirect.com/science/article/pii/S0006320719303714>

Abstract: The Danish Fungal Atlas was a citizen science project aiming to map Danish macrofungi over five years (2009–13). The atlas contributed >235,000 records of fruit-body forming Basidiomycota, adding to about 195,000 fungal records from earlier periods. The new records increased the average number of species known per 10 km × 10 km grid cell by 75% from 125 to 218 species. We recorded 197 species as new to Denmark, extending the number of known basidiomycote species by 7%. At least 15 species appeared to be new to science. Among the new

Danish records, species with northern distribution ranges were significantly overrepresented, in marked contrast to climate change predictions. Species with inconspicuous or subterranean fruit bodies were overrepresented among both the new Danish species and those only recorded before the project period, indicating low recording probability to be an important driver for the turnover in species recorded. Hence, the main drivers of novel fungal discoveries were 1) intensive sampling effort by citizen scientists guided by professional mycologists and 2) improved taxonomic knowledge. Summarizing over the last 100 years, an exponential increase in known macrofungal diversity in Denmark is evident, suggesting that we are still far from having a complete overview. This is striking, considering that Denmark is among the best-studied land areas on the globe. We conclude that citizen science projects, if appropriately designed, have a huge potential to boost primary knowledge on fungal biodiversity.

Keyword: Global change; Macrofungi; Nitrogen deposition; Species discovery

98. Foraging Behavior Development of Foals in Natural Grassland/ Bolzan, Anderson Michel Soares; Bonnet, Olivier Jean François; Wallau, Marcelo Osorio; Basso, Catarine; Neves, Adriana Pires; Carvalho, Paulo César de Faccio. Rangeland Ecology & Management. ISSN:1550-7424 (2019) v. p.Rangeland Ecology & Management

DOI: 10.1016/j.rama.2019.10.011

Link: <http://www.sciencedirect.com/science/article/pii/S1550742419300855>

Abstract: Early relationships between young mammalian herbivores and social models (e.g., mothers or peers) have been proposed as playing a major role in the process of diet learning. Diet selection is an important factor influencing animal development and ecology, especially in natural and seminatural grasslands, with a large diversity of plant species. To explore the learning process of foraging behavior and diet selection choices by foals, six free-ranging Criollo foals and their respective mares were monitored through continuous bite monitoring from birth to 130 d old, in the Pampas Grasslands of southern Brazil. Cumulative suckling time decreased exponentially from birth to 130 d old, while dry matter intake, foraging time, and bite mass of foals increased continuously. It was possible to identify three marked periods in the foal's foraging behavior development: 1) an exploratory phase (from 0 to 40 d old) marked by limited forage intake from a large diversity of plants; 2) a specialization phase (from 40 to 110 d old) with a marked increase in forage intake and a specialization around the same plants as the ones selected by the mares; and 3) a stabilization phase (after 110 d old) in which forage intake still increases but diet composition of foals stabilized similarly to the one of the respective mares. The higher diversity at young ages could be explained by exploratory hypothesis, where foals test different forages to discover their environment, given that their nutritional needs are fulfilled by milk consumption, not by forage intake. As requirements shift toward solid items, bite mass and foraging time increase and diet choices become similar to that of the mares. Our results detail how young foals develop their foraging behavior and suggest, without testing it and under the circumstances of this study, that they learn their diet through social transmission from their mothers.

Keyword: horses; campos; food selection; foraging behavior; Pampa; social transmission

99. Peripheral administration of κ -opioid receptor antagonist stimulates gonadotropin-releasing hormone pulse generator activity in ovariectomized, estrogen-treated female goats/ Sasaki, T.; Ito, D.; Sonoda, T.; Morita, Y.; Wakabayashi, Y.; Yamamura, T.; Okamura, H.; Oishi, S.; Noguchi, T.; Fujii, N.; Uenoyama, Y.; Tsukamura, H.; Maeda, K.I.; Matsuda, F.; Ohkura, S.. Domestic Animal Endocrinology. ISSN:0739-7240 (2019) v.68 p.83-91Domestic Animal Endocrinology

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Link: <http://www.sciencedirect.com/science/article/pii/S0739724019300025>

Abstract: Pulsatile gonadotropin-releasing hormone (GnRH) secretion is indispensable for reproduction in mammals. Kisspeptin neurons in the hypothalamic arcuate nucleus (ARC), referred to as KNDy neurons because of the coexpression of neurokinin B and dynorphin A, are considered as components of the GnRH pulse generator that produces rhythmic GnRH secretion. The present study aimed to investigate if peripheral administration of PF-4455242, a κ -opioid receptor (KOR, a dynorphin A receptor) antagonist, facilitates pulsatile luteinizing hormone (LH) secretion and GnRH pulse generator activity in estrogen-treated ovariectomized Shiba goats to determine the possibility of using KOR antagonists to artificially control ovarian activities. PF-4455242 was intravenously infused for 4 h (1 or 10 μ mol/kg body weight/4 h) or as a single subcutaneous injection (1 or 10 μ mol/kg body weight). In a separate experiment, the same KOR antagonist (10 μ mol/kg body weight/4 h) was intravenously infused during the recording of multiple unit activity (MUA) in the ARC that reflects the activity of the GnRH pulse generator to test the effects of KOR antagonist administration on GnRH pulse generator activity. Intravenous infusion and single subcutaneous injection of the KOR antagonist significantly increased the frequency of LH pulses compared with controls. Intravenous infusion of KOR antagonist also significantly increased the frequency of episodic bursts in the MUA. The present study demonstrates that peripherally administered KOR antagonist stimulates pulsatile LH secretion by acting on the GnRH pulse generator, and peripheral administration of PF-4455242 can be used to facilitate pulsatile LH secretion, which in turn facilitates ovarian activities in farm animals.

Keyword: Arcuate nucleus; Dynorphin; KNDy neuron; Multiple unit activity; κ -opioid receptor

100. Effects of *Acacia mearnsii* supplementation on nutrition, parasitological, blood parameters and methane emissions in Santa Inês sheep infected with *Trichostrongylus colubriformis* and *Haemonchus contortus*/ Lima, Paulo de Mello Tavares; Crouzoulon, Pierre; Sanches, Tamires Pinheiro; Zabré, Geneviève; Kabore, Adama; Niderkorn, Vincent; Hoste, Hervé; Amarante, Alessandro Francisco Talamini do; Costa-Júnior, Livio Martins; Abdalla, Adibe Luiz; Louvandini, Helde. *Experimental Parasitology*. ISSN:0014-4894 (2019) v.207 p.107777 *Experimental Parasitology*

DOI: 10.1016/j.exppara.2019.107777

Link: <http://www.sciencedirect.com/science/article/pii/S0014489419300426>

Abstract: Gastrointestinal nematodes are a main problem for ruminant production, reducing animal performance and increasing environmental impact per unit of animal product generated. Tannin supplementation may lead to positive results regarding aspects such as parasitic infections and methane (CH₄) emissions. Therefore, the objective of this experiment was to evaluate the effects of the condensed tannins (CT) extract made of powdered *Acacia mearnsii* bark (PAB) on nutrition, parasitic status and CH₄ emissions in sheep artificially infected with *Trichostrongylus colubriformis* and *Haemonchus contortus*. Twenty 10-month old Santa Inês lambs (24.7 $\pm$ 3.14 kg of initial body weight) were used in a 50-day trial. Animals were divided in four treatment groups according to parasitic infection and PAB supplementation: two control groups without infections, one without PAB (C-) (n = 4) and one with PAB (C+) (n = 4); two infected groups, one without PAB (I-) (n = 6) and another receiving PAB (I+) (n = 6). Initially, animals were kept in individual pens where they were fed ad libitum chopped tifton 85 hay (*Cynodon* spp.) and 210 g/animal/day of concentrate. On the first day of experiment, animals of I- and I+ groups were artificially infected with infective larvae (L3) of *T. colubriformis* and *H. contortus*. Lambs were weighed fortnightly to calculate average daily body weight gain (ADG). Blood and faeces samples were also collected in the same moment of weighing for the evaluation of blood parameters and faecal egg count (FEC) respectively. After 40 days of experiment, measurements of CH₄ emissions in small chamber system started and following that, apparent total tract digestibility (ATTD) assay

was carried out in metabolic cages. In the end of experimental period (50 days), lambs were slaughtered and samples of abomasum and small intestine content were collected for worm count, identification, and eggs/female count. No significant ($p > 0.05$) treatment effects were verified for ADG, ATTD and worm count. Blood parameters were affected in both infected groups ($p < 0.05$) from the 28th experimental day onwards, when these animals started to show reduced red blood cells, haemoglobin and packed cell volume when compared to C- and C+. Decreased FEC was verified in I+ when compared to I- and also, *H. contortus* eggs/female worm for I+ was lower than for I- ($p < 0.05$). Both infected groups showed higher CH₄ emissions than the control groups ($p < 0.05$). Results highlighted the anthelmintic potential of PAB and indicated methanogenic effect of parasitic nematode infections.

Keyword: Small ruminants; Sustainability; Tannins; Black wattle; Greenhouse gases; Nematodes

101. Science, God, and the cosmos: Science both erodes (via logic) and promotes (via awe) belief in God/ **Johnson, Kathryn A.; Moon, Jordan W.; Okun, Morris A.; Scott, Matthew J.; O'Rourke, Holly P.; Hook, Joshua N.; Cohen, Adam B.** Journal of Experimental Social Psychology. ISSN:0022-1031 (2019) v.84 p.103826 Journal of Experimental Social Psychology

DOI: 10.1016/j.jesp.2019.103826

Link: <http://www.sciencedirect.com/science/article/pii/S0022103118307698>

Abstract: Science and analytical thinking have been linked with atheism. We propose dual pathways whereby scientific engagement may have paradoxical effects on belief in God. Logical aspects of science, associated with analytical thinking, are associated with unbelief. However, people can also be awed by scientific information, and awe is associated with feelings of self-transcendence and belief in a mystical God. An exploratory study (supplemental material; $N = 322$) and Study 1 ($N = 490$) demonstrated that people interested in science often hold abstract (but not personal) representations of God. This effect was mediated by a predisposition to feel awe. In Studies 2 and 3 (combined $N = 570$), people experimentally exposed to awe-inspiring scientific content were more likely than control participants to endorse abstract God representations. These findings suggest that scientific engagement does not always erode belief in God. Instead, science-inspired awe can increase representations of God as a mystical cosmic force or as being beyond imagination.

Keyword: Analytical thinking; Awe; God representations; Interest in science; Religious beliefs

102. Regulation of voluntary protein/energy intake based practical diet composition for the carnivorous neotropical catfish *Lophiosilurus alexandri*/ **Santos, Fabio A.C.; Fortes-Silva, Rodrigo; Costa, Leandro S.; Luz, Ronald K.; Guilherme, Helder O.; Gamarano, Pedro G.; Oliveira, Camila G.; Santos, Welliene M.; Ribeiro, Paula A.P.** Aquaculture. ISSN:0044-8486 (2019) v.510 p.198-205 Aquaculture

DOI: 10.1016/j.aquaculture.2019.05.038

Link: <http://www.sciencedirect.com/science/article/pii/S0044848619304594>

Abstract: The effect of different energy to protein ratios on voluntary feed intake was investigated in the carnivorous catfish *Lophiosilurus alexandri*, in order to evaluate their feeding behaviour responses. Two trials were performed. The first trial involved 16 fish distributed among 16 tanks, which were allowed to select one of two experimental encapsulated diets (24% vs 42% of crude protein or Energy (MJ g⁻¹): Protein (g) ratio of 0.068 × 0.041). The objective

was to isolate sensorial influence on the choice of diet. For the second trial, six experimental groups were designed with successive increases in protein and successive decreases in energy to evaluate diet selection by the self-feeding method: Group 1 – 24% of crude protein x 30% of crude protein; G2 – 24% x 36%; G3 – 24% x 42%; G4 – 30% x 36%; G5 – 30% x 42%; and G6 – 36% x 42%. These groups had the following energy to protein ratios (E:P MJ g⁻¹ protein): G1 – 0.068 x 0.057; G2 – 0.068 x 0.048; G3 – 0.068 x 0.041; G4 – 0.057 x 0.048; G5 – 0.057 x 0.041; and G6 – 0.048 x 0.041. Diet selection data were arcsin (√) transformed and then subjected to the Student t-test. Mean protein (g/kg of BW), energy:protein (MJ energy/g crude protein/kg BW) and energy (MJ energy/kg BW) consumption were submitted to ANOVA and Tukey test (P < .05). The results of Trial 1 revealed a clear preference for diet with 42% crude protein and an energy to protein ratio of 0.041 MJ g⁻¹ protein (P < .05); even with the absence of taste the fish returned to the initial pattern of selection after the contents of the capsules were changed. Trial 2 revealed that with diets containing <30% crude protein (G1), the fish selected diets with higher energy (P < .05). In G2 and G6 the fish exhibited an unclear pattern of diet selection probably due to the narrow range of nutrient options or because the requirements for protein and energy were met by the diets, respectively. For the G2, G3 and G5, fish choose diets with higher protein content (P < .05), even after the diets were switched between feeders. The animals kept the protein intake pattern from G4 (~36–38% or 20 g/BW) and energy consumption (8.42 MJ kg⁻¹) for all treatments. In conclusion, based on the feeding behavior of *L. alexandri* in the present study, we infer that the target E:P is around 0.028 MJ g⁻¹ protein.

Keyword: Protein; Production; Nutrition; Food behaviour; Self-selection

103. Landscape context modifies the rate and distribution of predation around habitat restoration sites/ **Duncan, Cassandra K.; Gilby, Ben L.; Olds, Andrew D.; Connolly, Rod M.; Ortodossi, Nicholas L.; Henderson, Christopher J.; Schlacher, Thomas A.** Biological Conservation. ISSN:0006-3207 (2019) v.237 p.97-104 Biological Conservation

DOI: 10.1016/j.biocon.2019.06.028

Link: <http://www.sciencedirect.com/science/article/pii/S0006320718317981>

Abstract: The rate and distribution of ecological functions is modified by how species respond to the composition of landscapes. Extensive loss of habitats has led to habitat restoration becoming an important management tool, however, it is not clear where restoration sites should be located in heterogeneous landscapes to maximise outcomes for ecological functions. We used restored oyster reefs, and the guild of predators associated with them, as a model system to test whether, and how ecological functioning is modified by the spatial context of restoration sites in marine landscapes (i.e. seascapes). We measured predation rates and surveyed predators using videoed deployments of 'squidpops' (dried squid tethered using fishing line) at multiple restored oyster reefs and nearby control sites in Queensland, Australia. Sites were located in different spatial contexts in a seascape composed of a mosaic of habitat types. Predation rates at restored oyster reefs were double those at control sites. Seascape context was important in modifying these predation rates; consumption near reefs was significantly lower when reefs were close to seagrass and mangroves. By contrast, higher rates were observed on reefs surrounded by non-vegetated seafloor, far from seagrass and mangroves. In addition, the distance over which predation extended into the surrounding unvegetated areas was greater on reefs farther from vegetation. Strategically placing restoration sites in heterogeneous landscapes can maximise the effects of habitat restoration for ecosystem functioning and modify the distance over which these effects extent into surrounding seascape.

Keyword: Management; Mangroves; Connectivity; Ecological function; Oyster reefs; Seagrass

104. Apoptosis and proliferation in *Staphylococcus aureus*-challenged, nonlactating mammary glands stimulated to grow rapidly and develop with estradiol and progesterone/ **Enger, B.D.; Nickerson, S.C.; Tucker, H.L.M.; Parsons, C.L.M.; Akers, R.M.** Journal of Dairy Science. ISSN:0022-0302 1(2019) v.102 p.857-865 Journal of Dairy Science

DOI: 10.3168/jds.2018-15498

Link: <http://www.sciencedirect.com/science/article/pii/S0022030218310579>

Abstract: ABSTRACT Bovine mastitis is a common and costly disease in the dairy industry and is known to negatively affect the amount of epithelium in nonlactating mammary glands. Despite this recognition, an understanding of the mechanisms contributing to reductions in epithelium is lacking. The objective of this study was to evaluate cellular apoptosis and proliferation in uninfected and *Staphylococcus aureus*-infected mammary glands that were stimulated to rapidly grow and develop. Estradiol and progesterone injections were administered to 18 nonlactating dairy cows to induce mammary growth, and 2 quarters from each animal were infused with saline or *Staph. aureus*. Mammary tissues were collected at 5 (n = 9) and 10 d (n = 9) postinfusion and examined using quantitative bright field and fluorescent immunohistochemistry. *Staphylococcus aureus* mammary glands tended to have a greater number of mammary epithelial cells undergoing apoptosis than saline quarters. In the stromal compartment, challenged quarters contained a lower proportion of cells undergoing apoptosis than saline quarters overall; however, cell types undergoing apoptosis were differentially affected. *Staphylococcus aureus* quarters contained a lesser percentage of apoptotic fibroblasts while also containing more nonapoptotic immune cells than saline quarters in the intralobular stroma compartment. A similar number of proliferating epithelial cells were present in *Staph. aureus* and saline mammary tissues, but more proliferating cells were present in the intralobular stroma compartment of *Staph. aureus*-infused quarters than those infused with saline. When these cellular responses are considered together, it indicates that changes in cellular apoptosis and proliferation contribute to changes in the gland structure by potentiating the expansion of the intralobular stromal compartment, via cellular accumulation, and limiting the amount of epithelium due to increases in cellular apoptosis in affected glands. Reductions in mammary epithelium are expected to reduce future milk yields and productive herd life.

Keyword: mastitis; dry cow; heifer; intramammary infection; mammary growth

105. Pregnancy associated glycoproteins (PAGs) and pregnancy loss in high vs sub fertility heifers/ **Reese, S.T.; Geary, T.W.; Franco, G.A.; Moraes, J.G.N.; Spencer, T.E.; Pohler, K.G.** Theriogenology. ISSN:0093-691X (2019) v.135 p.7-12 Theriogenology

DOI: 10.1016/j.theriogenology.2019.05.026

Link: <http://www.sciencedirect.com/science/article/pii/S0093691X19301645>

Abstract: Reproductive inefficiency and infertility are major financial burdens to domestic livestock. Variables associated with these reproductive losses during early gestation include contributions from the oocyte, uterus, sperm, embryo and placenta. Bovine pregnancy associated glycoproteins (PAG) are produced by the binucleate cells of the ruminant placenta and can be used to diagnose pregnancy. Increased circulating concentrations of PAG early in gestation have been correlated with pregnancy success and decreased concentrations are predictive of impending embryonic mortality in both beef and dairy cattle. The objectives of the current study were to determine whether: 1) heifer fertility status is associated with circulating concentrations of PAG and pregnancy loss; and 2) PAG concentrations within the same animal are repeatable across multiple pregnancies. We hypothesized maternal PAG concentrations would be increased in high fertility compared to subfertile heifers but not repeatable across

subsequent pregnancies in the same heifer. Serial embryo transfer (ET; n = 4 rounds) was used to classify predominately Angus heifers (n = 92) as highly fertile (HF = 30; 100% pregnancy success) or subfertile (SF = 62; average = 33%; range = 25–75% pregnancy success) based on day 28 ultrasound diagnosis. Blood samples were collected at both day 28 and 44 for quantification of circulating PAG concentrations by an in house PAG ELISA with antibodies raised against early secreted PAGs. Pregnancy was terminated at day 44 of gestation and heifers were allowed 30 days recovery before synchronization for the next ET. Only heifers that were diagnosed pregnant by ultrasound were used in this study (HF: n = 30, SF: n = 62). Serum concentrations of PAGs were not different between HF (5.90 ± 0.27 ng/mL) and SF (5.56 ± 0.31 ng/mL; $P = 0.16$) heifers at day 28 of gestation nor was there a difference at day 44 of gestation ($P = 0.32$). Subfertile heifers had increased pregnancy loss between days 28 and 44 of gestation. Based on odds ratio analysis, SF heifers had a 2.41 times chance to undergo pregnancy loss between day 28–44 compared to HF heifers ($P < 0.05$). There was no correlation ($P > 0.05$) in maternal circulating concentrations of PAG between pregnancies on day 28 or 44 of gestation in samples obtained from HF heifers. In summary, circulating concentrations of PAG are not different between HF and SF heifers; however, HF classified heifers have decreased pregnancy loss between days 28 and 44 of gestation.

Keyword: Bovine; Embryonic mortality; Pregnancy; Pregnancy-associated glycoproteins

106. Ethnoveterinary remedies used in the Algerian steppe: Exploring the relationship with traditional human herbal medicine/ **Miara, Mohamed Djamel; Bendif, Hamdi; Ouabed, Asmahane; Rebbas, Khellaf; Ait Hammou, Mohammed; Amirat, Mokhtar; Greene, Alex; Teixidor-Toneu, Irene.** Journal of Ethnopharmacology. ISSN:0378-8741 (2019) v.244 p.112164 Journal of Ethnopharmacology

DOI: 10.1016/j.jep.2019.112164

Link: <http://www.sciencedirect.com/science/article/pii/S0378874119321373>

Abstract: Ethnopharmacological relevance Ethnoveterinary medicine is vastly under-documented, especially in North Africa, where livestock care is increasingly medicalised. Despite evidence of the interdependence of ethnoveterinary practices and ethnomedicine for human care, the overlap between these two systems and the possible drivers of similarity are rarely addressed in ethnopharmacological literature. Here, we present the first quantitative comparison of remedies used to treat human and animal health among a pastoral society. Aims This study aims to document the plants and other materials used in ethnoveterinary medicine among nomadic herders in the Algerian steppe. We calculate the overlap with remedies used for human health and evaluate some of the possible drivers of similarities between the two interlinked medical systems. Methods The field study was conducted in spring 2018 with 201 local knowledge holders in five provinces in the central part of the Algerian steppe. Forty-six camps and ten weekly animal markets were visited. After obtaining prior informed consent, data was collected through structured interviews. Anonymous sociodemographic information was collected along with veterinary use data. Plant specimens were acquired, identified and deposited in the Botanical Laboratory Herbarium of the University of Tiaret. Ethnobotanical information was structured in use reports and therapeutic applications organised into 13 simple categories. Plants used in ethnoveterinary medicine were compared to those used in human health care using a Chi square test, and ethnoveterinary use was predicted using a generalised linear model with use for human care and plant family as predictive variables. Logistic regressions were also used to test if any specific medicinal application predicts shared use in human and veterinary medicine. Results Sixty-six plant species from 32 botanical families and ten non-vegetable remedies were documented. Plants from the Lamiaceae, Asteraceae, Fabaceae and Apiaceae families were most commonly used. The plants most often cited by interviewees are all harvested from the wild (*Echinops spinosissimus* Turra, *Atriplex halimus* L., *Artemisia campestris* L., *Juniperus phoenicea* L. and *Peganum harmala* L.). Leaves are the most commonly used plant part and decoction is the most common preparation method. There are

important similarities between remedies used to treat humans and other animals: two thirds of the remedies used in ethnoveterinary medicine are also used in human health care, and these represent half of the human health treatments. Use for human health and plant family both predict the use of a medicinal plant in veterinary medicine, but no correlation is found regarding specific therapeutic applications. Conclusions Traditional veterinary knowledge is still key to sheep and goat herders in the Algerian steppe, but a knowledge transmission gap seems to exist between older and younger generations, and ethnoveterinary practices may disappear in the near future. Treatments for human and animal care overlap to a large extent, and a causal relationship possibly exists for, at least, some of them. However, overall a smaller number of remedies are used to treat animals than humans and for less therapeutic applications. This difference in the diversity of therapeutic applications and remedies should be the object of future research.

Keyword: Medicinal plants; Ethnobotany; Maghreb; Nomads; North Africa

107. Genetic parameters and genotype-environment interaction for growth traits of North African catfish, *Clarias gariepinus* (Burchell, 1822)/ **Srimai, Witsanu; Koonawootrittriron, Skorn; Manee-aphai, Wiroom; Chatchaiphan, Satid; Koolboon, Urai; Na-Nakorn, Uthairat.** Aquaculture. ISSN:0044-8486 (2019) v.501 p.104-110Aquaculture

DOI: 10.1016/j.aquaculture.2018.10.064

Link: <http://www.sciencedirect.com/science/article/pii/S004484861831295X>

Abstract: Aquaculture of North African catfish, *Clarias gariepinus* (Burchell, 1822) (Cg) has been widely practiced with global production sharply increasing by almost three folds in the past decade (FAO, 2018). Despite its advantageous growth rate and disease resistance, the genetic potential has not been fully exploited. Therefore, this research was conducted to estimate genetic parameters of growth traits of Cg in Thailand and to estimate the interaction of genetics and environment when it is cultured in different pond-types. Three genetically distinct stocks of Cg were crossed following a factorial mating design (a male mated with 2–3 females, each from different strains) which resulted in a total of 90 full-sib and 29 half-sib families. The fry were separately reared in two replicate hapas until 98 days after hatching (DAH) and were then tagged using elastomers and communally reared in two environments, namely earthen ponds and circular polyethylene (PE) tanks, each with two replicates. Body measurements were made when the fish reached market size (BW~300 g, 138 DAH) and genetic analyses were performed using an animal model. The results showed significant differences in body size and growth rate among families. Heritability estimates for the growth traits (body weight, BW; total length, TL; and standard length, STL) were high (0.49–0.51) at 98 DAH, while heritability for condition factor (K) was 0.06 ± 0.01 . At 138 DAH, the heritability estimates for growth traits were slightly lower than at 98 DAH. Heritability (h^2) estimated for the two environments were equal for body length, and slightly different for BW (PE-tanks: $h^2_{BW} = 0.35 \pm 0.07$; $h^2_{TL} = 0.34 \pm 0.07$, $h^2_{STL} = 0.29 \pm 0.07$; earthen ponds: $h^2_{BW} = 0.25 \pm 0.06$; $h^2_{TL} = 0.34 \pm 0.07$, and $h^2_{STL} = 0.29 \pm 0.07$). Heritability for K was higher in the PE-tanks ($h^2_K = 0.31 \pm 0.07$) than in the earthen ponds ($h^2_K = 0.11 \pm 0.04$). Genetic correlation of the same traits between the two environments was high for all traits and hence suggested no $G \times E$ interaction for growth traits in Cg. The results suggested that selective breeding of this population would give substantial selection response, and the improved strain derived from the PE-tank environment would perform similarly in earthen ponds.

Keyword: Heritability; Animal model; Genetic correlation; Condition factor

108. Effects of letrozole administration on growth and reproductive performance in Markhoz goat bucklings/ **Rezaei, Ako; Vaziry, Asaad; Farshad, Abbas; Farzinpour, Amjad; Rostamzadeh, Jalal.** Theriogenology. ISSN:0093-691X (2019) v. p.Theriogenology

DOI: 10.1016/j.theriogenology.2019.11.017

Link: <http://www.sciencedirect.com/science/article/pii/S0093691X19305175>

Abstract: This study evaluated the growth performance, testicular and semen characteristics, and hormonal profile of Markhoz (Iranian Angora) bucklings injected with letrozole (LTZ). Twenty-eight 4–4.5 month old bucks were randomly assigned into four groups and received either 0.25 mg/kg body weight (BW) LTZ subcutaneously (sc LTZ) or intramuscularly (im LTZ), and also sc (sc CONT) or im (im CONT) controls every week for 3 months. The study was performed at the beginning of the breeding season in Sanandaj Animal Husbandry Research Station (46.99 °E, 35.31 °N). The results showed that LTZ causes increased final body weight (25.78 ± 1.61 kg), higher average daily gain (104 ± 0.03 g/days), and decreased feed conversion ratio (7.81 ± 2.57) ($P < 0.05$). The pre-slaughter, hot, and cold carcass weights (27.56 ± 2.40 , 11.45 ± 1.07 and 11.11 ± 1.05 kg, respectively) were ($P < 0.05$) heavier in LTZ groups while other carcass characteristics did not differ between groups. No differences occurred between the groups in biochemical parameters, except high-density lipoprotein levels (35.47 ± 2.43 mg/dL) which was higher in LTZ treatments ($P < 0.05$). LTZ-treated bucks had larger scrotal circumference (20.12 ± 5.75 cm), higher relative testicular weight (560.91 ± 78.59 mg/100 g BW) and volume (175.5 ± 29.71 cm³), greater diameter of seminiferous tubules (224.5 ± 5.21 μm), and number of Sertoli cells (8.39 ± 0.77) ($P < 0.05$). Semen volume (0.74 ± 0.16 mL), sperm concentration ($2.64 \pm 0.19 \times 10^{-9}$ /mL), total sperm per ejaculate ($1.95 \pm 0.49 \times 10^{-9}$), and semen index (1248 ± 323) increased ($P < 0.05$) by LTZ treatments, while semen pH (6.77), motility (80.91%), progressive motility (76.75%), viability (83.35%), abnormality (13.70%), acrosome integrity (78.06%), and membrane integrity (80.05%) of sperm remained unaffected. Intratesticular and serum testosterone (T) levels (7.97 ± 0.89 ng/mg protein and 2.47 ± 0.59 ng/mL, respectively), serum luteinizing hormone (LH), growth hormone (GH) levels (1.71 ± 0.24 and 3.62 ± 0.33 ng/mL, respectively) of LTZ groups were elevated, whereas intratesticular and serum estradiol (E2) levels (84.14 ± 8.15 pg/mg protein and 32.33 ± 2.16 pg/mL, respectively) decreased ($P < 0.05$). No differences were recorded between the sc and im routes of LTZ administration in the measured parameters. To conclude, we have found that LTZ treatment improves growth and reproductive functions of goat bucklings associated with increased serum LH and GH, elevated T and reduced E2 levels in both serum and testis.

Keyword: Testosterone; Growth performance; Bucks; Estradiol; Letrozole; Semen characteristics

109. Can live with 'em, can live without 'em: Pair housed male C57BL/6J mice show low aggression and increasing sociopositive interactions with age, but can adapt to single housing if separated/ **Melotti, Luca; Kästner, Niklas; Eick, Anna Katharina; Schnelle, Anna Lisa; Palme, Rupert; Sachser, Norbert; Kaiser, Sylvia; Richter, S. Helene.** Applied Animal Behaviour Science. ISSN:0168-1591 (2019) v.214 p.79-88Applied Animal Behaviour Science

DOI: 10.1016/j.applanim.2019.03.010

Link: <http://www.sciencedirect.com/science/article/pii/S0168159118306312>

Abstract: The basic question as to whether male laboratory mice should be singly or group housed represents a major animal welfare concern within current laboratory animal legislation and husbandry. To better understand the behavioural and physiological mechanisms underlying this issue, we conducted two longitudinal experiments using C57BL/6J mice. In the first experiment ($N = 32$), we explored social behaviour of pair housed males from weaning to adulthood. We took weekly measures of agonistic, socio-exploratory and affiliative behaviours within two different

contexts, i.e. in the undisturbed home cage and immediately after cage cleaning. In the second experiment (N = 36), we investigated whether separation of male pairs into single housing at different ages (35, 56 or 77 days of age) affected welfare-related measures such as faecal corticosterone metabolites (FCMs) and anxiety-like behaviours. In the first experiment we found that levels of agonistic behaviour were higher after cage cleaning than in the undisturbed cage as expected, but did not significantly change with age in either context. Instead, affiliative behaviour increased with age in the undisturbed home cage. In the second experiment, social separation did not affect levels of FCMs or anxiety-like behaviours at any age point. Taken together, this study shows that pair housed male mice can maintain low levels of aggression across a long period of their life and perform increasing levels of sociopositive behaviours which may serve to promote stable social relations. At the same time, our results suggest that male mice can quickly adapt to separation into single housing at different ages, from adolescence to adulthood. These findings are in line with the behavioural ecology of wild male mice, which suggests that both solitary and group living represent two alternative strategies.

Keyword: Animal welfare; Stress; Social behaviour; Anxiety; Mouse; Social support

110. Branched chain fatty acid composition of yak milk and manure during full-lactation and half-lactation/ **Sun, Wancheng; Luo, Yihao; Wang, Dong Hao; Kothapalli, Kumar S.D.; Brenna, J. Thomas.** Prostaglandins, Leukotrienes and Essential Fatty Acids. ISSN:0952-3278 (2019) v.150 p.16-20 Prostaglandins, Leukotrienes and Essential Fatty Acids

DOI: 10.1016/j.plefa.2019.09.002

Link: <http://www.sciencedirect.com/science/article/pii/S0952327819300675>

Abstract: Background Branched chain fatty acids (BCFA) are bioactive food compounds and are well known to be essential components of human, cow and caprine milk. In Qinghai-Tibet plateau, yaks are domesticated in large numbers and their milk in addition to meat are commercially important to millions of Tibetans and Chinese. Objective We tested the hypotheses that concentrations of BCFA in yak milk and manure differ between lactation periods and evaluated gene expression levels of certain genes involved in the biosynthesis and elongation of fatty acids. Design Fresh milk and manure were collected from each yak and their fatty acid compositions compared with emphasis on BCFA. Participants/setting Yak milk and manure samples from the full lactation (October, 2015) and half lactation periods (March, 2016) were collected and BCFA levels were analyzed in detail by GC-FID and structures verified by GC-El-MS/MS. Gene expression studies were carried out by semi-quantitative real time PCR method. Statistical analyses performed The difference between full lactation and half lactation was tested using student's t-test. Linear regression model was modelled in Excel and its significance was tested by ANOVA. Statistical significance was determined by performing student's t-test for gene expression studies. Results BCFA ranged from 3–6% of total fatty acids in yak milk samples. The half-lactation yak milk contained higher levels of BCFA (5.29 ± 0.53) than the full-lactation milk (4.00 ± 0.46). The total BCFA in yak manure was found to be 14.67 ± 1.21 , high in anteiso-15:0 and anteiso-17:0. ELOVL1 enzyme involved in the elongation of saturated C18 to C26 acyl-CoA substrates and MCAT enzyme involved in the transfer of a malonyl group to the mitochondrial acyl carrier protein are significantly upregulated in full-lactation milk. Conclusions BCFA in yak manure especially anteiso BCFA are positively correlated with yak milk from the same animal, indicating that these BCFA come from dietary sources. Yak milk delivers 777 mg BCFA compared to 158 mg per cup of whole U.S. dairy milk. QTP herders known to consume up to 2 kg of yak yogurt take in an estimated 3,500–5,000 mg BCFA per day. We conclude that BCFA intake for yak milk consumers is among the highest known in the world, higher when drawn from half lactating yaks.

Keyword: Gene expression; Branched chain fatty acids (BCFA); Yak manure; Yak milk

111. In vivo measurement of brain network connectivity reflects progression and intrinsic disease severity in a model of temporal lobe epilepsy/ **Bertoglio, Daniele; Jonckers, Elisabeth; Ali, Idrish; Verhoye, Marleen; Van der Linden, Annemie; Dedeurwaerdere, Stefanie.** Neurobiology of Disease. ISSN:0969-9961 (2019) v.127 p.45-52Neurobiology of Disease

DOI: 10.1016/j.nbd.2019.02.012

Link: <http://www.sciencedirect.com/science/article/pii/S0969996118307204>

Abstract: Different types of brain injury, such as status epilepticus (SE), trauma, or stroke may initiate the process of epileptogenesis and lead to the development of temporal lobe epilepsy. Epileptogenesis is characterized by an initial latent period during which impaired network communication and synaptic circuit alterations are occurring. Ultimately, these modifications result in the development of spontaneous recurrent seizures (SRS). Current knowledge on the functional connectivity network changes during epileptogenesis and how network alterations relate to seizure is very limited. To investigate these underlying network connectivity modifications, we imaged epileptic and control rats by means of resting-state functional MRI (rsfMRI) during epileptogenesis. A cohort of animals was video-electroencephalography (video-EEG) monitored continuously over 12 weeks to determine disease severity during the course of disease, with the first SRS appearing around 2 weeks post-SE for most of the animals. Epileptic animals displayed a significant wide-spread hyposynchrony at 2 weeks post-SE, followed by a significant increase in network synchronicity from 2 to 4 weeks post-SE. Interestingly, subjects with a delayed epilepsy onset demonstrated significantly lower synchronicity compared to controls and the epileptic group at 4 weeks post-SE. Finally, network connectivity at 4 weeks post-SE was found to correlate with seizure onset ($r = 0.858$, $p < .0001$) and disease severity measured over 12 weeks (e.g. cingulate cortex: $r = 0.863$, $p = .002$), suggesting a possible network strengthening upon seizure reoccurrence. Our findings indicate that epileptogenesis is characterized by an initial hyposynchrony of brain networks and the disease-associated progression reflects disease severity.

Keyword: Rat; Animal model; Epileptogenesis; Temporal lobe epilepsy; BOLD response; Functional MRI; Network connectivity; Spontaneous recurrent seizure

112. Neuroprotective effect of exogenous melatonin on the noradrenergic neurons of adult male rats' locus coeruleus nucleus following REM sleep deprivation/ **Jameie, Seyed Behnamedin; Mesgar, Somaye; Aliaghaei, Abbas; Raoofi, Amir; Amini, Maryam; Khodagholi, Fariba; Danyali, Samira; Sorraya, Marziyeh; Sadeghi, Yousef.** Journal of Chemical Neuroanatomy. ISSN:0891-0618 (2019) v.100 p.101656Journal of Chemical Neuroanatomy

DOI: 10.1016/j.jchemneu.2019.101656

Link: <http://www.sciencedirect.com/science/article/pii/S0891061819300559>

Abstract: Melatonin is primarily secreted by the pineal gland in dark. In addition to its role as an internal sleep facilitator, melatonin acts as an antioxidant, anti-inflammatory and neuroprotective agents. melatonin has been introduced as a therapeutic strategy for sleep disorders. Hence, in the present study, we studied the neuroprotective effects of pre- and post-treatment of melatonin in locus coeruleus nucleus (LC) of rapid eye movement (REM) sleep deprived (REM-SD) male adult rats. Adult male rats of control, sham and trial groups were used Exogenous melatonin (ExMe) was intraperitoneally injected in two forms of pre and post treatment. The protein level of cleaved caspase-3, the number and density of tyrosine hydroxylase (TH) positive neurons and the microglia population in LC were studied by western blot and immunohistochemistry respectively. Morphological changes of LC nucleus and its neurons were also studied by using stereological analysis. The number of neurons and volume of LC was reserved in

animals that had received post-RSD ExMe. Apoptosis significantly was decreased comparing to RSD and Pre-RSD animals. Melatonin post-treatment of RSD rats also decreased cleavage of caspase-3 and increased reduced glutathione content in LC. Moreover, immunohistochemistry analysis showed an increase in the number of TH positive neurons and a decrease in microglia migration. Based on our findings antioxidant properties of exogenous melatonin could play a critical role in certain types of sleep disorders.

Keyword: Exogenous melatonin; Locus coeruleus; REM sleep deprivation

113. Antibiotic Resistance Genes in the Human-Impacted Environment: A One Health Perspective/ TIEDJE, James M.; WANG, Fang; MANAIA, Célia M.; VIRTÀ, Marko; SHENG, Hongjie; MA, Liping; ZHANG, Tong; TOPP, Edward. Pedosphere. ISSN:1002-0160 3(2019) v.29 p.273-282Pedosphere

DOI: 10.1016/S1002-0160(18)60062-1

Link: <http://www.sciencedirect.com/science/article/pii/S1002016018600621>

Abstract: Antibiotic resistance and its environmental component are gaining more attention as part of combating the growing healthcare crisis. The One Health framework, promulgated by many global health agencies, recognizes that antimicrobial resistance is a truly inter-domain problem in which human health, animal agriculture, and the environment are the core and interrelated components. This prospectus presents the status and issues relevant to the environmental component of antibiotic resistance, namely, the needs for advancing surveillance methodology: the environmental reservoirs and sources of resistance, namely, urban wastewater treatment plants, aquaculture production systems, soil receiving manure and biosolid, and the atmosphere which includes longer range dispersal. Recently, much work has been done describing antibiotic resistance genes in various environments; now quantitative, mechanistic, and hypothesis-driven studies are needed to identify practices that reduce real risks and maintain the effectiveness of our current antibiotics as long as possible. Advanced deployable detection methods for antibiotic resistance in diverse environmental samples are needed in order to provide the surveillance information to identify risks and define barriers that can reduce risks. Also needed are practices that reduce antibiotic use and thereby reduce selection for resistance, as well as practices that limit the dispersal of or destroy antibiotic-resistant bacteria or their resistance genes that are feasible for these varied environmental domains.

Keyword: human health; animal agriculture; antibiotic-resistant bacteria; antimicrobial resistance; aquaculture; One Health framework; soil contamination; wastewater and sludge

114. Anti-dyskinetic efficacy of 5-HT₃ receptor antagonist in the hemi-parkinsonian rat model/ Aboulghasemi, Nazanin; Hadipour Jahromy, Mahsa; Ghasemi, Amir. IBRO Reports. ISSN:2451-8301 (2019) v.6 p.40-44IBRO Reports

DOI: 10.1016/j.ibror.2018.12.001

Link: <http://www.sciencedirect.com/science/article/pii/S2451830118300645>

Abstract: Parkinson's disease is a progressive debilitating neurodegenerative disease characterised mostly with bradykinesia, tremor, catatonia, drooping posture, unsteady gate and unstable steps. Levodopa has been proven to be among the most effective and acceptable treatment that can reconstitute dopamine in Parkinson's disease. However, there is a relation between levodopa long term administration and dyskinesia. Regarding the effectiveness of ondansetron in Parkinson's disease, we planned to test its effect on levodopa-induced dyskinesia (LID). In this

study, Parkinsonism was induced in 40 adult male rats using 6-OHDA injection into the striatum via stereotaxic surgery. After 2 weeks, all animals tested for Parkinson's disease using apomorphine rotation test. Then, animals with positive symptoms for Parkinsonism divided into 4 equal groups, the first group treated with levodopa 50 mg/kg i.p, the second group received only distilled water, the third and forth groups treated with levodopa 50 mg/kg i.p plus two different doses of ondansetron (0.04 and 0.08 mg/kg i.p) for 3 weeks. Animals tested for dyskinesia using AIMs and rotarod tests at specific days and a week after discontinuation of ondansetron. Evaluations of AIMs test showed significant changes in dyskinetic movements and reduction in scores in groups treating with ondansetron when compared with the first group. Upon discontinuations of ondansetron in the last two groups, AIMs scores significantly increased. While in rotarod test, ondansetron had no additional benefit when added to levodopa in motor coordination of animals. Findings of this study suggest that co administration of ondansetron with levodopa is effective in attenuating dyskinesia.

Keyword: Rat; Serotonin; Dyskinesia; Levodopa; Ondansetron; Parkinson

115. Classifying with confidence using Bayes rule and kernel density estimation/ **Fearn, Tom; Pérez-Marín, Dolores; Garrido-Varo, Ana; Guerrero-Ginel, José Emilio.** Chemometrics and Intelligent Laboratory Systems. ISSN:0169-7439 (2019) v.189 p.81-87Chemometrics and Intelligent Laboratory Systems

DOI: 10.1016/j.chemolab.2019.04.004

Link: <http://www.sciencedirect.com/science/article/pii/S0169743919300760>

Abstract: An example in which near infrared spectroscopic data are used to classify animal feed ingredients is used to make the case for the value of probabilistic approaches to classification problems. The accuracy of probabilities given by linear and quadratic discriminant analysis and by a more flexible kernel density approach are examined, and the effect on these probabilities of the use of different tuning criteria is explored. The example involves the classification of multiple particles in a sample, and detailed probability calculations bearing on the inference for both the sample and its parent population are presented.

Keyword: Classification; Kernel density estimation; Near infrared spectroscopy; Probability

116. Supplementation with long-acting progesterone in early diestrus in beef cattle: II. Relationships between follicle growth dynamics and luteolysis/ **Martins, T.; Pugliesi, G.; Sponchiado, M.; Cardoso, B.O.; da Silva, K.R.; Celeghini, E.C.C.; Binelli, M..** Domestic Animal Endocrinology. ISSN:0739-7240 (2019) v.68 p.1-10Domestic Animal Endocrinology

DOI: 10.1016/j.domaniend.2018.12.004

Link: <http://www.sciencedirect.com/science/article/pii/S0739724018300900>

Abstract: The aims were to characterize follicular dynamics in response to supplemental progesterone (P4) and to investigate the relationships between follicular growth and onset of luteolysis in P4-treated cows, submitted or not to artificial insemination (AI). Nonsuckled beef cows detected in estrus were assigned to receive AI or to remain non-AI. Three days after ovulation (ie, D3), AI cows were injected with 150 mg of long-acting P4 (AI + injectable P4 formulation [iP4]; n = 22), and the non-AI cows were assigned to receive 150 mg iP4 (n = 19) or saline (control, n = 19). Between D3 and D21, growth dynamics of the dominant follicles (DFs) was monitored by ultrasonography.

Plasma P4 concentrations were measured every other day from D9 to D19. Pregnancy status (ie, P: pregnant and NP: nonpregnant) was examined by ultrasound on D28 to D32. Injectable P4 formulation supplementation decreased average maximum diameter of first-wave DF (DF1). Neither day of emergence of DF2 or DF3 nor the proportion of two- or three-wave cycles were altered by supplemental P4. Daily mean diameter of DF2 and DF3 was also similar between control and iP4 groups. Consistently, daily mean diameter of DF1 in iP4-treated cows was smaller for cows that underwent luteolysis by D15 compared to a later onset. Progesterone concentrations between D9 and D19 decreased earliest in the iP4 group, latest in the control group and was intermediate for the NP-AI + iP4 group. In addition, three-wave cycles presented a delayed decrease on plasma P4 concentrations than two-wave cycles. Further analysis revealed that on two-wave cycles, P4 concentrations on D15 were lowest in the iP4 and NP-AI + iP4 animals compared to the control and P-AI + iP4 groups. Conversely, for three-wave cycles, on D15, P-AI + iP4, NP-AI + iP4, and controls had greater P4 concentrations than the iP4 group. In summary, our data indicate that impairment of first follicular growth was associated with P4-induced shortened luteal lifespan (D14–D15) and that three-wave cycles after AI can be more supportive for pregnancy maintenance in P4-treated cows. We speculate that such conditions play a critical role in the embryonic ability to inhibit iP4-induced early luteolysis reported in part I of this series.

Keyword: Embryo; Pregnancy; Estradiol; First follicular wave

117. Repeated ethanol exposure influences key enzymes in cholesterol and lipid homeostasis via the AMPK pathway in the rat prefrontal cortex/ **Xu, Shijie; Jeong, Se Jin; Li, Gang; Koo, Ja Wook; Kang, Ung Gu.** Alcohol. ISSN:0741-8329 (2019) v. p.Alcohol

DOI: 10.1016/j.alcohol.2019.11.004

Link: <http://www.sciencedirect.com/science/article/pii/S0741832919301909>

Abstract: Cholesterol homeostasis has been proposed to be implicated in the development of addiction. However, the effects of ethanol on cholesterol homeostasis within the brain are not well understood. One of the most important regulators of cholesterol homeostasis is HMG-CoA reductase (HMG-CoAR), the rate-limiting enzyme of cholesterol biosynthesis. We examined the phosphorylation of HMG-CoAR and the other key regulator of lipid synthesis, acetyl-CoA carboxylase (ACC), following acute or chronic treatment with ethanol (0.5, 1, or 2 g/kg) in the rat prefrontal cortex. The phosphorylation of AMP-activated protein kinase (AMPK), which regulate the HMG-CoAR activity, and its well-known upstream regulators were also studied. The phosphorylation of HMG-CoAR and ACC were transiently increased by ethanol treatment only in animals previously treated chronically with ethanol. Acute administration to naïve animals did not induce the phosphorylation, regardless of dosage. Similarly, the phosphorylation of AMPK and the upstream regulators, LKB1 and CaMK4, were transiently increased only in chronically ethanol-treated animals. In naïve animals, a high dose (2 g/kg) of ethanol decreased phosphorylation. The phosphorylation of TAK1, another upstream kinase of AMPK was increased only from 30 min to 24 h after the chronic treatment with ethanol. Together, these results indicate that repeated exposure is required for the activating effect of ethanol on HMG-CoAR and ACC. This effect seems to be mediated by the AMPK system, and may contribute to the long-lasting neuroadaptation involved in the development of alcohol dependence.

Keyword: Ethanol; AMPK pathway; Cholesterol homeostasis; HMG-CoAR; Prefrontal cortex

118. Physical training improves exercise tolerance, cardiac function and promotes changes in neurotrophins levels in chagasic mice/ **Alves, Rafael Leite; Cardoso, Bárbara Ramalho Ladeira; Ramos, Isalira Peroba Rezende; Oliveira, Bruna da Silva; dos Santos, Mara Livia; de Miranda, Aline Silva; de Almeida, Tatiane Cristine Silva; Vieira, Maria Aparecida Ribeiro; Machado, Fabiana Simão; F.** Life Sciences. ISSN:0024-3205 (2019) v.232 p.116629Life Sciences

DOI: 10.1016/j.lfs.2019.116629

Link: <http://www.sciencedirect.com/science/article/pii/S0024320519305557>

Abstract: Aims To investigate the effects of moderate aerobic physical training on cardiac function and morphology as well as on the levels of glial cell-derived neurotrophic factor (GDNF), nerve growth factor (NGF) and brain derived neurotrophic factor (BDNF) of animals infected with the Y strain of *Trypanosoma cruzi*. Main methods Twenty-eight male C57BL/6 mice were distributed into 4 groups: sedentary control (SC), trained control (TC), sedentary infected (CHC) and trained infected (CHT). The infection was performed by intraperitoneal injection of trypomastigote forms and the animals were adapted to treadmill in the week before the beginning of the training protocol, initiated 45 days post infection. Maximal exercise test (TEM) was performed at the baseline as well as at the end of the 4th, 8th and 12th weeks of training. At the end of the 12th week, all animals were evaluated for cardiac morphology and function by echocardiography. Key findings CHC group showed a larger area of right ventricle (RVA), increased end-systolic volume and reduction in ejection fraction (EF), stroke volume (SV), cardiac output (CO) and fractional area change (FAC). The training reduced the RVA and improved the FAC of chagasic animals. GDNF level was higher in TC and CHC groups compared to SC in heart and BDNF levels were higher in CHC compared to SC in heart and serum. Significance Physical training ameliorated the cardiac function of infected animals and promoted adjusts in BDNF and GDNF levels. These findings evidenced these neurotrophins as possible biomarkers of cardiac function responsive to exercise stimulus.

Keyword: Exercise training; Brain derived neurotrophic factor (BDNF); Cardiac function; Chagas' disease; Chagasic cardiomyopathy; Glial cell-derived neurotrophic factor (GDNF); Nerve growth factor (NGF); Neurotrophins

119. A novel ferritin gene from *Procambarus clarkii* involved in the immune defense against *Aeromonas hydrophila* infection and inhibits WSSV replication/ **Yang, Hui; Liu, Zhe; Jiang, Qun; Xu, Junjie; An, Zhenhua; Zhang, Yingying; Xiong, Dongmei; Wang, Lixin.** Fish & Shellfish Immunology. ISSN:1050-4648 (2019) v.86 p.882-891Fish & Shellfish Immunology

DOI: 10.1016/j.fsi.2018.12.022

Link: <http://www.sciencedirect.com/science/article/pii/S1050464818308210>

Abstract: Ferritin is a protein related to the storage of iron and widely distributed in animals. It participates in many biological process, including antioxidation, cell activation, angiogenesis, regulation of iron metabolic balance and immune defense. In the present study, a novel ferritin gene was identified from red swamp crayfish *Procambarus clarkii*, with a cDNA sequence encoding a predicted 221 amino-acid residues. The ferritin protein contains a 19-residue signal peptide and 145-residue classic ferritin domain. The NJ phylogenetic analysis showed PcFer clustered with other crustacean peptides. The recombinant PcFer protein was produced and purified in *E. coli*, and the anti-rabbit polyclonal antibody was obtained. The rPcFer exhibited iron binding activity at a dose-dependent effect. The qPCR and western blot analysis revealed that PcFer was highly expressed in hemocytes, hepatopancreas, and gills. After challenged with WSSV and *Aeromonas hydrophila*, the mRNA and protein expression patterns of PcFer were significantly up-regulated in hemocytes and hepatopancreas. dsRNA interfering technique was utilized to silence the expression of PcFer gene. The WSSV copy number in PcFer silenced shrimp was much higher than that in the control

group. The present study indicated that PcFer was involved in the immune defense against WSSV and *Aeromonas hydrophila*, and might inhibit WSSV replication in *P. clarkii*. These results will provide important data support for further study of the functional role of the ferritin gene.

Keyword: Ferritin; Immune defense; WSSV

120. Identification of human pathogenic *Enterocytozoon bieneusi*, *Cyclospora cayetanensis*, and *Cryptosporidium parvum* on the surfaces of vegetables and fruits in Henan, China/ **Li, Junqiang; Shi, Ke; Sun, Fangfang; Li, Tingwen; Wang, Rongjun; Zhang, Sumei; Jian, Fuchun; Ning, Changshen; Zhang, Longxian.** International Journal of Food Microbiology. ISSN:0168-1605 (2019) v.307 p.108292 International Journal of Food Microbiology

DOI: 10.1016/j.ijfoodmicro.2019.108292

Link: <http://www.sciencedirect.com/science/article/pii/S0168160519302247>

Abstract: *Cryptosporidium* spp., *Giardia duodenalis*, *Cyclospora cayetanensis*, and *Enterocytozoon bieneusi* are known etiological agents of self-limiting diarrhea, chronic disorders, and severe debilitating illnesses in humans, particularly children and patients with immunodeficiency diseases. To assess the pathogen carriage status of raw vegetables and fruits and the potential transmission routes of the aforementioned parasites in Henan province, China, a total of 1099 vegetables and fruits samples (21 items) were purchased and collected from agricultural farms or open markets. *Cryptosporidium* spp., *E. bieneusi*, *C. cayetanensis* and *G. duodenalis* were screened by employing polymerase chain reaction (PCR) amplification of species-specific genes. Three kinds of human pathogenic agent (*E. bieneusi*, *C. cayetanensis* and *C. parvum*) were identified on the surfaces of the vegetables and fruits (3.7%, 41/1099). *E. bieneusi* was found in 3.5% (38/1099) of the samples, whereas *C. cayetanensis* and *C. parvum* were only identified in two (0.2%) and one (0.1%) of the vegetable and fruit samples, respectively. No *G. duodenalis* contamination was detected in the present study. In total, 12 different *E. bieneusi* ITS genotypes (eight known and four novel) were detected, of which the ten (EbpA, CM8, CHG19, EbpC, CTS3, Henan-IV, and CHV1 to CHV4) that occurred in 20 samples (20/38, 52.6%) clustered into the previously described high potential zoonotic group 1 in the phylogenetic analysis. The remaining two known genotypes (BEB8 and CD6) detected in 18 samples (18/38, 47.4%) belonged to group 2. That *C. cayetanensis*, *C. parvum* and some *E. bieneusi* genotypes have been reported in humans, highlights the possible risk of foodborne related disease outbreaks.

Keyword: Carriage status; Fresh produce

121. Updating predictions of dry matter intake of lactating dairy cows/ **de Souza, R.A.; Tempelman, R.J.; Allen, M.S.; VandeHaar, M.J..** Journal of Dairy Science. ISSN:0022-0302 9(2019) v.102 p.7948-7960 Journal of Dairy Science

DOI: 10.3168/jds.2018-16176

Link: <http://www.sciencedirect.com/science/article/pii/S0022030219306174>

Abstract: ABSTRACT Our objective was to model dry matter intake (DMI) by Holstein dairy cows based on milk energy (MilkE), body weight (BW), change in BW (Δ BW), body condition score (BCS), height, days in milk (DIM), and parity (primiparous and multiparous). Our database included 31,631 weekly observations on 2,791 cows enrolled in 52 studies from 8 states of the United States, mostly in the Upper Midwest. The means $\pm$ standard deviations of these variables were 24 ± 5 kg of DMI, 30 ± 6 Mcal of MilkE/d, 624 ± 83 kg of BW, 0.24 ± 1.50 kg of Δ BW/d, 3.0 ± 0.5 BCS,

149 ± 6 cm height, and 102 ± 45 DIM. Data analysis was performed using a mixed-effects model containing location, study within location, diet within study, and location and cow within study as random effects, whereas the fixed effects included the linear effects of the covariates described previously and all possible 2-way interactions between parity and the other covariates. A nonlinear (NLIN) mixed model analysis was developed using a 2-step approach for computational tractability. In the first step, we used a linear (LIN) model component of the NLIN model to predict DMI using only data from mid-lactation dairy cows (76–175 DIM) without including information on DIM. In the second step, a nonlinear adjustment for DIM using all data from 0 to 368 DIM was estimated. Additionally, this NLIN model was compared with an LIN model containing a fourth-order polynomial for DIM using data throughout the entire lactation (0–368 DIM) to assess the utility of an NLIN model for the prediction of DMI. In summary, a total of 8 candidate models were evaluated as follows: 4 ways to express energy required for maintenance (BW, BW^{0.75}, BW adjusted for a BCS of 3, and BW^{0.75} adjusted for a BCS of 3) × 2 modeling strategies (LIN vs. NLIN). The candidate models were compared using a 5-fold across-studies cross-validation approach repeated 20 times with the best-fitting model chosen as the proposed model. The metrics used for evaluation were the mean bias, slope bias, concordance correlation coefficient (CCC), and root mean squared error of prediction (RMSEP). The proposed prediction equation was $\text{DMI (kg/d)} = [(3.7 + \text{parity} \times 5.7) + 0.305 \times \text{MilK (Mcal/d)} + 0.022 \times \text{BW (kg)} + (-0.689 + \text{parity} \times -1.87) \times \text{BCS}] \times [1 - (0.212 + \text{parity} \times 0.136) \times \exp(-0.053 \times \text{DIM})]$ (mean bias = 0.021 kg, slope bias = 0.059, CCC = 0.72, and RMSEP = 2.89 kg), where parity is equal to 1 if the animal is multiparous and 0 otherwise. Finally, the proposed model was compared against the Nutrient Requirements of Dairy Cattle (2001) prediction equation for DMI using an independent data set of 9,050 weekly observations on 1,804 Holstein cows. The proposed model had smaller mean bias and RMSEP and higher CCC than the Nutrient Requirements of Dairy Cattle equation to predict DMI and has potential to improve diet formulation for lactating dairy cows.

Keyword: model; lactation; feed intake

122. Technical note: Developing a heat stress model in dairy cows using an electric heat blanket/ **Al-Qaisi, M.; Horst, E.A.; Kvidera, S.K.; Mayorga, E.J.; Timms, L.L.; Baumgard, L.H.** Journal of Dairy Science. ISSN:0022-0302 1(2019) v.102 p.684-689 Journal of Dairy Science

DOI: 10.3168/jds.2018-15128

Link: <http://www.sciencedirect.com/science/article/pii/S0022030218309858>

Abstract: ABSTRACT Precisely studying the biological consequences of heat stress (HS) in agriculturally relevant animals typically requires expensive climate-controlled facilities, infrastructure inaccessible to most researchers. Thus, study objectives were to explore the efficacy of an electric heat blanket (EHB) as an alternative method for evaluating HS and to determine whether EHB-induced hyperthermia affects production parameters similar to natural HS. Lactating Holstein cows ($n = 8$; 133 ± 3 d in milk; 709 ± 31 kg; 2.6 ± 0.3 parity) were housed in individual box stalls and allowed to acclimate for 3 d. After acclimation, the trial consisted of 2 experimental periods (P). During P1 (3 d), cows were housed in thermoneutral conditions for collecting baseline data. During P2 (7 d), cows were fitted with an EHB. During the entire experiment cows were fed ad libitum, and dry matter intake (DMI) was recorded daily. Cows were milked twice daily (0600 and 1800 h), and milk samples were collected on d 2 and 3 of P1 and d 3 and 7 of P2. Rectal temperature, respiration rate, heart rate, and skin temperature were obtained twice daily (0600 and 1800 h) during both P1 and P2. Overall, there was an increase in rectal temperature and respiration rate at 0600 h (1.0°C and 25 breaths/min, respectively) and 1800 h (1.2°C and 29 breaths/min, respectively) during P2. The EHB decreased DMI and milk yield (25 and 21%, respectively) by the end of P2. During P2, milk protein tended to decrease (4.4%) compared with P1. In contrast, milk urea nitrogen increased (33%) during P2 relative to P1. No other differences were observed in milk composition. In summary, our results indicate that employing an EHB affects physiological and

production parameters similarly to natural HS (i.e., increased rectal temperature and respiration rate, decreased DMI and milk yield); thus, the EHB is an effective and inexpensive research tool for evaluating the biological consequences of HS in lactating dairy cows.

Keyword: dairy cow; heat stress; electric blanket