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BALAI BESAR PELATIHAN KESEHATAN HEWAN

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443. Uptake and depuration kinetics of dicofol metabolite 4,4'-dichlorobenzophenone, in the edible Asiatic clam *Meretrix meretrix*/ **Ivorra, Lucia; Cruzeiro, Catarina; Chan, Shek Kiu; Tagulao, Karen Araño; Cardoso, Patricia G..** Chemosphere. ISSN:0045-6535 (2019) v.235 p.662-669Chemosphere

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Link: <http://www.sciencedirect.com/science/article/pii/S0045653519313967>

Abstract: Uptake and depuration kinetics of 4,4'-dichlorobenzophenone (main metabolite of dicofol) in the edible clam *Meretrix meretrix* were evaluated through a mesocosm experiment. *M. meretrix* was exposed to different dicofol concentrations (environmental concentration, D1 = 50 ng/L; supra-environmental concentration, D2 = 500 ng/L) for 15 days, followed by the same depuration period. To accomplish this goal, an analytical method was successfully optimized for 4,4'-DCBP using QuEChERS as extraction method with a range of concentrations 0.3–76.8 ng/g ww quantified by gas chromatography coupled to tandem mass spectrometry. Our results demonstrated different kinetics of accumulation depending on the two dicofol treatments. For D1, the uptake kinetic was best fitted using a plateau followed by one phase association kinetic model, while for D2 a one phase association kinetic model suited better. Similar bioconcentration factors were obtained for both concentrations but only animals exposed to D2, showed 4,4'-DCBP levels above the limits of quantification after 24 h exposure. These animals also showed lower uptake rate (k_u) than organisms exposed to D1. During the depuration period, only organisms exposed to D1 successfully depurated after 24 h. On the other hand, although animals exposed to D2 presented higher elimination factor, they did not reach the original levels after depuration. Moreover, values detected in these clams were higher than the Maximum Residue Level (10 ng/g) established by the European legislation. This indicates that longer periods of depuration time than the ones used in this study, may be needed in order to reach safe levels for human consumption. This work also demonstrated that studies on metabolite kinetics during uptake/depuration experiments, could be a new alternative to understand the impact and metabolism of pesticides in the marine environment.

Keyword: Bivalves; GC-MS/MS; Organochlorine pesticides; QuEChERS bioconcentration; Seafood

444. Effect of acute and chronic restraint stress on electrical activity of prefrontal cortex neurons in the reinstatement of extinguished methamphetamine-induced conditioned place preference: An electrophysiological study/ **Taslimi, Zahra; Komaki, Alireza; Sarihi, Abdolrahman; Haghparast, Abbas.** Brain Research Bulletin. ISSN:0361-9230 (2019) v.146 p.237-243Brain Research Bulletin

DOI: 10.1016/j.brainresbull.2019.01.013

Link: <http://www.sciencedirect.com/science/article/pii/S0361923018305550>

Abstract: Increased vulnerability to drug abuse has been observed after exposure to stress and the prefrontal cortex (PFC) plays a major role in the control of the stress response and reward pathway. The current study was conducted to clarify the effects of acute and chronic restraint stress on PFC neural activity during the reinstatement of methamphetamine (METH)-induced conditioned place preference (CPP) in rats. Following the establishment of CPP (METH 0.5 mg/kg; s.c. for 3 days) and the extinction phase, male Wistar rats were divided into threshold (0.25 mg/kg; s.c.) and sub-threshold (0.125 mg/kg; s.c.) METH-treated super groups to induce reinstatement. Each super group contained control (non-stressed), acute restraint stress (ARS) and chronic restraint stress (CRS) groups. *in vivo* single unit recordings were performed on the urethane-anesthetized rats in these groups. After baseline recordings (10-min period) of the neurons in the PFC, their firing activity was recorded for 50 min during the reinstatement phase after injection of METH. The results showed that the threshold dose, but not the sub-threshold dose, of METH

significantly increased PFC neural activity in the non-stressed animals. The sub-threshold dose of METH notably changed this activity in both the ARS and CRS groups. These changes in the excited neurons after the sub-threshold dose in the ARS and CRS groups were significantly higher than those in the non-stressed group. It appears that the PFC is implicated in the associated reward pathway and stress functions. METH affected the firing rate of PFC neurons and stress amplified the effect of METH on changes in the neuronal firing rate in the PFC.

Keyword: Prefrontal cortex; Methamphetamine; Acute restraint stress; Chronic restraint stress; Conditioned place preference; Neuronal activity

445. The synthetic tubulysin derivative, tubugi-1, improves the innate immune response by macrophage polarization in addition to its direct cytotoxic effects in a murine melanoma model/ **Drača, Dijana; Mijatović, Sanja; Krajnović, Tamara; Pristov, Jelena Bogdanović; Đukić, Tatjana; Kaluđerović, Goran N.; Wessjohann, Ludger A.; Maksimović-Ivanić, Danijela.** Experimental Cell Research. ISSN:0014-4827 2(2019) v.380 p.159-170Experimental Cell Research

DOI: 10.1016/j.yexcr.2019.04.028

Link: <http://www.sciencedirect.com/science/article/pii/S0014482719302125>

Abstract: Synthetic tubugis are equally potent but more stable than their natural forms. Their anticancer potential was estimated on a solid melanoma in vitro and in vivo. Tubugi-1 induced the apoptosis in B16 cells accompanied with strong intracellular production of reactive species, subsequently imposing glutathione and thiol group depletion. Paradoxically, membrane lipids were excluded from the cascade of intracellular oxidation, according to malondialdehyde decrease. Although morphologically apoptosis was typical, externalization of phosphatidylserine (PS) as an early apoptotic event was not detected. Even their exposition is pivotal for apoptotic cell eradication, primary macrophages successfully eliminated PS-deficient tubugi-1 induced apoptotic cells. The tumor volume in animals exposed to the drug in therapeutic mode was reduced in comparison to control as well as to paclitaxel-treated animals. Importantly, macrophages isolated from tubugi-1 treated animals possessed conserved phagocytic activity and were functionally and phenotypically recognized as M1. The cytotoxic effect of tubugi-1 is accomplished through its ability to polarize the macrophages toward M1, probably by PS independent apoptotic cell engulfment. The unique potential of tubugi-1 to prime the innate immune response through the induction of a specific pattern of tumor cell apoptosis can be of extraordinary importance from fundamental and applicable aspects.

Keyword: Apoptosis; Cancer; Macrophage polarization; Phosphatidylserine; Tubulysin

446. Monkeys are curious about counterfactual outcomes/ **Wang, Maya Zhe; Hayden, Benjamin Y..** Cognition. ISSN:0010-0277 (2019) v.189 p.1-10Cognition

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Link: <http://www.sciencedirect.com/science/article/pii/S0010027719300642>

Abstract: Many non-human animals show exploratory behaviors. It remains unclear whether any possess human-like curiosity. We previously proposed three criteria for applying the term curiosity to animal behavior: (1) the subject is willing to sacrifice reward to obtain information, (2) the information provides no immediate instrumental or strategic benefit, and (3) the amount the subject is willing to pay depends systematically on the amount of information available. In previous work on information-seeking in animals, information generally predicts upcoming rewards, and

animals' decisions may therefore be a byproduct of reinforcement processes. Here we get around this potential confound by taking advantage of macaques' ability to reason counterfactually (that is, about outcomes that could have occurred had the subject chosen differently). Specifically, macaques sacrificed fluid reward to obtain information about counterfactual outcomes. Moreover, their willingness to pay scaled with the information (Shannon entropy) offered by the counterfactual option. These results demonstrate the existence of human-like curiosity in non-human primates according to our criteria, which circumvent several confounds associated with less stringent criteria.

Keyword: Curiosity; Risk; Counterfactual; Entropy; Fictive; Gambling; Hypothetical

447. Topical photodynamic therapy with chloroaluminum phthalocyanine liposomes is as effective as systemic pentavalent antimony in the treatment of experimental cutaneous leishmaniasis/ **Lopes, Sávia Caldeira; Silva, Raphaela Ariany; Novais, Marcus Vinícius; Coelho, Larissa Dutra; Ferreira, Lucas Antônio; Souza, Paulo Eduardo; Tedesco, Antônio; Azevedo, Ricardo Bentes; Aguiar, Marta Gontijo; Oliveira, Mônica Cristina**. Photodiagnosis and Photodynamic Therapy. ISSN:1572-1000 (2019) v.28 p.210-215Photodiagnosis and Photodynamic Therapy

DOI: 10.1016/j.pdpdt.2019.08.020

Link: <http://www.sciencedirect.com/science/article/pii/S1572100019302261>

Abstract: Background In the Americas, one of the main causative species of cutaneous leishmaniasis is *Leishmania (Leishmania) amazonensis*. The systemic antimonials remain the most largely used option for disease control. However, this drug has significant toxicity. The development of new alternative therapies, including the identification of effective drugs for topical treatment of cutaneous leishmaniasis, is of utmost interest. In this sense, photodynamic therapy emerges as a new strategy. The aim of this study was to develop the chloroaluminum phthalocyanine-loaded liposome, characterize it, and evaluate its stability and efficacy in the topical treatment of cutaneous leishmaniasis caused by *L. (L.) amazonensis*. Methods Liposomes composed of egg phosphatidylcholine were prepared by Bangham's method. Storage stability of phthalocyanine-loaded liposomes was evaluated at 30 and 60 days after preparation. For the in vivo evaluation, the animals were infected with *L. (L.) amazonensis* and divided into groups: chloroaluminium phthalocyanine-loaded liposome, blank liposome, meglumine antimoniate (200 mgSb+5/Kg/day), and control. The lesion size was determined weekly after the beginning of the treatment. Upon completion, parasites were recovered from the skin lesion and spleen and evaluated by limiting dilution assay. Results Chloroaluminum phthalocyanine-loaded liposomes were stable and showed adequate characteristics for topical administration. The topical chloroaluminum phthalocyanine-loaded liposome was as effective as systemic pentavalent antimony in reducing the parasitic load in the lesion and spleen in infected animals. Conclusions The present study showed that photodynamic therapy with chloroaluminum phthalocyanine-loaded liposomes is a promising strategy for the treatment of American cutaneous leishmaniasis caused by *L. (L.) amazonensis*.

Keyword: Chloroaluminum phthalocyanine; Cutaneous leishmaniasis; Liposomes; Photodynamic therapy; Topical treatment

448. Decision-making of goats when exposed to choice feeding: Triggered by taste or smell?/ **Scherer, R.; Gerlach, K.; Südekum, K.-H.**. Applied Animal Behaviour Science. ISSN:0168-1591 (2019) v.210 p.46-51Applied Animal Behaviour Science

DOI: 10.1016/j.applanim.2018.10.007

Link: <http://www.sciencedirect.com/science/article/pii/S0168159118303010>

Abstract: Animals recognise known forages. However, it is unclear whether recognition is mainly based on sensory characteristics linked to postingestive feedback or whether the latter is activated each time before a choice is made. Moreover, knowledge is scarce regarding the duration of the memory process and if the memory is primarily activated by smell or a combination of smell and taste. The hypothesis of this study was that in choice situations (1) the preference for one of two offered forages develops in the initial moments of feeding, and (2) this is led by recognition via smell linked to postingestive feedback. In order to study the potential relationships between initial feed intake (FI) (3 min) and short-term FI (3 h), a preference trial as a special form of feed choice experiments with Saanen-type wethers was undertaken. Forages comprised lucerne (*Medicago sativa* L., first cut), red clover (*Trifolium pratense* L., first cut) and Italian ryegrass (*Lolium multiflorum* Lam., second cut). Six different treatments of each forage type were ensiled such that silages of varying quality were produced. Each possible two-way combination of silages and standard hay (n = 21 combinations) was offered and complemented with video recordings of the first 3 min of feed consumption in the morning. Data were analysed via correlation and regression analysis using PROC CORR (Pearson correlation coefficients) and PROC REG of SAS for examination of the relationships between dry matter intake (DMI; g/30 min and g/3 h) and the duration (s) of FI in the first 3 min. The head was moved 0.8–3.0 times between both boxes until the decision was made, and no differences were observed in the frequency of head movements between the silage treatments. The decision did not seem to occur by chance: the initially selected lucerne silages were consumed in greater amounts than the initially non-selected silages within the first 3 min of feeding in 88.3% of the pairwise comparisons. With the red clover silages the proportion was 90.1%, and with the grass silages, 87.3%; 81.7%, 77.5% and 58.9% of the initially non-selected lucerne, red clover and Italian ryegrass silages respectively were not eaten at all (i.e. 0 s). A strong relationship was observed between DMI (g/30 min and g/3 h) and the duration of FI in the first 3 min, indicating a high predictive power of initial FI for the preference that develops within 3 h. Around 90% of the variation in DMI, both expressed as g/3 h and g/30 min, was explained by the duration of FI in the first 3 min of feeding. The results suggest that already in the very first minutes of feeding, recognition of the silages and decision-making processes take place based on the smell emitted by the silages.

Keyword: Ruminants; Feed intake behaviour; Forage recognition

449. Generation of porcine *Pasteurella multocida* ghost vaccine and examination of its immunogenicity against virulent challenge in mice/ **Ran, Xuhua; Meng, Xiang-Zhu; Geng, Hong-Li; Chang, Chunlong; Chen, Xiaohong; Wen, Xiaobo; Ni, Hongbo.** Microbial Pathogenesis. ISSN:0882-4010 (2019) v.132 p.208-214 Microbial Pathogenesis

DOI: 10.1016/j.micpath.2019.04.016

Link: <http://www.sciencedirect.com/science/article/pii/S0882401019304565>

Abstract: *Pasteurella multocida* (PM) causes a variety of clinical manifestation in domestic animals, even acute death. Vaccination is among effective strategy to prevent and control PM-related diseases. Bacterial ghosts (BGs) are empty bacterial envelopes, which sustain subtle antigenic conformation in bacterial outer-membrane and exhibit higher efficacy compared to inactivated vaccines. Here, a BG vaccine generated from the porcine PM reference strain CVCC446 (serotype B:2) was prepared upon lysis by E protein of bacteriophage PhiX174, and the safety and immunogenicity were evaluated its in a mouse model. Lysis rate was in 99.99% and the BG vaccine was completely inactivated by addition of freeze-dry procedure. Mice were immunized subcutaneously twice in 2-week intervals with BGs, or BGs plus adjuvant, or formalin-inactivated PM or an adjuvant control. Mice inoculated twice with BGs vaccines generated higher titer of antibodies, interleukin 4 and gamma interferon than those in the inactivated vaccine group

or adjuvant placebo group ($P < 0.05$). CD4+ and CD8+ T lymphocyte levels in spleen were higher in both BG groups than inactivated vaccine group or adjuvant group. Mice administered with the BGs plus adjuvant were completely protected against intraperitoneal challenge with $10 \times \text{LD}_{50}$ dose of virulent isolate and exhibited decreased tissue lesion and lower bacterial loads, which was superior to the inactivated vaccine. The results demonstrated safety of the BG vaccine and primary immunogenicity in a mouse model, suggesting a potential of further evaluation in a pig model and vaccine candidate.

Keyword: Vaccine; Porcine; bacterial ghost; Immunogenic analysis

450. Cognitive impairment in elderly people with prediabetes or diabetes: A cross-sectional study of the NHANES population/ **Cichosz, Simon Lebech; Jensen, Morten Hasselstrøm; Hejlesen, Ole.** Primary Care Diabetes. ISSN:1751-9918 (2019) v. p.Primary Care Diabetes

DOI: 10.1016/j.pcd.2019.11.005

Link: <http://www.sciencedirect.com/science/article/pii/S1751991819303183>

Abstract: Aim To investigate the cognitive function in people without diabetes, with prediabetes and with diabetes. Methods/Design The study design used was a cross-sectional analysis of data in people above 60 years registered in NHANES from 2011 to 2014. Three assessments were used to characterize cognitive function: (a) CERAD Word Learning subtest assessing immediate and delayed learning ability, (b) The Animal Fluency test assessing categorical verbal fluency, and (c) The Digit Symbol Substitution test assessing processing speed, sustained attention, and working memory. Results (A) Memory recall (-0.19 , $[-0.34; -0.039]$, $p = 0.014$) and Delayed memory recall decline was associated with diabetes (-0.285 , $[-0.503; -0.067]$, $p = 0.01$), but not in an adjusted analysis. (B) Animal Fluency score decline was associated with diabetes (-1.185 , $[-1.688; -0.682]$, $p < 0.001$). (C) Digit Symbol score decline was associated with diabetes (-6.897 , $[-8.491; -5.302]$, $p < 0.001$). Prediabetes was not associated with cognitive function. Conclusions This study demonstrates an association between cognitive dysfunction and diabetes. Results may also indicate that cognitive decline is not yet present in people with mild impairments of glucose homeostasis.

Keyword: Cognitive function; Diabetes; Cognitive decline; Prediabetes

451. Protective effect of curcumin on ochratoxin A–induced liver oxidative injury in duck is mediated by modulating lipid metabolism and the intestinal microbiota/ **Zhai, S.S.; Ruan, D.; Zhu, Y.W.; Li, M.C.; Ye, H.; Wang, W.C.; Yang, L.** Poultry Science. ISSN:0032-5791 (2019) v. p.Poultry Science

DOI: 10.1016/j.psj.2019.10.041

Link: <http://www.sciencedirect.com/science/article/pii/S0032579119447809>

Abstract: Curcumin has antioxidant functions, regulates the intestinal microbial composition, and alleviates mycotoxin toxicity. The present study aimed to explore whether curcumin could alleviate ochratoxin A (OTA)-induced liver injury via the intestinal microbiota. A total of 720 mixed-sex 1-day-old White Pekin ducklings were randomly assigned into 4 groups: CON (control group, without OTA), OTA (fed a diet with 2 mg/kg OTA), CUR (ducks fed a diet with 400 mg/kg curcumin), and OTA + CUR (2 mg/kg OTA plus 400 mg/kg curcumin). Each treatment consisted of 6 replicates and 30 ducklings per replicate. Treatment lasted for 21 D. Results were analyzed by a two-tailed Student t test between 2 groups. Our results demonstrated that OTA treatment had the highest serum low-density lipoprotein

(LDL) level among 4 groups. Compared with OTA group, OTA + CUR decreased serum LDL level ($P < 0.05$). OTA decreased liver catalase (CAT) activity in ducks ($P < 0.05$), while addition of curcumin in OTA group increased liver CAT activity ($P < 0.05$). 16S ribosomal RNA sequencing suggested that curcumin increased the richness indices (ACE index) and diversity indices (Simpson index) compared with OTA group ($P < 0.05$) and recovered the OTA-induced alterations in composition of the intestinal microbiota. Curcumin supplementation relieved the decreased abundance of butyric acid producing bacteria, including *blautia*, *butyricococcus*, and *butyricimonas*, induced by OTA ($P < 0.05$). OTA also significantly influenced the metabolism of the intestinal microbiota, such as tryptophan metabolism and glyceropholipid metabolism. Curcumin could alleviate the upregulation of oxidative stress pathways induced by OTA. OTA treatment also increased SREBP-1c expression ($P < 0.05$). The curcumin group had the lowest expression of FAS and PPARG mRNA ($P < 0.05$) and the highest expression of NRF2 and HMOX1 mRNA. These results indicated that curcumin could alleviate OTA-induced oxidative injury and lipid metabolism disruption by modulating the cecum microbiota.

Keyword: curcumin; duck; intestinal microbiota; liver oxidative injury; ochratoxin A

452. The dimensional structure of students' self-concept and interest in science depends on course composition/
Jansen, Malte; Schroeders, Ulrich; Lüdtke, Oliver; Marsh, Herbert W.. Learning and Instruction. ISSN:0959-4752 (2019) v.60 p.20-28 Learning and Instruction

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Link: <http://www.sciencedirect.com/science/article/pii/S0959475218300045>

Abstract: Both academic self-concept and interest are considered domain-specific constructs. Previous research has not yet explored how the composition of the courses affects the domain-specificity of these constructs. Using data from a large-scale study in Germany, we compared ninth-grade students who were taught science as an integrated subject with students who were taught biology, chemistry, and physics separately with regard to the dimensional structure of their self-concepts and interests. Whereas the structure of the constructs was six-dimensional in both groups (self-concept and interest factors for biology, chemistry, and physics), the correlations between the domain-specific factors were higher in the integrated group. Furthermore, the pattern of gender differences differed across groups. Whereas male students generally showed higher self-concept and interest in physics and chemistry, a small advantage for male students in biology was only present in integrated science teaching group. We conclude that aspects of the learning environment such as course composition may affect the dimensional structure of motivational constructs.

Keyword: Interest; Academic self-concept; Construct differentiation; Dimensionality; Integrated science teaching

453. Virulence evaluation of classical swine fever virus subgenotype 2.1 and 2.2 isolates circulating in China/
Gong, Wenjie; Li, Junhui; Wang, Zunbao; Sun, Jiumeng; Mi, Shijiang; Lu, Zongji; Cao, Jian; Dou, Zhihua; Sun, Yanjun; Wang, Pengjiang; Yuan, Ke; Zhang, Liying; Zhou, Xubin; He, Sun; Tu, Changchun. Veterinary Microbiology. ISSN:0378-1135 (2019) v.232 p.114-120 Veterinary Microbiology

DOI: 10.1016/j.vetmic.2019.04.001

Link: <http://www.sciencedirect.com/science/article/pii/S0378113519302238>

Abstract: Classical swine fever (CSF) remains an important pig disease in China, where it usually presents with mild or atypical clinical manifestations, with large scale outbreaks rarely seen. This has led to speculation about the possible circulation of viral strains of low virulence. To investigate this possibility, five field isolates within the predominant genotype 2 (2.1b, 2.1c, 2.1 h and 2.2) were evaluated and compared by experimental infection of naturally farrowed but colostrum-deprived piglets. All infected piglets displayed clinical signs, including persistent high fever, depression, anorexia, dyspnea, conjunctivitis, constipation, and hesitant gait. Typical pathological lesions, including pulmonary edema, hemorrhagic or cellulosic exudation, and swelling and hemorrhage of lymph nodes, were observed. Viremia and Erns protein expression in the blood of all infected animals were detectable from 3 to 5 days post infection (DPI), their presence correlating with the onset of fever, clinical signs and leukopenia. E2 antibody did not develop in any of the field CSFV-infected piglets during the disease course, while Erns antibody was detectable in 4–56% of infected animals at various time points. Mortalities ranged from 20 to 80% within 21 DPI, progressing to 100% by 43 DPI. Based on clinical scores and fatalities within 21 DPI, 2 of the 5 field isolates were classified as of moderate virulence and 3 of high virulence; i.e., no field isolates of low virulence were identified. The study has provided data supporting the use of these isolates as challenge viruses to evaluate the efficacy of current CSF vaccines.

Keyword: Evaluation; Pathogenicity; Virulence; CSFV; Field isolate

454. Genistein increases progesterone secretion by elevating related enzymes in chicken granulosa cells/ **Xiao, Y.Q.; Shao, D.; Tong, H.B.; Shi, S.R.**. Poultry Science. ISSN:0032-5791 4(2019) v.98 p.1911-1917 Poultry Science

DOI: 10.3382/ps/pey411

Link: <http://www.sciencedirect.com/science/article/pii/S0032579119301208>

Abstract: ABSTRACT Genistein, a biologically active isoflavone, exists in many soy products. It is well known that genistein binds to both oestrogen receptor alpha (ER α) and oestrogen receptor beta (ER β), but it has a higher affinity to ER β . Genistein can also bind to the G protein-coupled receptor 30 (GPR30, also known as G protein-coupled oestrogen receptor 1 or GPER). Furthermore, weak oestrogenic activity has been found in genistein, but the mechanism of action remains unknown. The aim of this study was to investigate the in vitro effects of genistein on the secretion of progesterone (P4) and oestradiol (E2) in chicken granulosa cells harvested from follicles, as well as the mRNA expression of ERs in these cells. In addition, we examined the expression of key enzymes including steroidogenic acute regulatory protein (StAR), cytochrome P450 side-chain cleavage (P450scc), and 3 β -hydroxysteroid dehydrogenase (3 β -HSD) in the process of P4 synthesis. The results showed that genistein did not affect the viability of granulosa cells, nor was the proliferating cell nuclear antigen (PCNA) protein changed. Among the 1-, 10-, 100-, and 1,000-nM concentrations tested, treatment with 1 nM genistein for 48 h significantly increased P4 but did not affect E2 secretion. Real-time PCR results showed that the ER β gene expression in granulosa cells was markedly upregulated by 1 nM genistein treatment for 48 h, but there was no significant difference in ER α and GPR30 expression. Genistein also increased the gene expression of StAR, P450scc and 3 β -HSD in the cultured granulosa cells. These results indicate that genistein acts directly on chicken granulosa cells to increase P4 production by upregulating the gene expression of key enzymes through binding in ER β . It may exert positive effects on the reproduction of late-laying hens and act as an effective and safe feed additive for animals.

Keyword: estrogenic receptors; genistein; granulosa cells; progesterone

455. Innate visual recognition for sympatric carnivores in captive Amur tiger cubs/ **Wang, Qi; Xu, Tingting; Zhao, Xindi; Liu, Dan; Jiang, Guangshun.** Applied Animal Behaviour Science. ISSN:0168-1591 (2019) v.218 p.104823Applied Animal Behaviour Science

DOI: 10.1016/j.applanim.2019.06.004

Link: <http://www.sciencedirect.com/science/article/pii/S016815911930084X>

Abstract: Predator recognition is vital for the survival of prey. It has been shown that prey recognizes predators by instinct or learning. However, there was little research testing if carnivorous animals, especially mammals, could innately recognize potential predator sympatric carnivores. In addition, personality has an intimate connection with a physiological or cognitive state, but it remains unclear if predator recognition capability is correlated with personality. Here, we test if Amur tigers (*Panthera tigris altaica*) innately recognize their sympatric carnivores based on the assumption that Amur tiger cubs can be killed by sympatric carnivores. By studying captive Amur tiger cubs, which had been almost completely isolated from all other animal species since birth, we found that they significantly paid attention to the images, but not the sounds, of sympatric carnivores, as compared with those of non-sympatric carnivores and non-animal control. Meanwhile, the images, but not the sounds, of sympatric carnivores obviously elicited a frightened response in Amur tigers. However, we found no significant correlation between predator recognition capability and personality traits of tigers. In general, this study indicated that captive Amur tigers innately recognize the images, but not sounds, of sympatric carnivores, implying the importance of the visual instinct for recognizing competitive species in Amur tigers.

Keyword: Personality; Instinct; Predator recognition; Sympatric carnivores

456. Effect of testosterone cypionate and stanozolol on the heart of young trained mice: A morphometric study/ **Vieira, Tânia Martins; Rossi Junior, Wagner Costa; Da Ré Guerra, Flávia; Damião, Bruno; Marques, Petrus Pires; Esteves, Alessandra.** Steroids. ISSN:0039-128X (2019) v.145 p.19-22Steroids

DOI: 10.1016/j.steroids.2019.02.011

Link: <http://www.sciencedirect.com/science/article/pii/S0039128X19300364>

Abstract: Testosterone cypionate and Stanozolol are Anabolic-Androgenic Steroids (AAS) which are synthetic substances that possess functions similar to testosterone. The use of these substances has increased considerably among youngsters and sports practitioners aiming better performance of with aesthetic purposes. The major concern is the effects caused by the inappropriate use of the substances, such as hypertension, myocardial ischemia, and left ventricle hypertrophy. The objective of the present research was to measure the diameter of the left ventricle lumen and the thickness of the left ventricle myocardium in mice submitted to supraphysiological doses of AAS. A total of 30 female Swiss mice were used in the experiments. The animals received supraphysiological doses of the AAS for 30 days, and during the treatment period, they were put to swim in intercalated days. After treatment animals were euthanized and slides were made from the hearts for measurements. Results demonstrated that both AAS changed significantly the heart morphology: Testosterone cypionate led to an increase in the ventricular lumen and stanozolol increased left ventricle myocardium thickness. In conclusion, the use of AAS in supraphysiological doses can change the heart morphology and can lead to serious health consequences.

Keyword: Heart; Stanozolol; Testosterone cypionate; Ventricle myocardium

457. State-Dependent Spike and Local Field Synchronization between the Thalamic Parafascicular Nucleus and the Dorsal Striatum in a Rat Model of Parkinson's Disease/ **Zhang, Haiyan; Yang, Jing; Xiang, Tianyu; Sun, Shuang; Wang, Xiusong; Wang, Xuenan; Li, Min; Guo, Mengnan; Jia, Qingmei; Chen, Dadian; Wang, Min.** Neuroscience. ISSN:0306-4522 (2019) v.404 p.27-38Neuroscience

DOI: 10.1016/j.neuroscience.2019.01.055

Link: <http://www.sciencedirect.com/science/article/pii/S030645221930082X>

Abstract: Recent studies on the impact of Parkinson's disease (PD) on the thalamostriatal pathway have mainly focused on the structural and functional changes in the thalamus projection to the striatum. Alterations in the electrophysiological activity of the thalamostriatal circuit in PD have not been intensively studied. To further investigate this circuit, parafascicular nucleus (PF) single-unit spikes and dorsal striatum local field potential (LFP) activities were simultaneously recorded in control and 6-hydroxydopamine (6-OHDA)-lesioned rats during inattentive rest or treadmill walking states. We classified the PF neurons into two predominant subtypes (PF I and PF II). During rest state, after dopamine loss, increased PF I spike and striatal LFP coherence was observed in the beta-frequency (12–35 Hz), with changed PF I neuronal firing pattern and unchanged firing rates of the two neuron subtypes. However, in a treadmill walking state, PF II neurons displayed markedly increased coherence to striatal beta oscillations in the dopamine-depleted rats, as well as an altered PF II neuronal firing pattern and significantly decreased firing rates of the two neuron subtypes. The results indicate that in PD animals, state transition from rest to moving, such as treadmill walking, is associated with different PF neuron types and increased spike-LFP synchronization, which may provide new paradigms for understanding and treating PD.

Keyword: Parkinson's disease; dorsal striatum; parafascicular thalamic nucleus; synchronization

458. Citral prevents UVB-induced skin carcinogenesis in hairless mice/ **Kremer, Jean Lucas; Melo, Gabriella Pasqual; Marinello, Poliana Camila; Bordini, Heloíza Paranzini; Rossaneis, Ana C.; Sábio, Laís Roberta; Cecchini, Rubens; Cecchini, Alessandra Lourenço; Verri, Waldiceu A.; Luiz, Rodrigo Cabral.** Journal of Photochemistry and Photobiology B: Biology. ISSN:1011-1344 (2019) v.198 p.111565Journal of Photochemistry and Photobiology B: Biology

DOI: 10.1016/j.jphotobiol.2019.111565

Link: <http://www.sciencedirect.com/science/article/pii/S101113441930421X>

Abstract: The incidence of skin cancers has increased worldwide, requiring more prevention of this type of cancer. The use of sunscreen and the control of the time of exposure to sunlight are the recognized forms of prevention. However, new substances have been researched in order to develop formulations with more efficient protective activity. Citral is a natural compound with lemon scent that is used in food and cosmetic industries. The present work evaluated the chemoprotective effect of citral during UVB-induced skin carcinogenesis. Male hairless mice HRS/J, 8–12 weeks old, were exposed to UVB irradiation for 24 weeks, with a cumulative radiation dose of 13.875 J/cm². Citral (0.1, 0.5 and 1%) was applied to the skin at a dosage of 0.1 g/animal, 5 min after UVB exposure. At the end of the experiment, the number of lesion/animal, and size of lesions were measured. The histological sections of the skin were evaluated for the presence and intensity of actinic keratosis and squamous cell carcinoma. TUNEL assay was performed for apoptosis evaluation. Skin samples were used for the measurement of oxidative stress parameters (total radical-trapping antioxidant parameter of skin, glutathione, catalase activity and malondialdehyde), and cytokines levels (IL-1 β , IL-4, IL-10, IL-23, TNF- α , and IFN γ). Citral 1% completely inhibited UVB-induced skin

carcinogenesis by reducing levels of oxidative stress and pro-inflammatory cytokines, increasing apoptotic rate in the skin.

Keyword: Citral; Cancer protection; Hairless mice; Skin cancer; Ultraviolet light

459. Is the Famacha© system always the best criterion for targeted selective treatment for the control of haemonchosis in growing lambs?/ **Rizzon Cintra, Maria Christine; Ollhoff, Rüdiger Daniel; Weber, Saulo Henrique; Santos Sotomaior, Cristina.** Veterinary Parasitology. ISSN:0304-4017 (2019) v.266 p.67-72 Veterinary Parasitology

DOI: 10.1016/j.vetpar.2018.12.015

Link: <http://www.sciencedirect.com/science/article/pii/S0304401719300081>

Abstract: Targeted selective treatment (TST) aims to aid in the control of gastrointestinal nematodes in small ruminants, identifying animals that require treatment with the purpose of preserving the Refugia population and delaying the buildup of anthelmintic (AH) resistance. The objective of this study was to evaluate the effectiveness of both productive and clinical indicators in the selective treatment of gastrointestinal parasites in growing lambs. Two experiments were carried out between 2015 and 2016. Experiment 1: lambs (n = 70) exclusively raised on pasture were evaluated from the ages of 60 days to 180 days old. Experiment 2: lambs (n = 48) raised on pasture and fed concentrated commercial supplementation were evaluated from the ages of 60 days to 150 days old. Parasitological (eggs per gram of feces - EPG), productive (average daily weight gain - DWG), and clinical (hematocrit - Ht and FAMACHA© system - F) parameters were measured every 14 days. The lambs were divided into 4 experimental groups with different criteria for AH treatment: the control group (CG), was treated with AH every 30 days; the FAMACHA© group (FG), in which lambs classified as F3, F4, and F5 were treated with AH; Daily weight gain group (DWGG), in which lambs with average DWG $\leq$ the average DWG of the CG minus one standard deviation were treated with AH; FAMACHA© + daily weight gain group (FDWGG), in which lambs classified as F3, F4 and F5 and/or lambs with average DWG $\leq$ the average DWG of the CG minus one standard deviation were treated with AH. In experiment 1, no significant differences in the general means of DWG and Ht ($p > 0.05$) were observed between experimental groups, although the lowest mean EPG was observed in the CG ($p < 0.05$). In experiment 2, the lowest mean EPG ($p < 0.05$) was also observed in the CG (1044.5 EPG), and the highest mean ($p < 0.05$) in the FG (4845.5 EPG). There were differences in the mean DWG of the CG (198.4 g) and FDWGG (200.0 g), which were both higher ($p < 0.05$) than that of the FG (90.5 g), and similar ($p > 0.05$) to the DWGG (151.8 g). In both experiments, considering the total mean number of AH treatments, FG had the lowest number of lambs treated with AH ($p < 0.05$), with the DWG and FDWGG being similar to each other ($p > 0.05$). Even when Haemonchus is the major parasite, it is not recommended to use the FAMACHA© system as an exclusive criterion for TST in growing lambs. The DWG productive criterion can be used effectively in the TST of growing lambs.

Keyword: Sheep; Daily weight gain; FAMACHA system

460. In vivo conversion of astrocytes to oligodendrocyte lineage cells in adult mice demyelinated brains by Sox2/ **Farhangi, Sahar; Dehghan, Samaneh; Totonchi, Mehdi; Javan, Mohammad.** Multiple Sclerosis and Related Disorders. ISSN:2211-0348 (2019) v.28 p.263-272 Multiple Sclerosis and Related Disorders

DOI: 10.1016/j.msard.2018.12.041

Link: <http://www.sciencedirect.com/science/article/pii/S2211034818305790>

Abstract: Sox2 transcription factor has been frequently used for reprogramming starting cells to neural progenitor/stem cells. In vivo administration of Sox2 in the adult mouse brain reprogrammed the transduced astrocytes to neurons. In searching for adequate cell source for repairing the myelin insults, here, we studied the possible conversion of astrocytes to oligodendrocyte lineage cells by Sox2, while an extensive demyelination exists in animal brain. Lentiviral particles expressing Sox2-GFP were injected into the corpora callosa of animals fed with cuprizone diet for 12 weeks. Transduced cells were mainly astrocytes that changed their fate to oligodendrocyte lineage cells by time. For further confirmation astrocytes received the vector in culture and then transplanted to the animal brains. Tracing the fate of transplanted cells showed their conversion to oligodendrocyte lineage cells. In vitro transduced cell were also maintained in the oligodendrocyte progenitor cell (OPC) induction medium. Produced OPC-like cells were positive for specific markers. This study provides a new strategy for endogenous production of myelinating cells. After optimizing the experimental conditions for safety and feasibility, this approach may contribute into future cell based therapies in patients with white matter insults as like as those with multiple sclerosis.

Keyword: Myelin repair; conversion; Neural progenitors; Oligodendrocyte progenitor cell; Reactive astrocytes; Sox2 transcription factor

461. The sulcatone receptor of the strict nectar-feeding mosquito *Toxorhynchites amboinensis*/ **Dekel, Amir; Yakir, Esther; Bohbot, Jonathan D.** Insect Biochemistry and Molecular Biology. ISSN:0965-1748 (2019) v.111 p.103174 Insect Biochemistry and Molecular Biology

DOI: 10.1016/j.ibmb.2019.05.009

Link: <http://www.sciencedirect.com/science/article/pii/S0965174819301432>

Abstract: Controlling *Ae. aegypti* populations and the prevention of mosquito bites includes the development of monitoring, repelling and attract-and-kill strategies that are based on understanding the chemical ecology of these pests. Olfactory-mediated attraction to mammals has recently been linked to the mosquito *Aedes aegypti* odorant receptor Or4, which is activated by animal-released 6-Methyl-5-hepten-2-one (sulcatone). This odorant is also a major component of flower scents and may play a role outside animal-host seeking. To explore the role of this chemical cue, we looked at the interaction between sulcatone and an Or4 homolog expressed in the antennae of the strict nectar-feeding mosquito *Toxorhynchites amboinensis*. Using the two-electrode voltage clamp of *Xenopus* oocytes as a heterologous expression system, we show that this receptor is a high intensity sulcatone receptor comparable to its *Aedes* counterparts. We also show that OR4 is activated by other aliphatic ketones and is inhibited by DEET. This pharmacological characterization suggests that sulcatone may be operating in more than one context in the Culicidae family.

Keyword: Insect repellent; Odorant receptor; Olfaction

462. Colostrum and milk performance, and blood immunity indices and minerals of Holstein cows receiving organic Mn, Zn and Cu sources/ **Roshanzamir, Habiballah; Rezaei, Javad; Fazaeli, Hassan.** Animal Nutrition. ISSN:2405-6545 (2019) v. p. Animal Nutrition

DOI: 10.1016/j.aninu.2019.08.003

Link: <http://www.sciencedirect.com/science/article/pii/S2405654519301623>

Abstract: Effects of supplementing the basal diets with Mn, Zn and Cu, as sulphate, glycine or methionine salts, on colostrum and milk performance, some blood immunity indices and blood minerals of pre- and post-partum Holstein cows were assessed. Forty cows in different groups received: 1) a diet without supplementary Mn, Zn and Cu (control), 2) a diet containing Mn, Zn and Cu sulphates, 3) a diet containing Mn, Zn and Cu glycine, or 4) a diet containing Mn, Zn and Cu methionine with 10 cows per group from d 60 before calving (dry period) to d 100 of lactation. Dry matter intake (DMI), dry matter digestibility (DMD), colostrum and milk performance, milk somatic cell count (SCC), blood and milk total antioxidant capacity (TAC), immunoglobulin M (IgM) and immunoglobulin A (IgA), and blood Mn, Zn and Cu were determined. Dietary supplementation with Mn, Zn and Cu as methionine, glycine or sulphate salts had positive effects on DMD, DMI, colostrum and milk performance, milk SCC, and blood Mn and Zn. Addition of Mn, Zn and Cu in diets could increase ($P < 0.05$) blood and milk TAC and blood IgA and IgM in the cows and their new-born calves. There were no differences in DMI, DMD, colostrum and milk yields, milk SCC, blood Mn (except d 50 postpartum), Zn and Cu and TAC (except d 50 postpartum) among the organic and inorganic minerals-supplemented groups ($P > 0.05$), however, the blood concentrations of IgA (except d 1 postpartum) and IgM in the cows supplemented with organic Mn, Zn and Cu were higher ($P < 0.05$) than those in the cows receiving the sulphate sources of minerals. Overall, dietary supplementation of Mn, Zn and Cu as methionine, glycine or sulphate salts can improve colostrum and milk performance, blood Zn and Mn and immunity indices in Holstein cows and their new-born calves. Moreover, the organic sources of Mn, Zn and Cu have advantage over the sulphate forms in terms of the blood immunoglobulins.

Keyword: Performance; Cattle; Immunity; Antioxidant status; Organic trace minerals

463. Photobiomodulation can improve ovarian activity in polycystic ovary syndrome-induced rats/ **Alves, E.D.; Bonfá, A.L.O.; Pigatto, G.R.; Anselmo-Franci, J.A.; Achcar, J.A.; Parizotto, N.A.; Montezor, L.H.** Journal of Photochemistry and Photobiology B: Biology. ISSN:1011-1344 (2019) v.194 p.6-13 Journal of Photochemistry and Photobiology B: Biology

DOI: 10.1016/j.jphotobiol.2019.03.006

Link: <http://www.sciencedirect.com/science/article/pii/S1011134418308698>

Abstract: Follicular cystic ovary disease is a common reproductive disorder in women and females of domestic animals, characterized by anovulation and the persistence of follicle is a common cause of reproductive failure in mammalian. Polycystic ovary syndrome (PCOS) is characterized by hyperandrogenism (HA), chronic anovulation and polycystic ovaries, and it is a common reproductive endocrine disease with clinical manifestations including hirsutism, acne, infertility and obesity that can affect 5–20% of women in their reproductive age. Photobiomodulation (PBM) has been investigated and used in clinical practice, related to biomodulatory influences on cellular functions in animals and humans, both in vivo and in vitro. In this study, we include endocrine and reproductive features in a rat model for PCOS and the effects of PBM on ovarian activities. Forty-five adult female Wistar rats PCOS-induced by a single dose of the estradiol valerate (EV) were used in the study. After the EV injection for PCO induction, rats were divided into 9 groups ($n = 5/\text{group}$) named C30, C45 and C60 (Control group), S30, S45 and S60 (PCO group) and L30, L45 and L60 (PCO/Laser group). The rats were irradiated with laser 3 times/week. The results shown that EV PCO-induced rats had increased body mass, reduced ovary mass, and reduced GSI. The plasma levels of P4 and T were increased, and the LH plasma level was decreased by PBM stimulation. The number of ovarian follicles and corpus luteum were increased, and the number of ovarian cysts was decreased by PBM stimulation. Thus, reproductive and endocrine characteristics were modulated by PBM.

Keyword: Estradiol valerate; Ovarian follicles; Photobiomodulation therapy; Polycystic ovary syndrome 1

464. Different Origin, Different Response: Gene Expression Pattern in Collapsed Vitri-fied Blastocyst/ **Sehati, Ronak; Kazemi, Parinaz; Zandi, Ghazaleh; Mahdavinezhad, Forough; Sarmadi, Fatemeh; Fayazi, Samaneh; Hajarian, Hadi; Dashtizad, Mojtaba.** Reproductive Biology. ISSN:1642-431X 2(2019) v.19 p.158-164Reproductive Biology

DOI: 10.1016/j.repbio.2019.05.001

Link: <http://www.sciencedirect.com/science/article/pii/S1642431X18302882>

Abstract: There is a large body of animal experimental data about assisted reproductive techniques that could be applied to improve clinical outcomes. The great part of this information was obtained from research on in vivo-derived embryos. But whether these results are always similar with those we expect from embryos having in vitro origin in the clinical cases is a critical question. The present study was designed to compare the effects of vitrification (VIT) and artificial collapse (AC) as two commonly used techniques on in vivo- and in vitro-derived mouse embryos. In this regard, both origins of blastocysts were produced and randomly divided into three experimental groups, including control (non-vitrified), VIT, and AC-VIT. The survival and hatching rates and the expression of development-related genes were assessed in all groups and compared with their control counterpart. According to our results, although in vivo and in vitro origins followed the same pattern in the hatching rate, the real-time PCR data showed two distinct patterns of gene expression. Compared to the control, vitrification increased the expression of pluripotency genes in in vivo group. While in vitro vitrified blastocysts showed a significant reduction in the transcripts of these genes. More interestingly, although AC resulted in a sharp decrease of Gata6 and Grb2 in post warmed in vivo blastocysts, it could not affect the vitrified IVP ones. In conclusion, it seems that vitrification and artificial collapse techniques have different effects on embryo fate depending on in vivo or in vitro origins of the embryos.

Keyword: blastocyst; gene expression; artificial collapse; vitrification

465. Alzheimer's disease-like pathology-triggered oxidative stress, alterations in monoamines levels, and structural damage of locus coeruleus neurons are partially recovered by a mix of proteoglycans of embryonic genesis/ **Aghajanov, Michail; Chavushyan, Vergine; Matinyan, Senik; Danielyan, Margarita; Yenkovyan, Konstantin.** Neurochemistry International. ISSN:0197-0186 (2019) v.131 p.104531Neurochemistry International

DOI: 10.1016/j.neuint.2019.104531

Link: <http://www.sciencedirect.com/science/article/pii/S019701861930316X>

Abstract: Alzheimer's disease (AD) pathogenesis includes oxidative damage and perturbations of monoamines. However, as many details of these alterations are not known, we have investigated the changes in monoamine levels as well as the free radical oxidation processes (FRO) in the brainstem of rats that were administered i.c.v. A β (25–35) (rat model of AD-like pathology). The level of oxidative stress was found elevated in the brainstem along with the increased concentrations of monoamines, especially norepinephrine in the locus coeruleus (LC) area of the brainstem. This was accompanied by the substantial structural damage of monoaminergic neurons of LC. In addition, we have tested the ability of proteoglycans of embryonic genesis (PEG) that were shown previously to act as neuroprotectors, to restore the AD-triggered alterations in monoaminergic system and FRO. Indeed, PEG reduced the increased FRO and upregulated monoamines in the brainstem of A β (25–35) treated animals. Administration of PEG to control animals led to the increase of the antioxidant capacity as well as the intensity of free radical oxidation

processes. Our study confirms the important role of the brainstem FRO and monoamine shifts in AD development along with the known aggregation of Ab peptide and Tau hyperphosphorylation. We suggest that at the early stages of AD development, with still functional neurons, regulation of monoamine levels via stabilizing FRO processes can be beneficial. Our data demonstrate the regulatory action of PEG on the monoamine disturbances and the level of oxidative stress in the AD damaged structures, suggesting its possible therapeutic application in AD.

Keyword: Oxidative stress; Alzheimer's disease; Neuroprotection; Embryonic proteoglycans; Monoamines

466. Dialogue and materiality/embodiment in science|arts creative pedagogy: Their role and manifestation/ **Chappell, K.; Hetherington, L.; Keene, H. Ruck; Wren, H.; Alexopoulos, A.; Ben-Horin, O.; Nikolopoulos, K.; Robberstad, J.; Sotiriou, S.; Bogner, F.X.** Thinking Skills and Creativity. ISSN:1871-1871 (2019) v.31 p.296-322Thinking Skills and Creativity

DOI: 10.1016/j.tsc.2018.12.008

Link: <http://www.sciencedirect.com/science/article/pii/S1871187118302293>

Abstract: This paper responds to recent calls to explore the nuances of the interaction between the sciences, the arts and their inherent creativity to better understand their potential within teaching and learning. Building on previous arguments that the science-arts-creativity relationship is dialogic and relational, this research focuses on the question: How are dialogue and material/embodied activity manifested within creative pedagogy? We begin with a fusion of Bakhtinian-inspired and New-Materialist understandings of dialogue drawing out the importance of embodiment in order to revitalize how we articulate dialogue within creative educational practice. We then take on the challenge of a materialist diffractive analysis to conduct research which complements the theoretical framing and offers our outcomes in a way that appropriately makes the phenomena tangible. We present the outcomes of the diffractive analysis including the constitution of matter as well as meaning in the dialogic space; and the emergence of new assemblages of embodied teachers, students, ideas, and objects within transdisciplinary educational practice. We conclude by arguing for the benefits of diffractive analysis: that we have fore-fronted the entangled relationality of trans-disciplinary creative pedagogy; avoided bracketing out aspects of education that are often side-lined; opened out the space of pedagogical approaches that might be attempted; and begun to challenge what education is for. In so doing, the article aims to open up new ways for teachers, students and researchers to experience seeing, doing, feeling and researching science|arts creative pedagogy and provoke conversations about how this might develop in the future.

Keyword: Creativity; Creative pedagogy; Diffractive analysis; Embodied dialogic space; Science-arts

467. Influence of commercial yeast products in diets for beef cattle new to the feedlot environment/ **Palmer, E.A.; Kegley, E.B.; Ball, J.J.; Beck, P.A.; Hornsby, J.A.; Reynolds, J.L.; Shoulders, B.P.; Boyer, A.R.; Powell, J.G.** Applied Animal Science. ISSN:2590-2865 5(2019) v.35 p.491-497Applied Animal Science

DOI: 10.15232/aas.2019-01847

Link: <http://www.sciencedirect.com/science/article/pii/S2590286519300953>

Abstract: ABSTRACT Objective Bovine respiratory disease is of great concern for stocker producers in the southeastern United States. Thus, this research was conducted to test the effects of yeast products on health and

performance of high-risk, newly received beef calves. **Materials and Methods** Male beef calves (n = 175; initial BW = 226 ± 24.5 kg) were delivered in 2 arrival blocks (arrival block 1: n = 85 with 54 bulls and 31 steers; arrival block 2: n = 90 with 62 bulls and 28 steers). Within arrival block, calves were blocked by initial BW, stratified by castrate status, and assigned randomly to pen (5 or 6 calves per pen; 15 pens per truckload). Pens within each weight block were allocated to 1 of 3 treatments: unsupplemented control or supplementation with either brewers yeast or yeast culture for 28 d. Each day, a mixture (0.14 kg/d for each calf) of 58% ground corn and 42% of the appropriate yeast product, or 100% ground corn (control) was added to the feed bunks immediately after basal diet delivery. **Results and Discussion** Average daily gain from d 0 to 28 was not different (P = 0.99) between treatments. Providing yeast product did not affect ADFI (P ≥ 0.92) or G:F (P ≥ 0.91). Percentage morbidity (P = 0.36), percentage of bovine respiratory disease relapses (P = 0.32), and days to first antibiotic treatment (P = 0.17) did not differ. Application in high-risk calves with over 50% morbidity by d 5, neither of the yeast products provided during this trial influenced health and growth performance.

Keyword: health; performance; bovine respiratory disease; receiving calves

468. Dietary Metabolizable Energy Responses in Yellow-Feathered Broiler Chickens from 29 to 56 d/ **El-Senousey, HebatAllah Kasem; Wang, Weiwei; Wang, Yibing; Fan, Qiuli; Fouad, Ahmed Mohamed; Lin, Xiajing; Gou, Zhongyong; Li, Long; Jiang, Shouqun.** Journal of Applied Poultry Research. ISSN:1056-6171 4(2019) v.28 p.974-981 Journal of Applied Poultry Research

DOI: 10.3382/japr/pfz059

Link: <http://www.sciencedirect.com/science/article/pii/S1056617119322627>

Abstract: SUMMARY In this study, the metabolizable energy (ME) requirements were determined for Chinese yellow-feathered chickens aged from 29 to 56 d. In total, 1,200 29-d-old male yellow-feathered broilers were randomly assigned to 5 dietary treatments with 6 replicates each of 40 birds. Birds were fed 5 levels of dietary ME (2,799, 2,897, 2,997, 3,098, and 3,198 kcal ME/kg diet). Broilers that received high-energy diets had a higher (P < 0.05) final body weight, average daily gain (ADG), and average daily ME intake, and a lower (P < 0.05) feed conversion ratio (FCR) compared with those fed reduced energy diets. Increasing the dietary energy level had no significant influence on the carcass traits (P > 0.05), whereas the abdominal fat percentage and thigh intramuscular fat percentage increased significantly. The retention of energy and protein increased (P < 0.05) as the dietary energy concentration increased. Increasing the dietary energy level had no significant effect (P > 0.05) on the energy, protein, and fat contents in the whole body. The plasma concentrations of total cholesterol and total triglyceride were not (P > 0.05) affected by the dietary energy concentration but the plasma concentration of uric acid increased significantly. According to broken-line regression analysis, the recommended dietary ME levels that maximized ADG, optimized FCR, and minimized the deposition of abdominal fat (%) in yellow-feathered broiler chickens aged from 29 to 56 d were 3,198 kcal, 3,213 kcal, and 2,920 kcal ME/kg, respectively.

Keyword: metabolizable energy; performance; carcass trait; fat deposition; yellow-feathered broiler

469. Power generation from slaughterhouse waste materials. An emergy accounting assessment/ **Santagata, Remo; Viglia, Silvio; Fiorentino, Gabriella; Liu, Gengyuan; Ripa, Maddalena.** Journal of Cleaner Production. ISSN:0959-6526 (2019) v.223 p.536-552 Journal of Cleaner Production

DOI: 10.1016/j.jclepro.2019.03.148

Link: <http://www.sciencedirect.com/science/article/pii/S0959652619308376>

Abstract: The linear path “extraction-production-consumption-waste”, imposed by humans to natural ecosystems, where all material flows are instead circular, has become unsustainable. Understanding the potential value of some of these “by-products”, in order to exploit them effectively in a biorefinery perspective, may help overcoming resource shortages and decrease environmental impacts. This study investigates energy and resource restoration from animal by-products. The slaughterhouse waste undergoes a rendering process to separate residual meal and fat. The latter is combusted in a co-generation plant to produce electricity and heat. The process is carefully assessed using Energy Accounting approach with the aim of evaluating benefits and environmental load of the process considering the advantages achieved compared with the demand for ecosystem services and natural capital depletion. Moreover, the case aims at exploring three different methodological assumptions referring to the upstream burdens carried by the waste management system, proposing a modified exergy-based allocation rule. The electricity generated shows performances in terms of Unit Energy Values ranging between $2.7\text{E}+05$ sej/J, $2.2\text{E}+06$ sej/J and $3.1\text{E}+07$ sej/J among the different cases investigated, comparable to power from fossil fuels and renewables sources, and it provides an environmentally sound alternative to conventional waste disposal.

Keyword: Animal by-products; Bio-refinery; Electricity generation; Energy accounting; Resource recovery; Waste management

470. Prevalence and risk factors associated with gastrointestinal parasites in ruminant livestock in the Coastal Savannah zone of Ghana/ **Squire, S.A.; Robertson, I.D.; Yang, R.; Ayi, I.; Ryan, U..** Acta Tropica. ISSN:0001-706X (2019) v.199 p.105126Acta Tropica

DOI: 10.1016/j.actatropica.2019.105126

Link: <http://www.sciencedirect.com/science/article/pii/S0001706X19302220>

Abstract: Gastrointestinal (GIT) parasite infections result in significant economic losses to ruminant livestock production. To determine the prevalence and risk factors associated with GIT parasite infections in livestock from Ghana, a cross-sectional survey was conducted in cattle and small ruminants kept under different management systems in the Coastal Savannah zone from October 2014 to February 2015. Faecal samples were collected from 328 cattle and 502 small ruminants (sheep and goats) and examined by formal ether concentration microscopy. The management systems and environmental conditions of the farm or household were observed, and a questionnaire administered to the livestock owners. Overall, 90.8% (754/830) of livestock were infected with at least one of ten different parasites (Eimeria, Strongylid nematodes, Toxocara, Trichuris, Schistosoma, Dicrocoelium, Paramphistomum, Fasciola, Moniezia and Thysaniezia), with Eimeria the most prevalent (78.4%). Most (64.5%) livestock had coinfections with two to five parasites with parasite intensity mostly light and at least one parasite was found in 98.6% (140/142) of the herds. Binary logistic regression models were generated to assess the risk factors associated with infection. Earthen floor was positively associated with strongylid infection, multiple ruminant species with Paramphistomum infection and flock size (>25 animal) with Thysaniezia, Dicrocoelium and Fasciola infections. Separating young animals from older animals was negatively associated with Strongylid infection, feed supplementation with Thysaniezia infection and small ruminant species with Paramphistomum and Toxocara infections. The findings from this study suggests that good sanitation, proper husbandry practices and improved nutrition can improve livestock health and production in Ghana.

Keyword: Prevalence; Risk factors; Gastrointestinal parasites; Ghana; Ruminant livestock

471. Are the spectral Doppler indices of ovarian arteries indicative of antral follicular development and predictive of ovulatory responses and embryo yields in superovulated ewes?/ **Oliveira, Maria Emilia Franco; Fonseca, Jeferson Ferreira; Vicente, Wilter Ricardo Russiano; Rodrigues, Naiara Nantes; Vergani, Gabriel Brun; Souza-Fabjan, Joanna Maria Gonçalves; Jamieson, Mark; Cristescu, Ada; Murawski, Maciej; Bartlewski, Pawel Mieczys.** Reproductive Biology. ISSN:1642-431X 4(2019) v.19 p.394-403Reproductive Biology

DOI: 10.1016/j.repbio.2019.11.004

Link: <http://www.sciencedirect.com/science/article/pii/S1642431X19301032>

Abstract: Nineteen ewes received 200 mg of pFSH administered in eight decreasing doses from Days 1 to 4, starting three days before CIDR® device removal. Ten ewes received an injection of 350 µg of estradiol benzoate at CIDR® device insertion (Group E) and nine animals served as controls (Group C). B-mode and spectral Doppler ultrasonographic examinations were performed daily throughout superovulatory treatment to enumerate ovarian antral follicles and to determine ovarian blood flow indices, respectively. There were no differences ($P > 0.05$) in superovulatory responses between left and right ovaries/uterine horns or the two groups of animals. End-diastolic velocity (EDV) and mean velocity (Vm) values were greater ($P < 0.05$) on Days 1 and 2, and peak systolic velocity (SVp) was greater ($P < 0.05$) on Day 3 in Group C than in Group E. In Group E 15 correlations was recorded among indices (SVp, Vm, EDV, flow velocity integral-FVI, and pulsatility index-PI) and follicles numbers in different size classes on Days 1, 2 and 4, and seven correlations among indices (SVp, EDV, Vm, and vascular resistance index-RI) and superovulatory/embryo results (numbers of regressing corpora lutea, numbers/percentages of degenerated embryos and viability rates) on Days 1, 2 and 3. In Group C, there were three correlations among EDV and RI and medium-sized/large follicle numbers on Days 1 and 3, and five correlations among indices (EDV, RI and PI) and superovulatory/embryo results (numbers of luteinized unovulated follicles, degenerated embryos and unfertilized eggs) on Days 2 or 4. There was a lack of consistency in the velocimetric correlates of antral follicle numbers and superovulatory responses between the left and right side. Therefore, the usefulness of ovarian arterial indices to predict ovine superovulatory outcomes remains equivocal and requires further confirmatory studies.

Keyword: Sheep; Superovulation; Doppler ultrasonography; Estradiol benzoate; Ovarian artery

472. Nociceptor-dependent locomotor dysfunction after clinically-modeled hindlimb muscle stretching in adult rats with spinal cord injury/ **Keller, Anastasia V.; Hainline, Casey; Rees, Kathleen; Krupp, Sarah; Prince, Daniella; Wood, Brittney D.; Shum-Siu, Alice; Burke, Darlene A.; Petruska, Jeffrey C.; Magnuson, David S.K.** Experimental Neurology. ISSN:0014-4886 (2019) v.318 p.267-276Experimental Neurology

DOI: 10.1016/j.expneurol.2019.03.006

Link: <http://www.sciencedirect.com/science/article/pii/S0014488619300433>

Abstract: In the course of investigating how common clinical treatments and adaptive technologies affect recovery after spinal cord injury (SCI), we discovered that a clinically-modeled hindlimb stretching protocol dramatically, but transiently, reduces locomotor function. Nociceptive sensory input is capable of altering motor output at the spinal level, and nociceptive neurons are sensitized after SCI. Here we tested the hypotheses that stretch-induced locomotor deficits are dependent on nociceptive afferents by depleting TRPV1+ sensory afferents using capsaicin injections in neonatal rats. Following maturation, animals received 25g-cm contusive SCI at T10. After plateau of

locomotor recovery at 6 weeks, daily stretching was performed for 3 weeks, followed by 2 weeks without stretch, and again for two additional weeks. Animals were sacrificed 2 h after the last stretching session for histological assessments. Consistent with previous findings, stretch-induced drops in locomotor function were observed in nociceptor-intact animals but were nearly absent in nociceptor-depleted animals. These functional changes were accompanied by corresponding increases in the number of c-Fos+ nuclei throughout the lumbar enlargement. As expected, nociceptor-depleted animals had very little CGRP+ axonal innervation of the dorsal horn. Nociceptor-intact stretched animals had significantly higher levels of CGRP+ as compared to non-stretched SCI rats, suggesting that stretching promoted intraspinal CGRP+ sprouting. These results indicate that stretch-induced locomotor dysfunction in animals with incomplete SCI involves C-fibers, adding a negative post-SCI role to their adaptive roles (e.g., bladder control), and suggesting that the clinical use of muscle stretching to combat contractures and spasticity may be unintentionally detrimental to locomotor function.

Keyword: Spinal cord injury; Locomotor function; Muscle stretch; Nociceptors; Physical therapy

473. Analysis of CRISPR/Cas system of *Proteus* and the factors affected the functional mechanism/ **Qu, Daofeng; Lu, Shiyao; Wang, Peng; Jiang, Mengxue; Yi, Songqiang; Han, Jianzhong.** Life Sciences. ISSN:0024-3205 (2019) v.231 p.116531Life Sciences

DOI: 10.1016/j.lfs.2019.06.006

Link: <http://www.sciencedirect.com/science/article/pii/S0024320519304436>

Abstract: Background The *Proteus* is one of the most common human and animal pathogens. Clustered regularly interspaced short palindromic repeats and CRISPR-associated proteins (CRISPR/Cas) are inheritable genetic elements found in a variety of archaea and bacteria in the evolution, providing immune function against foreign invasion. Objectives To analyze the characteristics and functions of the CRISPR/Cas system in *Proteus* genomes, as well as the internal and external factors affecting the system. Methods CRISPR loci were identified and divided into groups based on the repeat sequence in 96 *Proteus* strains by identification. Compared the RNA secondary structure and minimum free energy of CRISPR loci through bioinformatics, the evolution of cas genes, and the effects of related elements were also discussed. Results 85 CRISPR loci were identified and divided into six groups based on the sequence of repeats, and the more stable the secondary structure of RNA, the smaller the minimum free energy, the fewer base mutations in the repeat, the more stable the CRISPR and the more complete the evolution of the system. In addition, Cas1 gene can be a symbol to distinguish species to some extent. Of all the influencing factors, CRISPR/Cas had the greatest impact on plasmids. Conclusions This study examined the diversity of CRISPR/Cas system in *Proteus* and found statistically significant positive/negative correlations between variety factors (the RNA stability, free energy, etc.) and the CRISPR locus, which played a vital role in regulating the CRISPR/Cas system.

Keyword: Cas; CRISPR; Mobile genetic element; Proteus; Spacer

474. The role of phospholipase A2 in multiple Sclerosis: A systematic review and meta-analysis/ **Trotter, Austin; Anstadt, Emily; Clark, Robert B.; Nichols, Frank; Dwivedi, Alok; Aung, Koko; Cervantes, Jorge L.** Multiple Sclerosis and Related Disorders. ISSN:2211-0348 (2019) v.27 p.206-213Multiple Sclerosis and Related Disorders

DOI: 10.1016/j.msard.2018.10.115

Link: <http://www.sciencedirect.com/science/article/pii/S2211034818304838>

Abstract: Phospholipases A2 (PLA2) are a diverse group of enzymes that cleave the fatty acids of membrane phospholipids. They play critical roles in pathogenesis of neurodegenerative diseases such as multiple sclerosis by enhancing oxidative stress and initiating inflammation. The levels of PLA2 activity in MS patients compared to controls and role of inhibiting PLA2 activity on severity scores in different experimental models are not comprehensively assessed in the light of varying evidence from published studies. The objective of this systematic review is to determine the association between PLA2 activity and multiple sclerosis (MS) and its animal model, experimental autoimmune encephalomyelitis (EAE). We performed a systematic review of six studies that assessed PLA2 activity in MS patients compared to controls and nine studies that assessed PLA2 activity in EAE. sPLA2 nor Lp-PLA2 activity were not increased in MS compared to controls in five of those six studies. A difference in sPLA2 activity was only found in a study that measured the enzyme activity in urine. However, inhibiting cPLA2 or sPLA2 led to lower clinical severity or no signs of EAE in mice, and a lower incidence of EAE lesions compared to animals without cPLA2 inhibition. These findings indicate that PLA2 appears to play a role in the pathogenesis of EAE.

Keyword:

475. An energy and monensin supplement reduces methane emission intensity of stocker cattle grazing winter wheat**Mention of trade names or commercial products in this article is solely for the purpose of providing specific information and does not imply recom/ **Thompson, L.R.; Beck, M.R.; Gunter, S.A.; Williams, G.D.; Place, S.E.; Reuter, R.R.** Applied Animal Science. ISSN:2590-2865 4(2019) v.35 p.433-440Applied Animal Science

DOI: 10.15232/aas.2018-01841

Link: <http://www.sciencedirect.com/science/article/pii/S2590286519300783>

Abstract: ABSTRACT Objective The objective of this study was to determine the effect of an energy supplement with monensin on CH₄ emissions and performance of stocker calves grazing winter wheat. Materials and Methods Eight steers and 8 heifers were grazed in a 9-ha winter wheat pasture, and CH₄ emissions were recorded. Animals were randomly assigned within sex to receive from 0 to 1.07 kg of a supplement (as fed, primarily ground corn, wheat middlings, and 34 mg/kg monensin) per day. Animals were supplemented 3 d per week in individual stalls and orts were weighed. Forage intake was estimated with TiO₂ as an external marker. As several independent variables were available, dependent variables of interest were subjected to backward stepwise regression with baseline CH₄, total supplement intake, forage intake, initial BW, sex, and monensin dose in the model. Results and Discussion Animal performance increased, but at a decreasing rate, with increased total supplement intake and forage intake ($P < 0.02$; $R^2 = 0.47$). Supplement intake reduced forage intake ($P < 0.01$; $R^2 = 0.77$) with initial BW and sex in the model. Methane emissions increased with increasing forage intake and initial BW, but heifers produced less CH₄ than steers ($P < 0.01$; $R^2 = 0.74$). Increasing supplement intake reduced CH₄ emission intensity (g of CH₄/kg of BW gain; $P = 0.03$) when baseline CH₄ was included in the model. Implications and Applications Taken together, these results suggest that supplementation with energy and monensin likely reduces methane emission intensity, and provide equations useful for future modeling efforts.

Keyword: wheat pasture; energy supplementation; enteric methane; grazing; GreenFeed

476. Taurine enhances skeletal muscle mitochondrial function in a rat model of resistance training/ **Ommati, Mohammad Mehdi; Farshad, Omid; Jamshidzadeh, Akram; Heidari, Reza.** PharmaNutrition. ISSN:2213-4344 (2019) v.9 p.100161PharmaNutrition

DOI: 10.1016/j.phanu.2019.100161

Link: <http://www.sciencedirect.com/science/article/pii/S2213434419300428>

Abstract: Taurine (β -amino sulfonic acid; TAU) is the most abundant amino acid in the human body. Recently, the positive effects of TAU on cellular mitochondria has been considered as an interesting mechanism for its beneficial effects. On the other hand, skeletal muscle disorders are debilitating complications, which could affect patients' quality of life. Moreover, increasing muscle performance and stamina without violating standard rules are of particular interest in athletes. The current study was designed to evaluate the effect of resistance training (RT) with and without TAU supplementation on skeletal muscle function. Rats underwent RT training for eight weeks. Concurrently, animals received TAU (100, 500, and 1000 mg/kg/day, gavage). It was found that TAU treatment significantly decreased animals weight gain and enhanced the weight carrying capacity in RT rats. Mitochondrial indices, including dehydrogenases activity, ATP level, and membrane potential were significantly increased upon TAU treatment. These data indicate the positive effects of TAU on skeletal muscle function and provide insight into its potential mechanism of action. Therefore, TAU could be feasibly used to enhance muscle function and stamina. Moreover, TAU could be considered as a potential preventive/therapeutic agent against muscle disorders linked to mitochondrial impairment and disrupted cellular energy metabolism.

Keyword: Energy metabolism; Muscle atrophy; Amino acid; Bioenergetics; Skeletal muscle performance

477. Organic selenium supplementation increases muscle selenium content in growing lambs compared to inorganic source/ **Paiva, F.A.; Netto, A. Saran; Corrêa, L.B.; Silva, T.H.; Guimarães, I.C.S.B.; Del Claro, G.R.; Cunha, J.A.; Zanetti, M.A.**. Small Ruminant Research. ISSN:0921-4488 (2019) v.175 p.57-64Small Ruminant Research

DOI: 10.1016/j.smallrumres.2019.04.008

Link: <http://www.sciencedirect.com/science/article/pii/S0921448819300616>

Abstract: The objective was to evaluate the selenium (Se) balance and Se concentration in serum, muscle and viscera as well hepatic glutathione peroxidase activity (GSH-Px) in lambs fed diets supplemented with different Se sources and levels. Forty male Suffolk lambs 90 ± 2.5 days old (19.8 ± 2.1 kg) received, during a 84 days period, a total mixed ration (TMR) with three Se sources [Sodium selenite (Na selenite), Selenium-Yeast (Se-Yeast) and Selenium-Methionine (Se-Methionine)] and three Se levels [0.2, 0.8 and 1.4 mg/kg dry matter (DM)]. Also, it was provided a control diet (no addition of Se) for regression comparisons. Contrasts and estimates were used for partition specific treatment effects and serum data were analyzed by time repeated measures. Absorption and retention of Se as well as Se excretion by feces and urine were higher as Se inclusion increased. At 1.4 mg/kg DM level, there was higher Se excretion by feces with inorganic source compared to organic sources. Also, linear increasing was detected to absorption of Se among sources supplemented relative to its intake. Regarding the Se retention efficiency (g/100 g of Se consumed) the Se-methionine treatment showed a linear pattern. Selenium concentrations in serum and liver were higher, regardless of the source, linearly to dose inclusion. The amount of Se in muscle was higher for organic sources at level 0.8 and 1.4 mg/kg DM. At the first cited level, Se-Methionine was superior compared to Se-Yeast and at the second, the opposite occurred. In addition, organic sources leaded to linear effect of Se content in muscle tissue. However, there was higher hepatic GSH-Px activity to Na selenite source compared to organic sources. Regarding to relative Se content, organic Se sources had higher content in muscle tissue compared to Na selenite.

Keyword: Tissue; Balance; GSH-Px; Na selenite; Se-Methionine; Se-Yeast

478. Split iron supplementation is beneficial for newborn piglets/ **Chen, Xiaoyun; Zhang, Xiaofeng; Zhao, Jing; Tang, Xueyou; Wang, Fengqin; Du, Huahua.** Biomedicine & Pharmacotherapy. ISSN:0753-3322 (2019) v.120 p.109479Biomedicine & Pharmacotherapy

DOI: 10.1016/j.biopha.2019.109479

Link: <http://www.sciencedirect.com/science/article/pii/S0753332219340351>

Abstract: Iron deficiency is the most common nutritional deficiency disorder in early postnatal period, which often manifesting into clinical complications. Therefore, iron supplementation is necessary to avoid iron deficiency anemia in the neonatal period. However, how to supplement iron effectively is a big problem. Thus, using newborn piglets as a model for iron deficiency, we compared the effects of routinely used protocol by intramuscular injection of high amount of iron dextran and a modified strategy by split iron supplementation with reduced amounts of iron. The results showed that split iron supplementation efficiently improved hematological status of piglets and attenuated the induction of hepcidin expression, which resulted in the recovery of piglets from iron deficiency and the increase of iron utilization. Compared with piglets received large amounts of iron dextran, low dose supplementation of iron improved the growth performance and duodenum development by increasing the villus height and crypt depth and enhancing microvilli morphology. Furthermore, split iron supplementation minimized the potential toxicity of the administered iron due to the oxidative stress and hepatocyte autophagy. Overall, the present study demonstrated that split supplementation with reduced amount of iron dextran not only protected newborn piglets from iron deficiency but also eliminated potential toxicity. It suggested that besides combating anemia, possible negative effects of excessive iron on oxidative stress, which is especially important for infant development, should be considered.

Keyword: Oxidative stress; Iron deficiency; Iron supplementation; Newborn piglets

479. Pelagic citizen science data reveal declines of seabirds off south-eastern Australia/ **Gorta, Simon B.Z.; Smith, James A.; Everett, Jason D.; Kingsford, Richard T.; Cornwell, William K.; Suthers, Iain M.; Epstein, Hal; McGovern, Roger; McLachlan, Greg; Roderick, Mick; Smith, Lindsay; Williams, Dan; Callaghan, Corey T..** Biological Conservation. ISSN:0006-3207 (2019) v.235 p.226-235Biological Conservation

DOI: 10.1016/j.biocon.2019.05.007

Link: <http://www.sciencedirect.com/science/article/pii/S0006320718318767>

Abstract: Many seabird communities are declining around the world, a trend frequently linked to climate change and human impacts on habitat and prey. Time series observations of seabirds away from breeding colonies are generally rare, which limits our understanding of long-term changes for conservation actions. We analysed a dedicated citizen science dataset of pelagic seabird abundance (86 species – 30 used for modelling analysis - from 385 trips) from two locations over 17 years (2000–2016) and a third for seven years, over the continental shelf and slope of south-eastern Australia. To estimate temporal trends and environmental drivers, we used generalised additive modelling and species archetype modelling for groups. Almost half (43%) of the most abundant seabird species declined in our study area over the 17 years. The declines may be associated with human-induced ecosystem change and represent poleward shifts in distribution out of our study area, changes in population abundance, or both. Winter-dominant groups, primarily species rarely frequenting warmer water, were often negatively associated with SSTanom, while summer-dominant groups, composed of species more tolerant of temperate and tropical environments, were generally positively associated with SSTanom. Widespread local declines in seabird populations are of increasing

concern. Understanding the extent to which these observed declines represent real declines in abundance, or range shifts, should be a priority. Changing sea temperatures are probably contributing to both. These results from the coast of south-eastern Australia need to be placed in the context of the highly mobile study organisms and the vast spatial scale of the ocean. Long-term citizen science observations, from an array of locations around the world, promise to provide valuable insights into seabird ecology, playing a key part in seabird conservation.

Keyword: Seasonality; Citizen science; Climate change; East Australian Current; Environmental drivers; Seabirds; Species archetype modelling

480. Mental time travel, language, and evolution/ **Corballis, Michael C.**. *Neuropsychologia*. ISSN:0028-3932 (2019) v.134 p.107202*Neuropsychologia*

DOI: 10.1016/j.neuropsychologia.2019.107202

Link: <http://www.sciencedirect.com/science/article/pii/S0028393219302441>

Abstract: Tulving (1985) was probably the first to use the term “mental time travel” to describe the human capacity to imagine personal events from the past, as well as to envisage possible future ones. He and others have also claimed that this capacity is unique to humans. One likely reason for this is that mental travel into the past, or episodic memory, is part of what has been termed declarative memory—or memory that can be declared. This implies a critical role for language itself, also generally regarded as unique to humans. I argue here that language probably did evolve to enable explicit reference to the nonpresent, a property known as displacement. This need not imply, though, that mental time travel is itself unique to humans. Behavioral evidence from a number of different species, including birds, mammals, and apes, increasingly implies the ability to recall specific events from the past, and even to imagine possible future ones. Brain recordings from both rodents and humans also show the hippocampus to be active in both replay of past events and the “play” of events that did not actually occur, including imagined future ones, suggesting an evolutionary continuity. The wider hippocampal/entorhinal system, with likely involvement of other cortical areas, has a generative capacity, underlying spatiotemporal imagination in both humans and nonhuman animals, which may underlie the generativity of language itself. As a communication system, though, language evolved late as a means of sharing imaginative explorations, or what Dor (2015) termed “the instruction of imagination.”

Keyword: Language; Evolution; Hippocampus; Memory; Imagination; Mental time travel

481. Effects of welding fumes on haematological parameters of male albino rats (*Rattus norvegicus*)/ **Sani, A.; Abdullahi, I.L.**. *Biochemistry and Biophysics Reports*. ISSN:2405-5808 (2019) v.19 p.100651*Biochemistry and Biophysics Reports*

DOI: 10.1016/j.bbrep.2019.100651

Link: <http://www.sciencedirect.com/science/article/pii/S2405580818302383>

Abstract: Welders or metal workers not being an exception are exposed to metals ions or oxides (fumes) at trace concentrations either through direct contact supplementation at occupational sites or indirectly through uptake from contaminated food, water or contaminated soil, dust, or air. The study aims to determine the effects of welding fumes exposure on haematological parameters in blood of experimental animals. The fumes were collected from

welding sites during the activity by a skilled welder. 130 male experimental animals were utilized and made into 13 groups. 12 groups were given dosages calculated to correspond to real life workers exposure regimes and 1 group served as control. The dosages were administered intratracheally after been anaesthetized weekly for 12 weeks. The animals were sacrificed and whole blood samples were taken which was then subjected to haematological analysis. The parameters have revealed changes in values whereby RBC, WBC, % lymphocytes, HGB, HCT, MCV, MCH, PLT, PCT and P-LCC have exceeds the control groups values. There was an increase across the treatment groups. However, lymphocytes, MID, granulocytes, % granulocytes, MCHC and MPV have values which were less than the control and no different from one another statistically. This indicates that exposure to welding fumes could cause alterations to most RBC, WBC and PLT indices majorly by effecting an increase. Further studies should be carried out on the response of other markers of toxicity so as to have a broad perception of the effects.

Keyword: Toxicity; Determination; Haematological; Welding fumes

482. Leea macrophylla root extract upregulates the mRNA expression for antioxidative enzymes and repairs the necrosis of pancreatic β -cell and kidney tissues in fructose-fed Type 2 diabetic rats/ **Mawa, Jannatul; Rahman, Md. Atiar; Hashem, M.A.; Juwel Hosen, Md..** Biomedicine & Pharmacotherapy. ISSN:0753-3322 (2019) v.110 p.74-84 Biomedicine & Pharmacotherapy

DOI: 10.1016/j.biopha.2018.11.033

Link: <http://www.sciencedirect.com/science/article/pii/S0753332218371087>

Abstract: This research investigated the functional food effect of *Leea macrophylla* (Roxb.) ex Hornem root extract on pancreatic necrosis in Streptozotocin-induced type-2 diabetes. Prior to animal intervention, *Leea macrophylla* root extract (LMR) was subjected to GC-MS analysis. Across a three-week intervention of fructose-fed albino model with LMR50, LMR100 and LMR200, the fluid & food intake, body weight changes, weekly blood glucose concentrations and oral glucose tolerance (OGT) were recorded. The animals were sacrificed after intervention and serum was analyzed for insulin, ALT, AST, LDH, CK-MB, creatinine, uric acid and lipid profile and liver section was used for glycogen estimation. Changes of pancreas and kidney architecture were evaluated by histopathology. Relative mRNA for superoxide dismutase 1 (SOD1), glutathione peroxidase (GPx) and catalase (CAT) were quantitated using assay kits. Results showed that fluid and food intake, weekly blood glucose level, ALT, AST, LDH, CK-MB level were significantly ($p < 0.05$) decreased in LMR50 group. Conversely, the glucose tolerance ability, liver glycogen level, serum insulin, organ weight and pancreatic morphology were improved significantly in this group. Diameter of islet of Langerhans (μm), area occupied by β -cell/ islet of Langerhans (μm^2) and number of β -cells/islet of Langerhans were amazingly improved to the NC animals. Expressions of mRNA for SOD1 and CAT from liver tissue have been found to be increased multifold while GPx was remained unchanged. The data suggests that *L. macrophylla* root extract could be very potential as functional food to modulate pancreatic action.

Keyword: catalase; Dismutase; necrosis; pancreatic damage; type 2 diabetes

INDEKS KATA KUNCI

6

6-OHDA, 10

A

Academic self-concept, 8
Acute restraint stress, 3
amino acid, 22
Amino acid, 23
Animal, 5, 6, 9, 13, 17, 18, 22
animal behavior, 4
Animal by-products, 18
animal model, 21
Animals, 5, 20, 22
antibody, 8
antioxidant, 7, 11, 13, 16
Antioxidant, 14
antioxidant capacity, 13, 16
Antioxidant status, 14
Apoptosis, 3
artificial collapse, 15

B

bacteria, 7, 21
bacterial ghost, 6
Balance, 23
beef cattle, 16
Behaviour, 5, 9
Biochemistry, 13, 25
Bioenergetics, 23
Biophysics, 25
Bio-refinery, 18
Bivalves, 2
blastocyst, 15
Bovine, 17
bovine respiratory disease, 17
Brain, 2, 25
broiler, 18
broiler chicken, 18

C

calf, 17
Cancer, 3, 11
Cancer protection, 11
capsaicin, 20
carcass trait, 17, 18
Cas, 20, 21
catalase, 7, 11, 26
cattle, 18, 21
Cattle, 14
CGRP, 20

chicken, 8, 9
China, 8
Chloroaluminum phthalocyanine, 4, 5
Chronic restraint stress, 3
Citizen science, 25
Citral, 11
Climate change, 25
Coastal, 18
Cognition, 3
Cognitive decline, 6
Cognitive function, 6
Conditioned place preference, 3
Construct differentiation, 8
conversion, 12, 13, 17
correlation, 5, 9
Counterfactual, 4
Creative pedagogy, 16
Creativity, 16
CRISPR, 20, 21
CSFV, 8
curcumin, 7
Curcumin, 7
Curiosity, 4
Cutaneous leishmaniasis, 5

D

Daily weight gain, 12
Determination, 26
development, 4, 13, 15, 16, 19, 24
Diabetes, 6
Diffractive analysis, 16
Dimensionality, 8
Dismutase, 26
Doppler ultrasonography, 20
dorsal striatum, 10, 11
duck, 7

E

EAE, 21
East Australian Current, 25
education, 16
Effect, 2, 10
Electricity generation, 18
Embodied dialogic space, 16
Embryonic proteoglycans, 16
emergence, 16
Emergy accounting, 18
Energy, 17, 23
Energy metabolism, 23
energy supplementation, 22
enteric methane, 22
Entropy, 4
Environmental drivers, 25

Estradiol, 14, 20
Estradiol benzoate, 20
Estradiol valerate, 14
estrogenic receptors, 9
Evaluation, 8
Evolution, 25
Experimental, 3, 20

F

FAMACHA system, 12
fat deposition, 18
fatty acids, 21
feed intake, 5
Feed intake behaviour, 5
feedlot, 16
Fictive, 4
Field isolate, 8
Forage recognition, 5

G

Gambling, 4
Gastrointestinal parasites, 19
GC-MS, 2, 26
GC-MS/MS, 2
gene, 9, 15, 21
gene expression, 9, 15
genistein, 9
Ghana, 18, 19
granulosa cells, 8, 9
grazing, 21, 22
GreenFeed, 22
growth, 17, 24
growth performance, 17, 24
GSH, 23
GSH-Px, 23

H

Haematological, 26
Hairless mice, 11
health, 10, 17, 19
Heart, 10
hippocampus, 25
Hippocampus, 25
Hypothetical, 4

I

Imagination, 25
Immunity, 14
Immunogenic analysis, 6
In vivo, 12
injection, 3, 14, 19, 24

Insect repellent, 13
 Instinct, 10
 Integrated science teaching, 8
 Interest, 8
 intestinal microbiota, 7
 Iron deficiency, 24
 Iron supplementation, 24

L

L., 4, 5, 7, 14, 16, 21, 23, 25, 26
 lactation, 13
 Language, 25
 Laser, 14
 laying hen, 9
 laying hens, 9
 LH, 14
 Liposomes, 4, 5
 liver oxidative injury, 7
 livestock, 18
 Locomotor function, 20
 locus coeruleus, 15

M

Macrophage polarization, 3
 Memory, 6, 25
 Mental time travel, 25
 metabolism, 2, 7, 23
 metabolizable energy, 17, 18
 Methamphetamine, 3
 Methane emission, 22
 Methods, 4, 6, 17, 21, 22
 Mice, 6
 Mobile genetic element, 21
 model, 2, 3, 6, 14, 15, 22, 24, 26
 modeling, 22
 Monoamines, 16
 morbidity, 17
 mRNA expression, 9, 26
 muscle, 20, 22, 23
 Muscle, 20, 23
 Muscle atrophy, 23
 Muscle stretch, 20
 Myelin repair, 13

N

Na selenite, 23
 necrosis, 26
 Neural progenitors, 13
 Neuronal activity, 3
 Neuroprotection, 16
 Newborn piglets, 24
 Nociceptors, 20
 Nutrition, 13

O

ochratoxin A, 7
 Odorant receptor, 13
 Olfaction, 13
 Oligodendrocyte progenitor cell, 13
 organic, 13, 14, 23
 Organic trace minerals, 14
 Organochlorine pesticides, 2
 Ovarian artery, 20
 Ovarian follicles, 14
 Oxidative stress, 16, 24

P

pancreatic damage, 26
 parafascicular thalamic nucleus, 11
 Parkinson, 10, 11
 Pathogenesis, 6
 Pathogenicity, 8
 pathology, 15
 PCR, 9, 15
 performance, 10, 13, 17, 18, 22
 Performance, 14
 persistence, 14
 personality, 9
 Personality, 10
 Phosphatidylserine, 3
 Photobiomodulation therapy, 14
 Photodynamic therapy, 5
 Physical therapy, 20
 PM, 6
 Polycystic ovary syndrome 1, 14
 population, 6, 12, 24
 Porcine, 6
 Predator recognition, 9, 10
 Prediabetes, 6
 Prefrontal cortex, 3
 Prevalence, 18, 19
 Production, 18
 progesterone, 8, 9
 Proteus, 20, 21

Q

QuEChERS bioconcentration, 2

R

R, 5, 8, 14, 17, 18, 21, 23
 rat, 14, 15, 22
 Rat, 10
 Rats, 22
 Reactive astrocytes, 13
 receiving calves, 17
 recognition, 5, 9
 resistance, 12, 19, 22
 Resource recovery, 18
 respiratory disease, 17

Risk, 4, 19
 risk factor, 18
 Risk factors, 19
 Ruminant livestock, 19
 Ruminants, 5

S

s, 2, 4, 5, 9, 10, 11, 12, 15, 16, 17, 18, 22, 24
 safety, 6, 13
 SCI, 20
 Science, 5, 7, 8, 9, 16, 17, 22
 Science-arts, 16
 Seabirds, 25
 Seafood, 2
 Seasonality, 25
 Se-Methionine, 23
 Se-Yeast, 23
 Sheep, 12, 20
 skeletal muscle, 22
 Skeletal muscle, 23
 Skeletal muscle performance, 23
 Skin cancer, 11
 skin lesion, 4
 Sox2 transcription factor, 12, 13
 Spacer, 21
 Species archetype modelling, 25
 specificity, 7
 Spinal cord injury, 20
 SREBP-1, 7
 Stanazolol, 10
 stem cells, 12
 Streptozotocin, 26
 stress, 2, 7, 11, 15, 21, 24
 Striatum, 10
 study, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 24, 25
 Superovulation, 20
 Sympatric carnivores, 10
 synchronization, 11

T

Taurine, 22
 techniques, 15
 Testosterone, 10
 Testosterone cypionate, 10
 Therapy, 4
 Tissue, 23
 TNF- α , 11
 Topical treatment, 5
 toxicity, 4, 7, 24, 26
 Toxicity, 26
 Tubulysin, 3
 type 2 diabetes, 26

U

Ultraviolet light, 11

V

Vaccination, 6
vaccine, 5, 6
Vaccine, 6

Values, 18
Ventricle myocardium, 10
Virulence, 8
vitrification, 15

W

Waste management, 18
Welding fumes, 26

wheat pasture, 22

Y

yeast culture, 17
yellow-feathered broiler, 17, 18

INDEKS PENGARANG

A

Abdullahi, I.L., 25
Achcar, J.A., 14
Aghajanov, Michail, 15
Aguiar, Marta Gontijo, 4
Alexopoulos, A., 16
Alves, E.D., 14
Anselmo-Franci, J.A., 14
Anstadt, Emily, 20
Aung, Koko, 20
Ayi, I., 18
Azevedo, Ricardo Bentes, 4

B

Ball, J.J., 16
Beck, M.R., 21
Beck, P.A., 16
Ben-Horin, O., 16
Bogner, F.X., 16
Bohbot, Jonathan D., 13
Bonfá, A.L.O., 14
Bordini, Heloíza Paranzini, 11
Boyer, A.R., 16
Burke, Darlene A., 19

C

Callaghan, Corey T., 23
Cao, Jian, 8
Cardoso, Patricia G., 2
Cecchini, Alessandra Lourenço, 11
Cecchini, Rubens, 11
Cervantes, Jorge L., 20
Chan, Shek Kiu, 2
Chang, Chunlong, 5
Chappell, K., 15
Chavushyan, Vergine, 15
Chen, Dadian, 10
Chen, Xiao, 5, 23
Chen, Xiaohong, 5
Chen, Xiaoyun, 23
Cichosz, Simon Lebech, 6
Clark, Robert B., 20
Coelho, Larissa Dutra, 4
Corballis, Michael C., 24
Cornwell, William K., 23
Corrêa, L.B., 22
Cristescu, Ada, 19
Cruzeiro, Catarina, 2
Cunha, J.A., 22

D

Da Ré Guerra, Flávia, 9
Damião, Bruno, 9
Danielyan, Margarita, 15
Dashtizad, Mojtaba, 14
Dehghan, Samaneh, 12
Dekel, Amir, 13
Del Claro, G.R., 22
Dou, Zhihua, 8
Drača, Dijana, 3
Du, Huahua, 23
Đukić, Tatjana, 3
Dwivedi, Alok, 20

E

El-Senousey, HebatAllah Kasem, 17
Epstein, Hal, 23
Esteves, Alessandra, 10
Everett, Jason D., 23

F

Fan, Qiuli, 17
Farhangi, Sahar, 12
Farshad, Omid, 22
Fayazi, Samaneh, 14
Fazaeli, Hassan, 13
Ferreira, Lucas Antônio, 4
Fiorentino, Gabriella, 17
Fonseca, Jeferson Ferreira, 19
Fouad, Ahmed Mohamed, 17

G

Geng, Hong-Li, 5
Gerlach, K., 5
Gong, Wenjie, 8
Gorta, Simon B.Z., 23
Gou, Zhongyong, 17
Guimarães, I.C.S.B., 22
Gunter, S.A., 21
Guo, Mengnan, 10

H

Haghparast, Abbas, 2
Hainline, Casey, 19
Hajarian, Hadi, 14
Han, Jianzhong, 20

Hashem, M.A., 25
Hayden, Benjamin Y., 3
He, Sun, 8
Heidari, Reza, 22
Hejlesen, Ole, 6
Hetherington, L., 15
Hornsby, J.A., 16

I

Ivorra, Lucia, 2

J

Jamieson, Mark, 19
Jamshidzadeh, Akram, 22
Jansen, Malte, 7
Javan, Mohammad, 12
Jensen, Morten Hasselstrøm, 6
Jia, Qingmei, 10
Jiang, Guangshun, 9
Jiang, Mengxue, 20
Jiang, Shouqun, 17
Juwel Hosen, Md., 25

K

Kaluđerović, Goran N., 3
Kazemi, Parinaz, 14
Keene, H. Ruck, 15
Kegley, E.B., 16
Keller, Anastasia V., 19
Kingsford, Richard T., 23
Komaki, Alireza, 2
Krajnović, Tamara, 3
Kremer, Jean Lucas, 11
Krupp, Sarah, 19

L

Li, Jun, 8
Li, Junhui, 8
Li, Long, 17
Li, M.C., 7
Li, Min, 10
Lin, Xiajing, 17
Liu, Dan, 9
Liu, Gengyuan, 17
Lopes, Sávia Caldeira, 4
Lu, Shiyao, 20
Lu, Zongji, 8
Lüdtke, Oliver, 7
Luiz, Rodrigo Cabral, 11

M

Magnuson, David S.K., 19
 Mahdavinezhad, Forough, 14
 Maksimović-Ivanić, Danijela, 3
 Marinello, Poliana Camila, 11
 Marques, Petrus Pires, 9
 Marsh, Herbert W., 7
 Matinyan, Senik, 15
 Mawa, Jannatul, 25
 McGovern, Roger, 23
 McLachlan, Greg, 23
 Melo, Gabriella Pasqual, 11
 Meng, Xiang-Zhu, 5
 Mi, Shijiang, 8
 Mijatović, Sanja, 3
 Montrezor, L.H., 14
 Murawski, Maciej, 19

N

Netto, A. Saran, 22
 Ni, Hongbo, 5
 Nichols, Frank, 20
 Nikolopoulos, K., 16
 Novais, Marcus Vinícius, 4

O

Oliveira, Maria Emilia Franco, 18
 Oliveira, Mônica Cristina, 4
 Ollhoff, Rüdiger Daniel, 11
 Ommati, Mohammad Mehdi, 22

P

Paiva, F.A., 22
 Palmer, E.A., 16
 Parizotto, N.A., 14
 Petruska, Jeffrey C., 19
 Pigatto, G.R., 14
 Place, S.E., 21
 Powell, J.G., 16
 Prince, Daniella, 19
 Pristov, Jelena Bogdanović, 3

Q

Qu, Daofeng, 20

R

Rahman, Md. Atiar, 25
 Ran, Xuhua, 5
 Rees, Kathleen, 19

Reuter, R.R., 21
 Reynolds, J.L., 16
 Rezaei, Javad, 13
 Ripa, Maddalena, 17
 Rizzon Cintra, Maria Christine, 11
 Robberstad, J., 16
 Robertson, I.D., 18
 Roderick, Mick, 23
 Rodrigues, Naiara Nantes, 19
 Roshanzamir, Habiballah, 13
 Rossaneis, Ana C., 11
 Rossi Junior, Wagner Costa, 9
 Ruan, D., 6
 Ryan, U., 18

S

Sábio, Laís Roberta, 11
 Sani, A., 25
 Santagata, Remo, 17
 Santos Sotomaior, Cristina, 11
 Sarihi, Abdolrahman, 2
 Sarmadi, Fatemeh, 14
 Scherer, R., 5
 Schroeders, Ulrich, 7
 Sehati, Ronak, 14
 Shao, D., 8
 Shi, S.R., 8
 Shoulders, B.P., 16
 Shum-Siu, Alice, 19
 Silva, Raphaela Ariany, 4
 Silva, T.H., 22
 Smith, James A., 23
 Smith, Lindsay, 23
 Sotiriou, S., 16
 Souza, Paulo Eduardo, 4
 Souza-Fabjan, Joanna Maria Gonçalves, 19
 Squire, S.A., 18
 Südekum, K.-H., 5
 Sun, Jiumeng, 8
 Sun, Shuang, 10
 Sun, Yanjun, 8
 Suthers, Iain M., 23

T

Tagulao, Karen Araño, 2
 Tang, Xueyou, 23
 Taslimi, Zahra, 2
 Tedesco, Antônio, 4
 Thompson, L.R., 21
 Tong, H.B., 8
 Totonchi, Mehdi, 12
 Trotter, Austin, 20
 Tu, Changchun, 8

V

Vergani, Gabriel Brun, 19
 Verri, Waldiceu A., 11
 Vicente, Wilter Ricardo Russiano, 19
 Vieira, Tânia Martins, 9
 Viglia, Silvio, 17

W

Wang, Fengqin, 23
 Wang, Maya Zhe, 3
 Wang, Min, 10
 Wang, Peng, 8, 20
 Wang, Pengjiang, 8
 Wang, Qi, 9
 Wang, W.C., 7
 Wang, Wei, 17
 Wang, Weiwei, 17
 Wang, Xiusong, 10
 Wang, Xuenan, 10
 Wang, Yibing, 17
 Wang, Zunbao, 8
 Weber, Saulo Henrique, 11
 Wen, Xiaobo, 5
 Wessjohann, Ludger A., 3
 Williams, Dan, 23
 Williams, G.D., 21
 Wood, Brittney D., 19
 Wren, H., 16

X

Xiang, Tianyu, 10
 Xiao, Y.Q., 8
 Xu, Tingting, 9

Y

Yakir, Esther, 13
 Yang, Jing, 10
 Yang, L., 7
 Yang, R., 18
 Ye, H., 7
 Yenkoyan, Konstantin, 15
 Yi, Songqiang, 20
 Yuan, Ke, 8

Z

Zandi, Ghazaleh, 14
 Zanetti, M.A., 22
 Zhai, S.S., 6
 Zhang, Haiyan, 10
 Zhang, Liying, 8
 Zhang, Xiaofeng, 23

Zhao, Jing, 23
Zhao, Xin, 9

Zhao, Xindi, 9
Zhou, Xubin, 8

Zhu, Y.W., 6