



ABSTRAK AGRICULTURE AND EXTENSION BERSUMBER DARI PANGKALAN DATA SCIENDIRECT

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BALAI BESAR PELATIHAN KESEHATAN HEWAN

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123. Cell mediated and innate immune responses in pigs following vaccination and challenge with *Toxoplasma* parasites/ **Bartley, Paul M.; Burrells, Alison; Benavides, Julio; Canton, German; Garcia, Joao L.; Thomson, Jackie; Chianini, Francesca; Innes, Elisabeth A.; Katzer, Frank.** *Veterinary Parasitology*. ISSN:0304-4017 (2019) v.275 p.108963 *Veterinary Parasitology*

DOI: 10.1016/j.vetpar.2019.108963

Link: <http://www.sciencedirect.com/science/article/pii/S0304401719302444>

Abstract: *Toxoplasma gondii* has a worldwide distribution and can infect almost all warm blooded animals including pigs and humans. This study aims to examine the immune responses induced in pigs following vaccination (live S48 tachyzoites) and/or challenge with *T. gondii* oocysts, through the examination of changes in levels of transcription in CD4, CD8 α , IFN- γ , IL-12p35, CXCR3, MyD88. The experiment involved four groups of animals; pigs in group 1 (Challenged) (Chal) were challenged orally with (1×10^3 oocysts) on day 28 of the experiment. Pigs in group 2 (Vaccinated /Challenged) (Vac/Chal) were vaccinated (S48 isolate tachyzoites) on day 0, then challenged on day 28. The group 3 (Vaccinated) (Vac) animals were vaccinated (S48 isolate tachyzoites) on day 0 of the experiment. Finally the group 4 (control) pigs remained non-vaccinated and non-challenged. All animals were culled 6 weeks post challenge. At post mortem samples of retropharyngeal lymph node (RLN), mesenteric LN (MLN) and spleen were collected, RNA was extracted and cDNA synthesised. The results showed significant increases in IFN- γ expression in samples from groups 1 (Chal) and 2 (Vac/Chal) (RLN) and groups 1, 2 and 3 (Vac) (spleen) and in MyD88 expression (RLN) in samples from groups 1, 2 and 3 compared to the group 4 (control) animals. Significant increases were also observed in CD8 α expression in group 1 (Chal) (RLN) and groups 1 and 2 (Vac/Chal) (RLN and MLN) compared against group 4 (control) and group 3 (Vac) respectively. Conversely, significant down regulation of CD4 and/or IL-12p35 transcription was found in at least one sample from groups 1 (Chal), 2 (Vac/Chal) and 3 (Vac) compared to group 4 (control) pigs. This study demonstrates that cell mediated and innate immune responses are generated in pigs following exposure to *T. gondii* parasites (oocysts or tachyzoites), key amongst them appear to be IFN- γ , MyD88 and CD8 α .

Keyword: Vaccination; Cell mediated immunity; Porcine

124. Improvements in the growth performance, immunity, disease resistance, and gut microbiota by the probiotic *Rummeliibacillus stabekisii* in Nile tilapia (*Oreochromis niloticus*)/ **Tan, Heng Yih; Chen, Sai-Wei; Hu, Shao-Yang.** *Fish & Shellfish Immunology*. ISSN:1050-4648 (2019) v.92 p.265-275 *Fish & Shellfish Immunology*

DOI: 10.1016/j.fsi.2019.06.027

Link: <http://www.sciencedirect.com/science/article/pii/S1050464819306746>

Abstract: The application of probiotics as an eco-friendly alternative to antibiotics is an emerging strategy for sustainable aquaculture. In the present study, *Rummeliibacillus stabekisii* was isolated from the gut of Nile tilapia, and the effects of *R. stabekisii* on the growth, innate immunity, disease resistance, and gut microbiota of Nile tilapia (*Oreochromis niloticus*) were investigated. The results showed significantly increased weight gain (WG), feed conversion ratio (FCR), and feed efficiency (FE) in Nile tilapia fed *R. stabekisii* for 8 weeks compared to those in fish fed a control diet. Intestinal digestive enzymes such as protease, cellulase, and xylanase were also significantly increased in the *R. stabekisii*-administered groups. Enhanced cumulative survival was exhibited in fish fed *R. stabekisii* after challenge with *Aeromonas hydrophila* and *Streptococcus iniae*. Immune parameters such as the phagocytic activity, respiratory bursts, and superoxide dismutase of head kidney leukocytes; serum lysozyme activity; and expression of the cytokine genes interleukin-1 β , tumor necrosis factor- α , transforming growth factor- β , and heat shock protein 70 were significantly elevated in fish fed *R. stabekisii*. Administration of *R. stabekisii* considerably increased the abundance of potential probiotics (*Bacillus* and *Lactobacillus* spp.) and reduced abundances of potential pathogenic bacteria (*Streptococcus* and *Staphylococcus* spp.) in fish intestines. The present study indicated

that dietary supplementation with *R. stabekisii* improved the growth, immunity, disease resistance, and gut microflora of Nile tilapia. This research is the first study reporting that the genus *Rummeliibacillus* is a potential probiotic in animals, suggesting that *R. stabekisii* can be used as a feed additive to enhance the growth and health status in tilapia.

Keyword: Growth; Innate immunity; Gut microbiota; s

125. Attributable sources of community-acquired carriage of *Escherichia coli* containing β -lactam antibiotic resistance genes: a population-based modelling study/ **Mughini-Gras, Lapo; Dorado-García, Alejandro; van Duijkeren, Engeline; van den Bunt, Gerrita; Dierikx, Cindy M; Bonten, Marc J M; Bootsma, Martin C J; Schmitt, Heike; Hald, Tine; Evers, Eric G; de Koeijer, Aline; van Pelt, Wilfrid; Franz, Eelco; Mevius, D.** The Lancet Planetary Health. ISSN:2542-5196 8(2019) v.3 p.e357-e369The Lancet Planetary Health

DOI: 10.1016/S2542-5196(19)30130-5

Link: <http://www.sciencedirect.com/science/article/pii/S2542519619301305>

Abstract: Summary Background Extended-spectrum β -lactamase-producing *Escherichia coli* (ESBL-EC), plasmid-mediated AmpC-producing *E. coli* (pAmpC-EC), and other bacteria are resistant to important β -lactam antibiotics. ESBL-EC and pAmpC-EC are increasingly reported in animals, food, the environment, and community-acquired and health-care-associated human infections. These infections are usually preceded by asymptomatic carriage, for which attributions to animal, food, environmental, and human sources remain unquantified. Methods In this population-based modelling study, we collected ESBL and pAmpC gene data on the Netherlands population for 2005–17 from published datasets of gene occurrences in *E. coli* isolates from different sources, and from partners of the ESBL Attribution Consortium and the Dutch National Antimicrobial Surveillance System. Using these data, we applied an established source attribution model based on ESBL-EC and pAmpC-EC prevalence and gene data for humans, including high-risk populations (ie, returning travellers, clinical patients, farmers), farm and companion animals, food, surface freshwater, and wild birds, and human exposure data, to quantify the overall and gene-specific attributable sources of community-acquired ESBL-EC and pAmpC-EC intestinal carriage. We also used a simple transmission model to determine the basic reproduction number (R_0) in the open community. Findings We identified 1220 occurrences of ESBL-EC and pAmpC-EC genes in humans, of which 478 were in clinical patients, 454 were from asymptomatic carriers in the open community, 103 were in poultry and pig farmers, and 185 were in people who had travelled out of the region. We also identified 6275 occurrences in non-human sources, including 479 in companion animals, 4026 in farm animals, 66 in wild birds, 1430 from food products, and 274 from surface freshwater. Most community-acquired ESBL-EC and pAmpC-EC carriage was attributed to human-to-human transmission within or between households in the open community (60.1%, 95% credible interval 40.0–73.5), and to secondary transmission from high-risk groups (6.9%, 4.1–9.2). Food accounted for 18.9% (7.0–38.3) of carriage, companion animals for 7.9% (1.4–19.9), farm animals (non-occupational contact) for 3.6% (0.6–9.9), and swimming in freshwater and wild birds (ie, environmental contact) for 2.6% (0.2–8.7). We derived an R_0 of 0.63 (95% CI 0.42–0.77) for intracommunity transmission. Interpretation Although humans are the main source of community-acquired ESBL-EC and pAmpC-EC carriage, the attributable non-human sources underpin the need for longitudinal studies and continuous monitoring, because intracommunity ESBL-EC and pAmpC-EC spread alone is unlikely to be self-maintaining without transmission to and from non-human sources. Funding 1Health4Food, Dutch Ministry of Economic Affairs, and the EU's Horizon-2020 through One-Health European Joint Programme.

Keyword:

126. Evolution of lipid classes and fatty acid digestibility along the gastrointestinal tract of broiler chickens fed different fat sources at different ages/ **Rodriguez-Sanchez, R; Tres, A; Sala, R; Guardiola, F; Barroeta, A C.** Poultry Science. ISSN:0032-5791 3(2019) v.98 p.1341-1353 Poultry Science

DOI: 10.3382/ps/pey458

Link: <http://www.sciencedirect.com/science/article/pii/S0032579119304080>

Abstract: ABSTRACT The aim of the present study is to evaluate the effect of the dietary fat saturation degree and age on the lipid class (TAG, DAG, MAG, and FFA) composition and fatty acid digestibility along the gastrointestinal tract (GIT) and excreta in broiler chickens. A total of 120 one-day-old female broiler chickens were randomly distributed in 2 dietary treatments (6 cages/treatment), which resulted from the supplementation of a basal diet with 6% of soybean oil or palm oil. Two digestibility balances were carried out at 14 and 35 d and fatty acid digestibility and lipid class composition were determined in the gizzard, duodenum, jejunum, ileum, and excreta. Along de GIT, both fatty acid digestibility and lipid class composition were influenced by the dietary fat source and the age of the chickens. The absorption of the unsaturated fat was more efficient and faster than it was for the saturated fat. The ability of adult chickens to absorb fat was higher than for young chickens. The results show that the duodenum is the main place of fat digestion (hydrolysis), and the jejunum the main place of fat absorption. The role of the ileum on fat absorption is very important, as it is the last segment of the GIT where the absorption of fatty acids has been described. Thus, it was the contribution of the ileum that was responsible for the higher fat utilization observed for animals fed the unsaturated diet than for those fed the saturated diet at 14 d, and it was also responsible for the improvement on the utilization of the saturated diet between 14 and 35 d. All the results suggest that the absorption of fatty acids is more limiting than is hydrolysis, because the main differences were observed in the jejunum and ileum, where the absorption of fatty acids takes place.

Keyword: broiler; fat saturation degree; fatty acid absorption; fatty acid digestibility; lipid class

127. Exposure assessments in reproductive and developmental toxicity testing: An IQ-DruSafe industry survey on current practices and experiences in support of exposure-based high dose selection/ **Andrews, Paul A.; McNerney, Mary Ellen; DeGeorge, Joseph J..** Regulatory Toxicology and Pharmacology. ISSN:0273-2300 (2019) v.107 p.104413 Regulatory Toxicology and Pharmacology

DOI: 10.1016/j.yrtph.2019.104413

Link: <http://www.sciencedirect.com/science/article/pii/S0273230019301771>

Abstract: The draft ICH S5(R3) guideline includes an exposure-based endpoint as an option for selecting the high dose in developmental and reproductive toxicity (DART) studies. In 2016, IQ DruSafe conducted an anonymous survey to identify industry practices and experiences related to pharmacokinetic assessments in DART studies in order to facilitate a pragmatic data-driven approach to development of an acceptable multiple of the clinical exposure to be proposed for dose selection in the guideline. Questions in the survey were designed to explore pharmacokinetic differences in pregnant versus non-pregnant animals, and to assess exposure levels attained in the absence of maternal toxicity as well as DART outcomes in animal studies associated with those exposures. Small molecule and therapeutic proteins were analyzed separately. The key findings for small molecules were: a) differences in exposures between pregnant and non-pregnant animals were generally ≤ 3 -fold, b) C_{max} or AUC exposures ≥ 25 -fold the clinical exposure were achieved in the absence of maternal toxicity for 31% and 23% of rat and rabbit developmental toxicity studies, respectively, and c) only 3.3% (5/153) and 1.6% (2/128) of the developmental toxicity studies were positive

for malformations or embryofetal lethality in rats and rabbits, respectively, that were not observed until exposure margins were ≥ 25 -fold.

Keyword: Fertility; Risk assessment; Pregnancy; Developmental toxicity; Embryofetal; Exposure; Malformations; Pharmacokinetics

128. Inactivated whole virus particle vaccine with potent immunogenicity and limited IL-6 induction is ideal for influenza/ **Sekiya, Toshiki; Mifsud, Edin J; Ohno, Marumi; Nomura, Naoki; Sasada, Mayumi; Fujikura, Daisuke; Daito, Takuji; Shingai, Masashi; Ohara, Yuki; Nishimura, Tomohiro; Endo, Masafumi; Mitsumata, Ryotarou; Ikeda, Tomio; Hatanaka, Hironori; Kitayama, Hiroki; Mo.** Vaccine. ISSN:0264-410X 15(2019) v.37 p.2158-2166Vaccine

DOI: 10.1016/j.vaccine.2019.02.057

Link: <http://www.sciencedirect.com/science/article/pii/S0264410X19302646>

Abstract: In contrast to current ether- or detergent-disrupted “split” vaccines (SVs) for influenza, inactivated whole influenza virus particle vaccines (WPVs) retain the original virus structure and components and as such may confer similar immunity to natural infection. In a collaboration between academia and industry, the potential of WPV as a new seasonal influenza vaccine was investigated. Each of the four seasonal influenza vaccine manufacturers in Japan prepared WPVs and SVs from the same batches of purified influenza virus. Both mice and monkeys vaccinated with the WPVs exhibited superior immune responses to those vaccinated with the corresponding SVs. Vaccination with A/California/07/2009 (H1N1) WPV enabled mice to survive a lethal challenge dose of homologous virus whereas those vaccinated with SV succumbed to infection within 6 days. Furthermore, mice vaccinated with WPV induced substantial numbers of multifunctional CD8⁺ T cells, important for control of antigenically drifted influenza virus strains. In addition, cytokines and chemokines were detected at early time points in the sera of mice vaccinated with WPV but not in those animals vaccinated with SV. These results indicate that WPVs induce enhanced innate and adaptive immune responses compared to equivalent doses of SVs. Notably, WPV at one fifth of the dose of SV was able to induce potent immunity with limited production of IL-6, one of the pyrogenic cytokines. We thus propose that WPVs with balanced immunogenicity and safety may set a new global standard for seasonal influenza vaccines.

Keyword: Inactivated whole influenza virus particle vaccine; Seasonal and pandemic influenza

129. Retrospective study of epidemiological, clinical and pathological findings of bovine babesiosis in Mato Grosso do Sul, Brazil (1995 –2017)/ **Pupin, Rayane Chitolina; Guizelini, Carolina de Castro; Lemos, Ricardo Antônio Amaral de; Martins, Tessie Beck; Borges, Fernando de Almeida; Borges, Dyego Gonçalves Lino; Gomes, Danilo Carloto.** Ticks and Tick-borne Diseases. ISSN:1877-959X 1(2019) v.10 p.36-42Ticks and Tick-borne Diseases

DOI: 10.1016/j.ttbdis.2018.08.015

Link: <http://www.sciencedirect.com/science/article/pii/S1877959X18301274>

Abstract: Babesiosis is a tick-borne hemolytic disease caused by intraerythrocytic protozoan parasites of the genus *Babesia*. The present study describes epidemiological, clinical, and pathological features of cases of bovine babesiosis diagnosed over the last two decades in the state of Mato Grosso do Sul in central-western Brazil. Examination of a total of 5298 bovine samples resulted in a definitive or presumptive diagnosis of babesiosis in 41 cases from 33 outbreaks. *Babesia bovis* was the most common causal agent of bovine babesiosis, and animals of all ages were

affected. Zebu cattle, which are more frequent in the study region than are taurine cattle, were the cattle most often affected. Although zebu cattle have been claimed to be highly tolerant, the present findings show that they can develop severe illness and die due to *Babesia* spp. infection. The disease was diagnosed almost every year over the time period covered in this study (1995–2017). However, the number of cases of bovine babesiosis diagnosed was low compared to the total number of cases reviewed. Veterinary practitioners that work on cattle farms should be able to diagnose the disease in its early stages so that treatment can be initiated promptly and economic losses can be minimized.

Keyword: Protozoa; Cattle; Epidemiology; Brazil; Tick; Zebu

130. Host immunomodulation by ascorbic acid ameliorates oxidative stress in caprine pediculosis—A pilot study/ **Ajith, Y.; Dimri, Umesh; Gopalakrishnan, Arumugam; Devi, Gopinath; Junaid, Nellooran; Madhesh, E.** Small Ruminant Research. ISSN:0921-4488 (2019) v.176 p.65-69 Small Ruminant Research

DOI: 10.1016/j.smallrumres.2019.05.017

Link: <http://www.sciencedirect.com/science/article/pii/S0921448819300938>

Abstract: Pediculosis is the most common and economically significant dermatological condition in goats caused mainly by the chewing lice, (*Damalinea* (*Bovicola*) *caprae*). Clinically, it is associated with varying levels of hypersensitivity skin reactions and its clinico-pathology is less explored. The present study aimed to investigate the immuno-oxidative pathology of chewing lice infestation in goats vis-à-vis immunomodulatory potential of two standard antioxidants (Ascorbic acid and N-acetyl cysteine) as an adjunct therapy in its management. Thirty two goats were divided into four groups of eight animals each; Group I, II and III included lice infested and Group IV included healthy control. Group I animals underwent ivermectin therapy (200 µg/kg SC single dose) only; whereas group II and group III animals received N-acetyl cysteine (12 mg/kg B. wt.) and Ascorbic acid (20 mg/kg B. wt.), respectively, orally once daily for 14 days along with ivermectin therapy (200 µg/kg SC single dose). The haematological (Hb, TEC, TLC and DLC), oxidant-antioxidant (LPO, GSH, TAC, SOD and catalase activity) and immunological (TNF-α, IL-10, TGF-β1, Th1/Th2 ratio and immunosuppression ratio) parameters were studied on day 0 (Before therapy) and day 28 (Post therapy). Animals with pediculosis revealed Th2 dominant cytokine response and marked oxidative stress along with anaemia and leukocytosis. Ascorbic acid treated animals showed better recovery from the immuno-oxidative pathology of pediculosis and approached normalcy post therapy. Ascorbic acid as an adjunct therapy along with licideal drugs alleviated the pathological damages in host biology and hastened clinical recovery, whereas, N-acetyl cysteine was less effective in inducing favorable immune response, in this Th2 cytokine dominant condition. Future studies on antioxidants may focus on the influence of Th1/Th2 ratio in selecting antioxidant drugs and immunomodulatory mechanisms involved.

Keyword: Immunomodulator; Antioxidant; Vitamin C; Oxidative stress; -acetyl cysteine; Chewing lice; Th2 immunity

131. Interaction between rennet source and transglutaminase in white fresh cheese production: Effect on physicochemical and textural properties/ **García-Gómez, Belén; Vázquez-Odériz, M^a Lourdes; Muñoz-Ferreiro, Nieves; Romero-Rodríguez, M^a Ángeles; Vázquez, Manuel.** LWT. ISSN:0023-6438 (2019) v.113 p.108279 LWT

DOI: 10.1016/j.lwt.2019.108279

Link: <http://www.sciencedirect.com/science/article/pii/S002364381930619X>

Abstract: The aim of this study was to determine the effect of the rennet source and the interaction of rennet with TG on physicochemical and texture properties of fresh cheese made with pasteurized cow milk. The rennets used were: animal, recombinant chymosin, vegetal or microbial rennet. Cheeses with and without addition of TG was obtained. The rennet source did not affect statistically the activity water and water content of the cheese. The highest yield was obtained using recombinant chymosin. The rennet source showed important effects on texture parameters. Microbial and vegetal rennets increased the adhesiveness of cheeses. Cheeses coagulated with animal rennet were the most affected by the TG treatment, observing a significant decrease in hardness (62.19%), chewiness (75.09%) and springiness (43.75%). The adhesiveness and cohesiveness values also increased significantly. An increase of 0.69% in the yield was achieved when the TG was combined with animal rennet. The TG addition combined with animal rennet can be an effective way to obtain cheese products with innovative textural properties and slightly improved yield.

Keyword: Cheese; Rennet; Texture; TPA; Transglutaminase; Yield

132. Abnormal empathy-like pro-social behaviour in the valproic acid model of autism spectrum disorder/ **Fontes-Dutra, Mellanie; Della-Flora Nunes, Gustavo; Santos-Terra, Júlio; Souza-Nunes, Walquíria; Bauer-Negrini, Guilherme; Hirsch, Mauro Mozael; Green, Lily; Riesgo, Rudimar; Gottfried, Carmem; Bambini-Junior, Victorio.** Behavioural Brain Research. ISSN:0166-4328 (2019) v.364 p.11-18Behavioural Brain Research

DOI: 10.1016/j.bbr.2019.01.034

Link: <http://www.sciencedirect.com/science/article/pii/S0166432818311148>

Abstract: Impairments in social behaviour are a defining feature of autism spectrum disorder (ASD). Individuals with ASD also usually present some difficulty to recognize or understand another person's feelings. Therefore, it is possible that altered empathy processing could hinder typical social interaction in ASD. Recently, robust paradigms confirmed that rodents show primordial forms of empathy-like behaviour. Therefore, in this work, we used one of these new protocols to test pro-social behaviour in the rat model of autism induced by Valproic Acid (VPA). We also evaluated possible beneficial effects of Resveratrol, since it can prevent social deficits in the VPA model. Rats were tested on their ability to open a restrainer to release a trapped conspecific. Exposure to VPA precludes the timely manifestation of this empathy-like behaviour, but does not affect its continuation after its first expression. We also found a significant correlation between average speed during the first day of test and becoming an Opener. Similarly, rats able to open the restrainer on the first day had an increased likelihood of repeating this behaviour in the later days of the testing programme. We did not find any protective effects of Resveratrol. Further investigation of empathy-like behaviour in the VPA model and in other models of autism could help to clarify the behavioural and neural processes underpinning the basic aspects of empathy alterations in autistic individuals.

Keyword: Valproate; Animal models; Autism; Empathy; Pro-social behaviour

133. Derivation of chicken primordial germ cells using an indirect Co-culture system/ **Xie, Long; Lu, Zhenping; Chen, Dongyang; Yang, Mengmeng; Liao, Yuying; Mao, Wenrong; Mo, Lifen; Sun, Juanjuan; Yang, Wenhao; Xu, Huiyan; Lu, Kehuan; Lu, Yangqing.** Theriogenology. ISSN:0093-691X (2019) v.123 p.83-89Theriogenology

DOI: 10.1016/j.theriogenology.2018.09.017

Link: <http://www.sciencedirect.com/science/article/pii/S0093691X18308057>

Abstract: Primordial germ cells (PGCs) are promising genetic resources for avian studies including modified animals. However, chicken PGCs are slow to proliferate and gradually lose germline competency after long-term culture, which hinders their application in avian biotechnology. Thus, we developed a robust method for the isolation and rapid propagation of PGCs using an indirect co-culture system. PGCs derived from a pair of embryonic chicken gonads were expanded to 1×10^6 within 2 weeks, and no sex bias was observed in. These PGCs presented high capacity of germline transmission and produced donor-derived offspring after injection into the chicken embryos. This system allows the efficient gene-banking of chicken species and can facilitate the production of chickens bearing a desired phenotype via genomic editing.

Keyword: Chicken; In vitro culture; Primordial germ cells

134. Modeling the effects of infection status and hygiene practices on *Mycobacterium avium* subspecies paratuberculosis contamination in bulk tank milk/ **Rani, Surabhi; Beaver, Annabelle; Schukken, Ynte H.; Pradhan, Abani K.** Food Control. ISSN:0956-7135 (2019) v.104 p.367-376Food Control

DOI: 10.1016/j.foodcont.2019.04.031

Link: <http://www.sciencedirect.com/science/article/pii/S0956713519301926>

Abstract: Infectious diseases in dairy cattle are of significant concern to dairy industries because of their huge impact on animal health, milk production, and economics. *Mycobacterium avium* subsp. paratuberculosis (MAP) is a pathogenic bacterium that causes Johne's disease, one of the important endemic infectious diseases in dairy cattle. Contamination of bulk tank milk with MAP can occur through direct shedding into milk by infected cows (internal route), fecal contamination (fecal route), or introduction of soil and water containing MAP (environmental route). Humans can be exposed to MAP via raw milk consumption; additionally, there are reports of MAP survival in milk after pasteurization. The risk of human consumption is particularly important due to an association between MAP and human Crohn's disease. In the current study, we used a probabilistic modeling framework to predict the level of MAP contamination per liter in the bulk tank milk and weigh the relative importance of each contamination route. Our model focused on several different infection statuses and the contribution of each group to environmental and fecal contamination, in addition to internal route shedding. We assessed the influence of common hygiene practices, such as washing of udders before milking and the use of milk filters, on the concentration of MAP in bulk tank milk. We extracted parameters and their distributions from national surveys and thorough literature search. Our baseline model comprising all hygiene practices provided an average estimate of 0.76 log CFU/L for the final concentration of MAP in bulk tank milk, with a maximum of 6.70 log CFU/L and a minimum of 0.04 log CFU/L depending on herd size and the ratio of infection statuses. Results from sensitivity analyses indicated that the average fecal contamination showed the greatest impact on the final MAP concentration per liter in bulk tank milk, followed by herd size and washing efficiency. This study emphasized that good hygiene practices are crucial for maintaining the quality of raw milk in an endemically-infected dairy herd.

Keyword: subsp.; Johne's disease; Bulk tank milk; Good hygiene practices; Milk filters; Washing efficiency

135. Symposium review: The genomic architecture of inbreeding: How homozygosity affects health and performance/ **Baes, Christine F.; Makanjuola, Bayode O.; Miglior, Filippo; Marras, Gabriele; Howard, Jeremy T.;**

Fleming, Allison; Maltecca, Christian. Journal of Dairy Science. ISSN:0022-0302 3(2019) v.102 p.2807-2817 Journal of Dairy Science

DOI: 10.3168/jds.2018-15520

Link: <http://www.sciencedirect.com/science/article/pii/S0022030219300633>

Abstract: ABSTRACT Inbreeding depression is a growing concern in livestock because it can detrimentally affect animal fitness, health, and production levels. Genomic information can be used to more effectively capture variance in Mendelian sampling, thereby enabling more accurate estimation of inbreeding, but further progress is still required. The calculation of inbreeding for herd management purposes is largely still done using pedigree information only, although inbreeding coefficients calculated in this manner have been shown to be less accurate than genomic inbreeding measures. Continuous stretches of homozygous genotypes, so called runs of homozygosity, have been shown to provide a better estimate of autozygosity at the genomic level than conventional measures based on inbreeding coefficients calculated through conventional pedigree information or even genomic relationship matrices. For improved and targeted management of genomic inbreeding at the population level, the development of methods that incorporate genomic information in mate selection programs may provide a more precise tool for reducing the detrimental effects of inbreeding in dairy herds. Additionally, a better understanding of the genomic architecture of inbreeding and incorporating that knowledge into breeding programs could significantly refine current practices. Opportunities to maintain high levels of genetic progress in traits of interest while managing homozygosity and sustaining acceptable levels of heterozygosity in highly selected dairy populations exist and should be examined more closely for continued sustainability of both the dairy cattle population as well as the dairy industry. The inclusion of precise genomic measures of inbreeding, such as runs of homozygosity, inbreeding, and mating programs, may provide a path forward. In this symposium review article, we describe traditional measures of inbreeding and the recent developments made toward more precise measures of homozygosity using genomic information. The effects of homozygosity resulting from inbreeding on phenotypes, the identification and mapping of detrimental homozygosity haplotypes, management of inbreeding with genomic data, and areas in need of further research are discussed.

Keyword: inbreeding; mating programs; runs of homozygosity

136. A survey of plants used to treat livestock diseases in the Mnisi community, Mpumalanga, South Africa, and investigation of their antimicrobial activity/ **Khunoana, E.T.; Madikizela, B.; Erhabor, J.O.; Nkadameng, S.M.; Arnot, L.F.; Van Wyk, I.; McGaw, L.J.** South African Journal of Botany. ISSN:0254-6299 (2019) v.126 p.21-29 Special Issue in honour of Prof. van Staden's 80th Birthday

DOI: 10.1016/j.sajb.2019.07.026

Link: <http://www.sciencedirect.com/science/article/pii/S0254629919306118>

Abstract: Ethnoveterinary medicine (EVM), although not documented well, still serves as an alternative or complementary medication for curing or preventing bacterial, fungal and helminth diseases, as well as other maladies such as ticks and tick-borne diseases in South Africa. The aim of this study was to document plant species used as EVM by the Mnisi community at Bushbuckridge in the province of Mpumalanga, and to evaluate their antimicrobial, antibiofilm and cytotoxic activities. The survey was carried out for two weeks from the end of January to the beginning of February 2018 at the local dipping tanks following the Rapid Rural Appraisal (RRA) approach. A total of 50 individuals were interviewed: 82% were local small scale farmers, 10% were herdsmen, 6% herbalists and 2% animal health technicians. Three plant species were selected for bioassays based on their frequency index and lack

of information on their bioactivity in the literature. Traditional methods were used for plant extraction using water as described by the respondents. Acetone was used as an organic solvent to compare traditional and organic solvent methods of extract preparation. The extracts were tested for their antibacterial, antibiofilm, antifungal, and cytotoxic properties. Eleven plant species belonging to seven families were reported by the farmers for EVM use, and fresh plants from the wild were commonly used to prepare the remedies as decoctions, infusions, pastes and extracted sap. *Elephantorrhiza obliqua* acetone extract had the best antibacterial activity with a minimum inhibitory concentration (MIC) value of 0.09 mg/mL against *Pseudomonas aeruginosa*, while *E. obliqua* water extracts had the best antifungal activity with MIC values of 0.02 to 0.04 mg/mL against *Aspergillus fumigatus*. *Schotia brachypetala* acetone extracts inhibited *Enterococcus faecalis* biofilms by 113% and 135% at zero and 24 h of bacterial growth respectively, while *E. obliqua* acetone extracts had values of 64% and 83% at these time periods, indicating that they were good inhibitors of biofilm formation and also had the capacity to act against mature biofilms. Seven out of nine tested plant extracts (78%) were non-toxic to moderately cytotoxic while only two plant extracts were relatively toxic against Vero cells. Traditionally prepared remedies were generally more active against fungi and mycobacteria and less toxic than the organic solvent extracts. However, in vivo studies are necessary to support the traditional use of the remedies against diseases in livestock in terms of validating the efficacy but also assessing their potential toxicity.

Keyword: Cytotoxicity; Ethnoveterinary medicine; Antibacterial; Antibiofilm; Antifungal; Antimycobacterial; Mpumalanga

137. Does socio-ecology drive differences in alertness between wolves and dogs when resting?/ **Kortekaas, Kim; Kotrschal, Kurt.** Behavioural Processes. ISSN:0376-6357 (2019) v.166 p.103877Behavioural Processes

DOI: 10.1016/j.beproc.2019.05.024

Link: <http://www.sciencedirect.com/science/article/pii/S0376635718302870>

Abstract: Variation in resting behaviour across animals may be driven by adaptations towards their environment. Wolves and dogs seem promising models to examine this idea as they share a common ancestor, but occupy different socio-ecological niches. While wolves generally avoid humans, hunt, defend their territory, and raise offspring cooperatively, most dogs live in human-shaped environments. Hence, we hypothesized wolves to be more alert towards their environment than dogs, i.e. the degree of activation along the sleep-wake continuum (alertness) should be greater in wolves than in dogs. We estimated alertness via cardiac output. We tested similarly raised and kept pack-living wolves and dogs in two different behavioural conditions: (1) inactive wakefulness: animal is lying, head in an upward position with eyes opened, (2) resting: animal is lying, head in downward position with eyes mainly closed. In contrast to our expectations, we found that in both conditions wolves had a lower heart rate and higher heart rate variability than dogs, i.e. wolves might be less alert/more relaxed than dogs. Although our results are preliminary, we suggest that the higher alertness of dogs compared to wolves is potentially driven by differences in their socio-ecology (i.e. domestication) causing greater attention of dogs to human behaviour.

Keyword: Domestication; Dog; Wolf; Heart rate; Alertness; Resting

138. Zebrafish embryo as a replacement model for initial biocompatibility studies of biomaterials and drug delivery systems/ **Rothenbücher, Theresa S.P.; Ledin, Johan; Gibbs, David; Engqvist, Håkan; Persson, Cecilia; Hulsart-Billström, Gry.** Acta Biomaterialia. ISSN:1742-7061 (2019) v.100 p.235-243Acta Biomaterialia

DOI: 10.1016/j.actbio.2019.09.038

Link: <http://www.sciencedirect.com/science/article/pii/S1742706119306592>

Abstract: The development of new biomaterials and drug delivery systems necessitates animal experimentation to demonstrate biocompatibility and therapeutic efficacy. Reduction and replacement of the requirement to conduct experiment using full-grown animals has been achieved through utilising zebrafish embryos, a promising bridge model between in vitro and in vivo research. In this review, we consider how zebrafish embryos have been utilised to test both the biocompatibility of materials developed to interact with the human body and drug release studies. Furthermore, we outline the advantages and limitations of this model and review legal and ethical issues. We anticipate increasing application of the zebrafish model for biomaterial evaluation in the near future. Statement of significance This review aims to evaluate the potential application and suitability of the zebrafish model in the development of biomaterials and drug delivery systems. It creates scientific impact and interest because replacement models are desirable to the society and the scientific community. The continuous development of biomaterials calls for the need to provide solutions for biological testing. This review covers the topic of how the FET model can be applied to evaluate biocompatibility. Further, it explores the zebrafish from the wild-type to the mutant form, followed by a discussion about the ethical considerations and concerns when using the FET model.

Keyword: 3Rs; Zebrafish; FET test; Fish embryo toxicity; High-throughput

139. Platelet-rich plasma incorporated electrospun PVA-chitosan-HA nanofibers accelerates osteogenic differentiation and bone reconstruction/ **Abazari, Mohammad Foad; Nejati, Fatemeh; Nasiri, Navid; Khazeni, Zahra Al Sadat; Nazari, Bahareh; Enderami, Seyed Ehsan; Mohajerani, Hassan.** Gene. ISSN:0378-1119 (2019) v.720 p.144096Gene

DOI: 10.1016/j.gene.2019.144096

Link: <http://www.sciencedirect.com/science/article/pii/S0378111919307553>

Abstract: Biologically active materials and polymeric materials used in tissue engineering have been one of the most attractive research areas in the past decades, especially the use of easily accessible materials from the patients that reduces or eliminates any patient's immune response. In this study, electrospun nanofibrous scaffolds were fabricated by using polyvinyl-alcohol (PVA), chitosan and hydroxyapatite (HA) polymers and platelet-rich plasma (PRP) as a bioactive substance isolated from human blood. Fabricated scaffold's structure and cytotoxicity were evaluated using scanning electron microscope and MTT assays. Scaffolds osteoinductivity was investigated by osteogenic differentiation of the mesenchymal stem cells (MSCs) at the in vitro level and then its osteoconductivity was examined by implanting at the critical-sized rat calvarial defect. The in vitro results showed that scaffolds have a good structure and good biocompatibility. Alkaline phosphatase activity, calcium content and gene expression assays were also demonstrated that their highest amount was detected in MSCs-seeded PVA-chitosan-HA(PRP) scaffold. For this reason, this scaffold alone and along with the MSCs was implanted to the animal defects. The in vivo results demonstrated that in the animals implanted with PVA-chitosan-HA(PRP), the defect was repaired to a good extent, but in those animals that received MSCs-seeded PVA-chitosan-HA(PRP), the defects was almost filled. It can be concluded that, PVA-chitosan-HA(PRP) alone or when stem cells cultured on them, has a great potential to use as an effective bone implant.

Keyword: Mesenchymal stem cells; Bone regeneration; Critical-sized rat calvarial defect; Platelet rich plasma; Polyvinyl alcohol-chitosan-hydroxyapatite

140. Using poly(β -hydroxybutyrate- β -hydroxyvalerate) as carbon source in biofloc-systems: Nitrogen dynamics and shift of *Oreochromis niloticus* gut microbiota/ **Liu, Gang; Deng, Yale; Verdegem, Marc; Ye, Zhangying; Zhu, Songming.** Science of The Total Environment. ISSN:0048-9697 (2019) v.694 p.133664Science of The Total Environment

DOI: 10.1016/j.scitotenv.2019.133664

Link: <http://www.sciencedirect.com/science/article/pii/S0048969719335909>

Abstract: Inorganic-nitrogen removal is essential for the sustainable operation of aquaculture industry and also influences the health of aquatic animals, which may be accomplished by utilizing biofloc technology. In this paper, we studied the use of three different carbon sources 1) longan seed powder (LP), 2) Poly(β -hydroxybutyrate- β -hydroxyvalerate) (PHBV) and 3) synthesized PHBV and LP (PHBVL) in biofloc systems for 90days to investigate the nitrogen dynamics and gut microbiota of Nile tilapia (*Oreochromis niloticus*). The PHBVL and PHBV groups had higher total inorganic-nitrogen removal efficiencies ($70.99 \pm 19.45\%$ and $63.54 \pm 19.44\%$) than the LP group ($35.02 \pm 11.21\%$), which had an accumulation of nitrate. Meanwhile, the biofloc in PHBVL and PHBV group generally had a higher amino acid composition, particularly for methionine and lysine, but was not reflected in the tilapia muscle. High-throughput sequencing indicated that the different carbohydrates shaped different bacterial community compositions in the fish gut after exposure in the three environments for 90-day. These differences, which resulted in different gut digestive enzyme activities (amylase, lipase and trypsin), and growth performance, which the food conversion ratio in the PHBVL group was lower than LP and PHBV group, the final body weight in PHBVL group was average 4.33% and 3.65% bigger than in LP and PHBV group. Network analysis revealed that the keystone taxa (90.33%) were Proteobacteria, Chloroflexi, Actinobacteria, Planctomycetes, Verrucomicrobia and Bacteroidetes, which relative abundance varied in the fish gut in the three groups. The experiment verified the feasibility and advantage to use biodegradable polymers (BDPs) as carbohydrates for biofloc systems.

Keyword: Gut microbiota; Biodegradable polymers (BDPs); Biofloc system; Carbohydrate; Nitrogen dynamic

141. Genetic parameters for resistance to *Aeromonas hydrophila* in the Neotropical fish pacu (*Piaractus mesopotamicus*)/ **Mastrochirico-Filho, Vito A.; Ariede, Raquel B.; Freitas, Milena V.; Lira, Lieschen V.G.; Agudelo, John F.G.; Pilarski, Fabiana; Reis Neto, Rafael V.; Yáñez, José M.; Hashimoto, Diogo T..** Aquaculture. ISSN:0044-8486 (2019) v.513 p.734442Aquaculture

DOI: 10.1016/j.aquaculture.2019.734442

Link: <http://www.sciencedirect.com/science/article/pii/S0044848619313754>

Abstract: Pacu (*Piaractus mesopotamicus*) is one of the main farmed freshwater fish species of South America. Disease outbreaks caused by *Aeromonas hydrophila* are considered one of the major bottlenecks for the development of pacu production. Genetic selection for disease resistance may represent a sustainable and effective alternative to reduce mortality and, therefore, improve productive performance of pacu. To verify whether *A. hydrophila* resistance can be included in genetic selection programs, the estimation of genetic parameters is needed. The aim of this study was to estimate variance components and heritability for *A. hydrophila* resistance in pacu, through experimental challenge performed in 36 full-sib families, resulting in the analysis of 1094 individuals. During 14 days of challenge, survival rate (TS) and time of death (TD) of fish presenting clinical signs of *A. hydrophila* infection were recorded. No influence of weight on TS or TD was detected. Genetic data were analyzed with two different univariate animal models using TS and TD. The total cumulative TS varied considerably among families (0 to 65.5%),

which indicated a significant phenotypic variation related to resistance to *A. hydrophila* infection. TD ranged from 313 to 14,846 min, with an average of 1722 ± 1476 min. Low values for heritability were found for TS and TD (0.15 ± 0.05 and 0.12 ± 0.05 , respectively). Our results represent the first report of genetic parameters for disease resistance in a Neotropical fish species and indicate that resistance against *A. hydrophila* in pacu might be improved through selection breeding.

Keyword: Heritability; Animal breeding; Disease resistance; Aeromoniosis

142. The novel caprine parainfluenza virus type 3 showed pathogenicity in Guinea pigs/ **Hao, Fei; Wang, Zhongyu; Mao, Li; Yang, Leilei; Zhang, Wenwen; Li, Jizong; Wang, Xuyuan; Li, Wenliang; Jiang, Jieyuan.** Microbial Pathogenesis. ISSN:0882-4010 (2019) v.134 p.103569 Microbial Pathogenesis

DOI: 10.1016/j.micpath.2019.103569

Link: <http://www.sciencedirect.com/science/article/pii/S0882401019307399>

Abstract: Caprine parainfluenza virus type 3 (CPIV3) is one of the important viral respiratory tract agents in goats. The pathogenicity of CPIV3 has been examined in goats but it has not been explored in other laboratory animals. In the present study, an experimental infection of guinea pigs with CPIV3 was performed. The virus-inoculated guinea pigs displayed clinical signs related to the respiratory disease at 2–12 days post inoculation (dpi). Five infected guinea pigs died during 2 and 7 dpi. Apparent gross pneumonic lesions including consolidation and congestion in one or more lung lobes were observed in necropsied and dead animals. Histo-pathological changes in lungs including expansions of the alveolar interstitium, congestion, macrophage infiltration and compensatory emphysema were also observed. Virus was detectable at 2–10 dpi, 2–10 dpi and 2–7 dpi, as detected by virus isolation, real-time RT-PCR and immunohistochemistry staining, respectively. Viremia was also confirmed after CPIV3 infection during 3–7 dpi. The severe pathological lesions and highest viral load were observed before 7 dpi. Viral specific hemagglutination inhibition and neutralizing antibodies were produced from 7 dpi and 10 dpi, respectively, which related to the clearance of virus. The results present here indicated that guinea pig could be an ideal laboratory animal model for CPIV3 studies in the future.

Keyword: Pathogenicity; Caprine parainfluenza virus type 3; Guinea pigs; Respiratory disease

143. Telmisartan use in rats with preexisting osteoporotics bone disorders increases bone microarchitecture alterations via PPAR γ / **Birocale, Antonio Marcos; Ferreira de Melo, Antonio; Peixoto, Pollyana; Costalonga Oliveira, Phablo Wendell; Gonçalves Ruffoni, Leandro Dias; Takayama, Liliam Masako; Nogueira, Breno Valentim; Nonaka, Keico Okino; Rodrigues Pereira, Rosa Maria; Martins de.** Life Sciences. ISSN:0024-3205 (2019) v.237 p.116890 Life Sciences

DOI: 10.1016/j.lfs.2019.116890

Link: <http://www.sciencedirect.com/science/article/pii/S0024320519308173>

Abstract: Aims Telmisartan (TEL), an angiotensin II type I receptor blocker and PPAR γ partial agonist, has been used for to treat hypertension. It is known that PPAR γ activation induces bone loss. Therefore, we evaluate the effects of telmisartan on PPAR γ protein expression, biomechanics, density and bone microarchitecture of femurs and lumbar vertebrae in SHR ovariectomized animals, a model of hypertension in which preexisting bone impairment has been

demonstrated. Main methods SHR females (3 months old) were distributed into four groups: sham (S), sham + TEL (ST), OVX (C) and OVX + TEL (CT). TEL (5 mg/kg/day) or vehicle were administered according to the groups. After the protocol, blood pressure was measured and density, microarchitecture and biomechanics of bone were analyzed. Western blotting analysis was performed to evaluate PPAR γ protein expression in the bones. Key findings Castration induced a deleterious effect on mineral density and trabecular parameters, with telmisartan enhancing such effects. Telmisartan increased PPAR γ levels, which were at their highest when the treatment was combined with castration. As to biomechanical properties, telmisartan reduced the stiffness in the castration group (CT vs. S or C group), as well as resilience and failure load in ST group (vs. all others groups). Significance These results demonstrated that telmisartan compromised bone density and microarchitecture in animals that shows preexisting osteoporotic bone disorders, probably via mechanisms associated with increased PPAR γ . If this translates to humans, a need for greater caution in the use of telmisartan by patients that have preexisting bone problems, as in the postmenopausal period, may be in order.

Keyword: Ovariectomy; Hypertension; Bone; PPAR γ ; Telmisartan

144. A hypercaloric diet induces hepatic oxidative stress, infiltration of lymphocytes, and mitochondrial reshuffle in *Psammomys obesus*, a murine model of insulin resistance/ **Sihali-Beloui, Ouahiba; Aroune, Djamila; Benazouz, Fella; Hadji, Adile; El-Aoufi, Salima; Marco, Sergio.** *Comptes Rendus Biologies.* ISSN:1631-0691 5(2019) v.342 p.209-219 *Comptes Rendus Biologies*

DOI: 10.1016/j.crv.2019.04.003

Link: <http://www.sciencedirect.com/science/article/pii/S1631069119300411>

Abstract: The aim of this study was to show, for the first time, the effect of a hypercaloric diet on the mitochondrial reshuffle of hepatocytes during the progression from steatosis to steatohepatitis to cirrhosis in *Psammomys obesus*, a typical animal model of the metabolic syndrome. Metabolic and oxidative stresses were induced by feeding the animal through a standard laboratory diet (SD) for nine months. Metabolic parameters, liver malondialdehyde (MDA) and glutathione (GSH), were evaluated. The pathological evolution was examined by histopathology and immunohistochemistry, using CD3 and CD20 antibodies. The dynamics of the mitochondrial structure was followed by transmission electron microscopy. SD induced a steatosis in this animal that evolved under the effect of oxidative and metabolic stress by the appearance of adaptive inflammation and fibrosis leading the animal to the cirrhosis stage with serious hepatocyte damage by the triggering, at first the mitochondrial fusion–fission cycles, which attempted to maintain the mitochondria intact and functional, but the hepatocellular oxidative damage was increased inducing a vicious circle of mitochondrial alteration and dysfunction and their elimination by mitophagy. *P. obesus* is an excellent animal model of therapeutic research that targets mitochondrial dysfunction in the progression of steatosis. **Résumé** Le but de cette étude était de montrer, pour la première fois, l'effet du régime hypercalorique sur le remaniement mitochondrial des hépatocytes au cours de l'évolution de la stéatose vers la stéatohépatite jusqu'à la cirrhose chez *Psammomys obesus*, un modèle animal typique du syndrome métabolique. Le stress métabolique et oxydatif a été induit en nourrissant l'animal par un régime de laboratoire standard (RS) pendant neuf mois. Les paramètres métaboliques, les dosages du malondialdéhyde (MDA) et de glutathion (GSH) hépatiques ont été évalués. L'évolution pathologique a été examinée par histopathologie et par immunohistochimie, en utilisant les anticorps CD3 et CD20. La dynamique de la structure mitochondriale a été suivie par microscopie électronique à transmission. Le RS a induit chez cet animal une stéatose qui a évolué, sous l'effet du stress oxydatif et métabolique dû à l'apparition de l'inflammation adaptative et de la fibrose, conduisant l'animal au stade cirrhose avec de sérieuses détériorations hépatocytaires par le déclenchement, d'abord, de cycles de fusion et de fission mitochondriales qui tentaient de maintenir les mitochondries intactes et fonctionnelles, mais ensuite les dommages

oxydatifs hépatocellulaires ont été accrus, induisant un cercle vicieux d'altération et de dysfonctionnement mitochondrial et leur élimination par mitophagie. P. obesus constitue un excellent modèle animal pour la recherche thérapeutique qui cible le dysfonctionnement mitochondrial dans la progression de la stéatose.

Keyword: Oxidative stress; Adaptive inflammation; Dynamique mitochondriale; Inflammation adaptative; Lésions hépatiques; Liver injury; Mitochondrial dynamics; Stress oxydatif

145. Assessing the citizen science approach as tool to increase awareness on the marine litter problem/ **Locritani, M.; Merlino, S.; Abbate, M.** Marine Pollution Bulletin. ISSN:0025-326X (2019) v.140 p.320-329Marine Pollution Bulletin

DOI: 10.1016/j.marpolbul.2019.01.023

Link: <http://www.sciencedirect.com/science/article/pii/S0025326X19300335>

Abstract: This paper provides a quantitative assessment of students' attitude and behaviors towards marine litter before and after their participation to SEACleaner, an educational and citizen science project devoted to monitor macro- and micro-litter in an Area belonging to "Pelagos Sanctuary" (Mediterranean Sea). This approach produced interesting outcomes both for the research sector of marine pollution and environmental monitoring, as well for the scientific and environmental education. Here we focus on citizen science as an effective vector for raising young people awareness of marine litter and fostering sound behaviors. A specially designed questionnaire was administered to 87 High School students, to test the validity of such approach. The results state that the students change quantitatively their perception of beach-litter causes and derived problems, and they improved their knowledge about the main marine litter sources and the role of the sea in the waste transport and deposition along the coast.

Keyword: Citizen science; Assessment; Anthropogenic marine debris; Mediterranean Sea; SEACleaner

146. Isolation and characterization of a germ cell marker in teleost fish *Colossoma macropomum*/ **Vasconcelos, Ana Carina Nogueira; Streit, Danilo Pedro; Octavera, Anna; Miwa, Misako; Kabeya, Naoki; Freitas Garcia, Raycon Roberto; Rotili, Daniel Antonio; Yoshizaki, Goro.** Gene. ISSN:0378-1119 (2019) v.683 p.54-60Gene

DOI: 10.1016/j.gene.2018.10.027

Link: <http://www.sciencedirect.com/science/article/pii/S0378111918310618>

Abstract: The native Amazonian fish tambaqui (*Colossoma macropomum*) is the second-largest scaled fish in South America and the most common native species in Brazil. To preserve genetic resources with sufficient genetic diversity through germ cell cryopreservation and transplantation techniques, a molecular marker for identifying the cells is required to trace them during the manipulation processes. The vasa gene is a promising candidate, as its specific expression in germ cell lineage has been well-conserved throughout animal evolution. In this study, the full sequence of the vasa cDNA homolog from tambaqui was isolated and characterized, showing an open reading frame of 2010 bp encoding 669 amino acids. The putative protein was shown to contain eight conserved motifs of the DEAD-box protein family and high similarity to vasa homologs of other species. Tambaqui vasa (tvasa) mRNA expression was specific to the gonads, and in situ hybridization showed signals only in oocytes and spermatogonia. The results suggested that tvasa could be a useful germ cell marker in this species.

Keyword: Oocytes; Germ cells; Spermatogonia; Vasa

147. Arbutin attenuates cognitive impairment and inflammatory response in pentylenetetrazol-induced kindling model of epilepsy/ **Ahmadian, Seyed Raheleh; Ghasemi-Kasman, Maryam; Pouramir, Mahdi; Sadeghi, Farzin.** Neuropharmacology. ISSN:0028-3908 (2019) v.146 p.117-127Neuropharmacology

DOI: 10.1016/j.neuropharm.2018.11.038

Link: <http://www.sciencedirect.com/science/article/pii/S0028390818306257>

Abstract: Arbutin as a natural soluble glycosylated phenol possesses a wide range of pharmacological activities including anti-inflammatory and anti-oxidant effects. The present study was designed to evaluate the effect of arbutin supplementation on seizures behavior, memory performance, glial activation, release of inflammatory factors and neuroprotection in pentylenetetrazole-induced kindling model. Chemical kindling was induced by repetitive injections of PTZ at subconvulsive doses (36 mg/kg). Arbutin at doses of 25 or 50 mg/kg was administrated intraperitoneally (i.p.), 10 days before PTZ injection and its application was continued 1 h before each PTZ injection. High performance liquid chromatography (HPLC) analysis was performed to measure the arbutin content in hippocampus. After monitoring the behavioral signs of seizures, Morris water maze task was used to assess the spatial learning and memory of animals. Gene expression analysis was carried out to evaluate the effect of arbutin on expression of inflammatory mediators and astrocyte activation. Furthermore, immunostaining was used to assess the protein levels of astrocytes and neurons in hippocampus. The results of HPLC analysis showed that high amount of arbutin can be detected in hippocampus of arbutin + PTZ receiving animals. The seizure behavioral manifestations and memory dysfunction were reduced by arbutin in a dose-dependent manner. The mRNA levels of TNF- α , IL-6 and GFAP were significantly downregulated in animals treated by arbutin. Additionally, the levels of astrocytes activation and neuronal damage were attenuated in arbutin treated animals. These results suggest that arbutin attenuates glial activation, memory impairment and release of inflammatory mediators in model of chronic epilepsy.

Keyword: Neuroprotection; Pentylenetetrazole; arbutin; Glial activation; Inflammatory mediators; Spatial learning and memory

148. Differential effect of modafinil on impulsivity, attention and motor activity in preadolescent rats prenatally treated with alcohol/ **Gomez-Ordoñez, Daisy; Juárez, Jorge.** Brain Research. ISSN:0006-8993 (2019) v.1722 p.146395Brain Research

DOI: 10.1016/j.brainres.2019.146395

Link: <http://www.sciencedirect.com/science/article/pii/S0006899319304494>

Abstract: The purpose of the present research was to study the effect of different doses of modafinil (0, 10, 30 and 60 mg/kg) on reactive impulsivity, attention and hyperactivity in male Wistar rats treated with prenatal alcohol (PA), treatment that produces an alteration in dopaminergic (DA) neurons. The control rats were treated prenatally with sucrose (PS). Animals with PA were less efficient, more impulsive, and inattentive compared to PSs, in a Go-Signal-Task paradigm. The results indicated that a dose of 30 mg/kg of modafinil increased the number of correct responses in the task; decreased impulsivity and did not affect the attention in the PA animals. In contrast, in the PS animals the doses of 30 and 60 mg/kg of modafinil decreased the number of correct responses and increased the impulsivity. Inattention was only increased with 30 mg/kg in PS animals. Hyperactivity increased with a dose-response effect of

modafinil in the PS group; meanwhile, this behavior increased only with the dose of 60 mg/kg in the PA group. A moderate dose of modafinil had beneficial effects on behaviors that are altered in animals with a dysfunction of the dopaminergic system; on the other hand, it has a deleterious effect on these behaviors in healthy animals, which suggests that it is due to the predominance of the psychostimulant effect of this drug. The main target of modafinil is the DA system, thus, the data suggest that this system has an important role in impulsive behavior and hyperactivity.

Keyword: Hyperactivity; Impulsivity; Inattention; Modafinil; Prenatal alcohol

149. BrdU-induced hyperlocomotion in the stroked rat/ **Cooperrider, Jessica; Chan, Hugh H.; Gale, John T.; Park, Hyun-Joo; Baker, Kenneth B.; Machado, Andre G..** Neuroscience Letters. ISSN:0304-3940 (2019) v.703 p.96-98Neuroscience Letters

DOI: 10.1016/j.neulet.2019.03.007

Link: <http://www.sciencedirect.com/science/article/pii/S0304394019301533>

Abstract: 5-bromo-2'-deoxyuridine (BrdU) is often used in neuroscience research as a marker of newly-divided cells. However, several studies suggest that BrdU can produce unwanted side effects, including changes in animal behavior and cellular function. In this study, we investigated the effect of BrdU injections on locomotor behavior in a rodent model of ischemic stroke. Ischemic strokes were induced in adult rats, and 50 mg/kg BrdU was intraperitoneally injected over 5 days beginning 2 weeks post-stroke, while control animals received vehicle. Locomotor activity was evaluated by videotaping the rats in their home cages for 30 min, beginning one hour after BrdU injection. BrdU-injected rats showed a nearly three-fold increase in locomotor activity compared to control animals. These findings suggest that BrdU induces a hyperlocomotor effect in rats following brain injury, pointing to the need for caution when interpreting behavioral results in such studies.

Keyword: BrdU; Bromodeoxyuridine; Ischemia; Neurogenesis; Neurorehabilitation

150. Is tail biting in growing pigs reduced by a prolonged suckling period?/ **Naya, Ashley; Traulsen, Imke; Gertz, Marvin; Hasler, Mario; Burfeind, Onno; große Beilage, Elisabeth; Krieter, Joachim.** Applied Animal Behaviour Science. ISSN:0168-1591 (2019) v.211 p.41-46Applied Animal Behaviour Science

DOI: 10.1016/j.applanim.2018.10.020

Link: <http://www.sciencedirect.com/science/article/pii/S0168159118303083>

Abstract: It was the aim of the study to investigate the effect of a prolonged suckling period and group housing before weaning on tail biting in undocked nursery pigs. To do this, experiments with three treatment groups were investigated. In the first group, pigs were conventionally housed in pens with farrowing crates for a four-week suckling period (SH-4). In the second group, suckling was prolonged to five weeks whereas housing was the same as in the first group (SH-5). The animals of the third group were kept in a group housing system for six sows and their piglets during a five-week suckling period (GH-5). At weaning, piglets were moved to conventional rearing pens in which two litters of the same treatment group were mixed together. Scoring of tail lesions and tail losses was carried out once a week from birth to end of rearing at the level of the individual animal. Significant effects on tail lesions were found for week after weaning ($p < 0.001$), and interaction of batch and treatment group ($p < 0.001$). Tail losses

were also significantly affected by the interaction of batch and treatment group ($p < 0.001$). In conclusion, batch had a stronger effect on tail biting than treatment group did and no clear statement about the relation between treatment group and tail biting can be made.

Keyword: Pigs; Weaning; Group housing; Suckling period; Tail biting

151. Comparison of telomere lengths in leukocytes and in nasal and vaginal epithelial cells from Water Buffaloes (*Bubalus bubalis*) of different ages/ **Seibt, Katharina D.; Häussler, Susanne; Vecchio, Domenico; DeCarlo, Esterina; Ceciliani, Fabrizio; Sauerwein, Helga.** Research in Veterinary Science. ISSN:0034-5288 (2019) v.124 p.328-333Research in Veterinary Science

DOI: 10.1016/j.rvsc.2019.04.013

Link: <http://www.sciencedirect.com/science/article/pii/S003452881930061X>

Abstract: Telomeres are short and repetitive sequences at the ends of linear chromosomes which shorten with every cell-division in vitro. Telomere length (TL) is reported to decrease with age and stress. The domesticated water buffalo (*Bubalus bubalis*) is the second most important milk producing animal worldwide. The productive lifespan of water buffalo cows is reported to be longer than that of dairy cows (*Bos taurus*). With this background, we aimed to compare TL in leukocytes obtained from blood samples from water buffaloes across different ages. In addition, we tested the suitability of assessing TL in DNA derived from nasal and vaginal epithelial cells via swabs as potential non-invasive alternatives to blood sampling. Samples were collected from 20 calves (3 months of age), 20 heifers (2 years old), 20 cows (1st lactation, 3 years old), and 13 cows (3rd lactation, about 5 years old). We found that TL in leukocytes from water buffalo calves, heifers, and from cows in their first lactation was not different, but shorter telomeres were observed in cows in their third lactation. The results thus support an age-dependent decrease of TL in water buffaloes. Leukocyte TL was weakly correlated with TL measured in DNA from nasal epithelial cells ($r = 0.327$; $P = .025$), but not with TL from vaginal epithelial cells. Due to the poor correlation between epithelial cell and leukocyte TL and to the difficulties with collecting nasal swabs, we conclude that they are no suitable alternatives to blood samples for telomere studies in water buffaloes.

Keyword: Leukocytes; Nasal swabs; Telomere length; Vaginal swabs; Water buffaloes

152. Adaptation of a skin sensitization assay to a chemically defined culture/ **Marigliani, Bianca; Silva, Josemar Vinícius Maiworm Abreu; Balottin, Luciene Bottentuit López; Silva, Karina Ribeiro; Baptista, Leandra Santos; Campos, Claudia Barbosa Ladeira de; Augusto, Elisabeth de Fatima Pires.** Toxicology in Vitro. ISSN:0887-2333 (2019) v.57 p.145-153Toxicology in Vitro

DOI: 10.1016/j.tiv.2018.12.004

Link: <http://www.sciencedirect.com/science/article/pii/S0887233318304107>

Abstract: There are currently three in vitro methods adopted by the Organization for the Economic Co-operation and Development for testing chemicals based on the third key event of the skin sensitization adverse outcome pathway, the activation of dendritic cells. All of them use culture medium supplemented with fetal bovine serum (FBS), which brings technical disadvantages and animal welfare concerns. The objective of this study was to analyze the possibility of eliminating the use of FBS in the human Cell Line Activation Test (h-CLAT). After successful implementation of the

h-CLAT using THP-1 cells cultured in FBS-containing medium, several attempts to adapt THP-1 cells to four different serum-free media were made. The best results were obtained with gradual adaptation to RPMI-1640 medium with HL-1™ Supplement and to X-VIVO™ 10. Adapted cells were cryopreserved and submitted to the reactivity check. After being approved, they were used in dose finding and proficiency assays. Despite minor adjustments in the original protocol, it was possible to correctly predict the sensitizing potential of the ten proficiency substances using THP-1 cells adapted to X-VIVO™ 10, which indicates that it is possible to eliminate the use of FBS in the h-CLAT, using a chemically defined medium.

Keyword: techniques; Animal use alternatives; Culture media, serum-free; Dermatitis, allergic contact; Toxicity tests

153. Establishment of a rodent cooperation assay as a model of social cognition/ **Kozma, Kata; Kassai, Ferenc; Ernyey, Aliz J.; Gyertyán, István.** Journal of Pharmacological and Toxicological Methods. ISSN:1056-8719 (2019) v.97 p.44-51Journal of Pharmacological and Toxicological Methods

DOI: 10.1016/j.vascn.2019.03.003

Link: <http://www.sciencedirect.com/science/article/pii/S1056871918307603>

Abstract: Introduction Impaired cooperative skills form a characteristic symptom in autism, which lacks adequate treatment. The objective of this study was to establish a rat cooperation assay which fits the feasibility and capacity requirements of drug development. Methods Long-Evans and Lister Hooded rats were trained in pairs to simultaneously perform nose-pokes (within 1 s) for reward in a Skinner box equipped with two nose-poke modules. Conditioning took place first with naive-naive pairs, then with naive-experienced and finally with experienced-experienced pairs, when the task was familiar for both rats. In a control experiment, experienced Lister-hooded pairs were tested under the learnt schedule but without the possibility to communicate with each other. Results Rats were able to learn the task in 8–15 sessions. Experienced-experienced Long-Evans pairs completed the training significantly faster than the other pairs Analysis of the nose-poke latency data, sample video-recordings and the significantly decreased performance of rats in the control experiment suggested that the animals solved the task via real cooperation. Discussion The newly developed rat cooperation model is quick and has sufficiently high throughput, therefore it may be used in the drug development of putative social cognitive enhancer compounds.

Keyword: Animal model; Cooperation; Autism; Methods; Drug testing; Skinner box; Theory of mind

154. Voluntary exercise reduces both chemotherapy-induced neuropathic nociception and deficits in hippocampal cellular proliferation in a mouse model of paclitaxel-induced peripheral neuropathy/ **Slivicki, Richard A.; Mali, Sonali S.; Hohmann, Andrea G..** Neurobiology of Pain. ISSN:2452-073X (2019) v.6 p.100035Neurobiology of Pain

DOI: 10.1016/j.ynpai.2019.100035

Link: <http://www.sciencedirect.com/science/article/pii/S2452073X19300108>

Abstract: Chemotherapy-induced peripheral neuropathy (CIPN) is a common dose-limiting side-effect of all major chemotherapeutic agents. Here, we explored efficacy of voluntary exercise as a nonpharmacological strategy for suppressing two distinct adverse side effects of chemotherapy treatment. We evaluated whether voluntary running would suppress both neuropathic pain and deficits in hippocampal cell proliferation in a mouse model of CIPN

induced by the taxane chemotherapeutic agent paclitaxel. Mice were given free access to running wheels or were housed without running wheels during one of three different intervention phases: 1) during the onset (i.e. development phase) of paclitaxel-induced neuropathy, 2) prior to dosing with paclitaxel or its vehicle, or 3) following the establishment (i.e. maintenance phase) of paclitaxel-induced neuropathy. Paclitaxel treatment did not alter running wheel behavior relative to vehicle-treated animals in any study. Animals that engaged in voluntary running during the development phase of paclitaxel-induced neuropathy failed to display mechanical or cold hypersensitivities relative to sedentary control animals that did not have access to running wheels. A prior history of voluntary running delayed the onset of, but did not fully prevent, development of paclitaxel-induced neuropathic pain behavior. Voluntary running reduced already established mechanical and cold allodynia induced by paclitaxel. Importantly, voluntary running did not alter mechanical or cold responsivity in vehicle-treated animals, suggesting that the observed antinociceptive effect of exercise was dependent upon the presence of the pathological pain state. In the same animals evaluated for nociceptive responding, paclitaxel also reduced cellular proliferation but not cellular survival in the dentate gyrus of the hippocampus, as measured by immunohistochemistry for Ki67 and BrdU expression, respectively. Voluntary running abrogated paclitaxel-induced reductions in cellular proliferation to levels observed in vehicle-treated mice and also increased BrdU expression levels irrespective of chemotherapy treatment. Our studies support the hypothesis that voluntary exercise may be beneficial in suppressing both neuropathic pain and markers of hippocampal cellular function that are impacted by toxic challenge with chemotherapeutic agents.

Keyword: Exercise; Environmental enrichment; Neuropathic pain; Chemotherapy; Hippocampal cellular proliferation; Paclitaxel

155. Association of two single nucleotide polymorphisms in the calpastatin gene with tenderness under varying lengths of meat ageing in two native Spanish cattle breeds/ **Iguácel, Laura Pilar; Calvo, Jorge Hugo; Casasús, Isabel; Serrano, Malena; Ripoll, Guillermo; Sarto, Pilar; Villalba, Daniel; Blanco, Mireia.** *Livestock Science*. ISSN:1871-1413 (2019) v.230 p.103820 *Livestock Science*

DOI: 10.1016/j.livsci.2019.103820

Link: <http://www.sciencedirect.com/science/article/pii/S187114131930304X>

Abstract: The objective of this study was to validate the effect of the SNPs rs210072660 and rs109221039 of the calpastatin (CAST) gene on meat toughness in Longissimus thoracis muscle aged for 1 d (± 0 ; short-term ageing), 8 d (± 1 ; medium-term ageing) and 15 d (± 2 ; long-term ageing). The samples were obtained in experiments with different management strategies in Parda de Montaña (grazing and concentrate-fed bulls, grazing steers, and steers finished on a total mixed ration) and Pirenaica (concentrate-fed bulls, steers and heifers, and steers on a total mixed ration) cattle. In the Parda de Montaña breed, the Warner-Bratzler Shear Force (WBSF) was similar among management strategies under short-term aging, but it was lower for concentrate-fed bulls than for grazing bulls under medium-term and long-term aging ($P < 0.05$), presenting both groups of forage-fed steers intermediate values. Similarly, there were no differences in the short-term ageing, but there were differences observed thereafter in the Pirenaica breed. Regarding the effect of SNPs of CAST in the Parda de Montaña breed, WBSF was only affected by the interaction between the SNP rs210072660 and ageing ($P < 0.05$). Shear force did not differ among genotypes ($P > 0.05$) under short-term ageing, but the GG genotype had 14–16% greater WBSF than the GA and AA genotypes under medium-term ageing ($P < 0.001$), and a trend was found under long-term ageing ($P = 0.07$). In Pirenaica, WBSF was only affected by SNP rs109221039 ($P < 0.001$). The GG genotype showed higher WBSF than the GA and AA genotypes under medium-term and long-term ageing ($P < 0.01$). Haplotype analyses confirmed the association results. In the Parda de Montaña breed, animals carrying no copies of haplotype AA had a greater WBSF under medium-term ageing than animals with 1 or 2 copies of this haplotype ($P < 0.05$). In the AG haplotype, animals with 0 copies of this

haplotype had greater toughness than animals with 1 copy ($P < 0.05$). In Pirenaica breed, animals with 2 copies of the GG haplotype had greater toughness than animals with 1 or 2 copies in both ageing periods ($P < 0.001$). These findings suggest that SNPs rs210072660 and rs109221039 could be useful markers for effective marker-assisted selection to increase meat tenderness in the Parda de Montaña and Pirenaica breeds, respectively.

Keyword: Management; Beef; Shear force; CAST; Parda de Montaña; Pirenaica

156. Invited review: Dairy proteins and bioactive peptides: Modeling digestion and the intestinal barrier/ **Giromini, Carlotta; Cheli, Federica; Rebucci, Raffaella; Baldi, Antonella.** Journal of Dairy Science. ISSN:0022-0302 2(2019) v.102 p.929-942Journal of Dairy Science

DOI: 10.3168/jds.2018-15163

Link: <http://www.sciencedirect.com/science/article/pii/S0022030218311512>

Abstract: ABSTRACT Dairy products are one of the most important sources of biologically active proteins and peptides. The health-promoting functions of these peptides are related to their primary structure, which depends on the parent protein composition. A crucial issue in this field is the demonstration of a cause-effect relationship from the ingested protein form to the bioactive form in vivo. Intervention studies represent the gold standard in nutritional research; however, attention has increasingly been focused on the development of sophisticated in vitro models of digestion to elucidate the mechanism of action of dairy nutrients in a mechanistic way and significantly reduce the number of in vivo trials. On the other hand, the epithelial intestinal barrier is the first gate that actively interacts with digestion metabolites, making the intestinal cells the first target tissue of dairy nutrients and respective metabolites. An evolution of the in vitro digestion approach in the study of dairy proteins and derived bioactive compounds is the setup of combined in vitro digestion and cell culture models taking into consideration the endpoint to measure the target organism (e.g., animal, human) and the key concepts of bioaccessibility, bioavailability, and bioactivity. This review discusses the relevance and challenges of modeling digestion and the intestinal barrier, focusing on the implications for the modeling of dairy protein digestion for bioactivity evaluation.

Keyword: bioactive peptide; dairy protein; in vitro digestion; intestinal cell

157. Identification of signal pathways for immunotoxicity in the spleen of common carp exposed to chlorpyrifos/ **Xing, Houjuan; Chen, Jianqing; Peng, Muqiao; Wang, Zhilei; Liu, Feng; Li, Shu; Teng, Xiaohua.** Ecotoxicology and Environmental Safety. ISSN:0147-6513 (2019) v.182 p.109464Ecotoxicology and Environmental Safety

DOI: 10.1016/j.ecoenv.2019.109464

Link: <http://www.sciencedirect.com/science/article/pii/S014765131930795X>

Abstract: Chlorpyrifos (CPF) is an environmental pollutant due to its high toxicity to aquatic animals. Because CPF was detected in aquatic environments in many countries, it has been widely concerned by researchers. Although the immunotoxicity of CPF to fish had been reported, the immunotoxicity mechanism is still not clear. Recently, transcriptome analysis has become a major method to study the toxic mechanism of pollutants in environmental toxicology. However, the immunotoxicity identification of CPF on fish had not been reported by transcriptome analysis. In the present study, we examined the effects of CPF on organismal system in the spleen of common carp by transcriptome analysis. We have successfully constructed a database of transcriptome analysis of carp spleens

under exposure to CPF and found 773 differentially expressed genes (DEGs) (including 498 up-regulated DEGs and 275 down-regulated DEGs) and 4 branches (containing 33 known KEGG pathways). Some genes associated with the 4 pathways (Complement and coagulation cascades, PPAR signaling pathway, Fat digestion and absorption, and Collecting duct acid secretion) contained in organismal system were validated by quantitative real-time PCR and showed significant improvement compared with the control group. Our results indicated that exposure to CPF caused a change in the signal pathways of organismal system in carp spleens. The present study provides new insights into the immunotoxicity mechanism and risk assessment of CPF, as well as references for comparative medicine.

Keyword: Fish; Chlorpyrifos; Immunotoxicity mechanism; Organismal system; Signal pathway; Transcriptome analysis

158. Development of Medication-Related Osteonecrosis of the Jaw After Extraction of Teeth With Experimental Periapical Disease/ **Hadaya, Danny; Soundia, Akrivoula; Gkouveris, Ioannis; Dry, Sarah M.; Aghaloo, Tara L.; Tetradis, Sotirios.** Journal of Oral and Maxillofacial Surgery. ISSN:0278-2391 1(2019) v.77 p.71-86Journal of Oral and Maxillofacial Surgery

DOI: 10.1016/j.joms.2018.08.010

Link: <http://www.sciencedirect.com/science/article/pii/S0278239118309741>

Abstract: Purpose Medication-related osteonecrosis of the jaw (MRONJ) is a rare but severe side effect of antiresorptive medications. Most animal models use tooth extraction as an instigating local factor to induce MRONJ, with varied results. However, these teeth are healthy and absent of dental disease, a rare finding that does not reflect clinical practices. The authors hypothesized that extraction of teeth with periapical inflammation would lead to MRONJ in rats treated with high-dose bisphosphonates. Materials and Methods Rats were pretreated with zoledronic acid (ZA) for 1 week. Pulp exposure (PE) was established by exposing the pulpal chamber of the first and second molars. Experimental periapical disease (EPD) was induced by PE and bacterial inoculation into pulp chambers of the first and second mandibular molars. The mandibular molars were extracted 4 weeks after PE or EPD, and animals were euthanized 4 weeks after tooth extraction. Extraction sockets were assessed clinically, radiographically, and histologically. Results Clinically, radiographically, and histologically, socket healing was observed in all vehicle-treated animals and in ZA-treated animals after extraction of healthy teeth or teeth with PE. In contrast, bone exposure, lack of socket healing, and osteonecrosis were present in most ZA-treated animals after extraction of teeth with EPD. Bacterial presence was noted in areas of osteonecrotic alveolar bone. Conclusion These data support a synergistic contribution of severe dental disease and tooth extraction to MRONJ pathogenesis. Importantly, this model is amenable to manipulation of methodologic conditions for the dissection of parameters involved in MRONJ pathogenesis.

Keyword:

159. Resveratrol supplementation improves metabolic control in rats with induced hyperlipidemia and type 2 diabetes/ **Rašković, Aleksandar; Čučuz, Veljko; Torović, Ljilja; Tomas, Ana; Gojković-Bukarica, Ljiljana; Čebović, Tatjana; Milijašević, Boris; Stilinović, Nebojša; Cvejić Hogervorst, Jelena.** Saudi Pharmaceutical Journal. ISSN:1319-0164 7(2019) v.27 p.1036-1043Saudi Pharmaceutical Journal

DOI: 10.1016/j.jsps.2019.08.006

Link: <http://www.sciencedirect.com/science/article/pii/S1319016419301148>

Abstract: Resveratrol was recognized as the major factor responsible for the beneficial properties of red wine. Several resveratrol-based dietary supplements are available, but their efficacy has not been sufficiently tested. This study was designed to examine the effect of resveratrol supplementation, using a commercially available product, on the metabolic status of experimental animals with induced hyperlipidemia or type 2 diabetes mellitus (T2DM). Hyperlipidemia was induced by feeding the rats a standard pellet diet supplemented with cholesterol. T2DM was induced by adding 10% fructose to drinking water and streptozotocin. Treatment with resveratrol-based supplement improved glycemic control in diabetic animals and significantly decreased serum low-density-lipoprotein (LDL) and triglyceride levels, concurrently increasing the high-density-lipoprotein (HDL) levels in animals with hyperlipidemia. Resveratrol-treated animals had improved tolerance to glucose loading. Supplementation did not induce alterations in parameters of liver and renal function. Findings indicate that commercial resveratrol supplement improves metabolic control in rats with induced hyperlipidemia and T2DM.

Keyword: Diabetes; Hyperlipidemia; Resveratrol; Metabolic parameters

160. The effect of Psidium guajava aqueous leaf extract on liver glycogen enzymes, hormone sensitive lipase and serum lipid profile in diabetic rats/ **Tella, Toluwani; Masola, Bubuya; Mukaratirwa, Samson.** Biomedicine & Pharmacotherapy. ISSN:0753-3322 (2019) v.109 p.2441-2446 Biomedicine & Pharmacotherapy

DOI: 10.1016/j.biopha.2018.11.137

Link: <http://www.sciencedirect.com/science/article/pii/S0753332218349576>

Abstract: Diabetes mellitus is characterized by hyperglycaemia that results from defects in insulin secretion or insulin action and is accompanied by general disturbances metabolism. Psidium guajava (PG) leaf is known to have antidiabetic effects that include lowering of blood glucose. The aim of the study was to investigate the effect of PG leaf extract on tissue activity of glycogen synthase (GS) and glycogen phosphorylase (GP); tissue activity of hormone sensitive lipase (HSL); serum lipid profile; and serum enzyme biomarkers of tissue damage. Diabetes was induced in male Sprague-Dawley rats with a single dose of 40 mg/kg body weight streptozotocin. The aqueous extract of PG leaves was used to treat both normal and diabetic animals (400 mg/kg body weight) for 2 weeks while control animals were treated with the vehicle. At the end of the treatment period, blood, liver and adipose tissue samples were collected from the euthanized animals. The results show that PG extract significantly decreased ($P < 0.05$) HSL activity in adipose tissue and liver of diabetic animals which was accompanied by increased glycogen levels, reduced serum triglycerides, total cholesterol, LDL-cholesterol and increased HDL-cholesterol. This study demonstrates that P. guajava has significant anti-diabetic effects that include increased glycogen storage and reduced HSL activity in the liver and adipose tissue with an improved serum lipid profile.

Keyword: Diabetes; Glycogen phosphorylase; Glycogen synthase; Hormone sensitive lipase; Serum lipids

161. Acoustic signalling of aggressive intent in the agonistic encounters of female Asian particoloured bats/ **Zhao, Xin; Jiang, Tinglei; Liu, Heng; Wang, Yuze; Liu, Ying; Feng, Jiang.** Animal Behaviour. ISSN:0003-3472 (2019) v.149 p.65-75 Animal Behaviour

DOI: 10.1016/j.anbehav.2019.01.012

Link: <http://www.sciencedirect.com/science/article/pii/S0003347219300132>

Abstract: The signals of animal aggressive intent can communicate aggression levels to competitors, thereby settling conflicts at an early stage and thus reducing energy costs. We tested whether aggressive vocalizations of female Asian particoloured bats, *Vespertilio sinensis*, encode aggressive intent during agonistic encounters that occur whenever an intruder pushes a resident to obtain a more central roosting spot. Our results showed that the number of noisy/tonal syllables of the disturbed bats met the three criteria used to define aggressive intent. First, the number and ratio of tonal syllables were significantly greater when intruders continued to push, and the number and ratio of noisy syllables were significantly greater when they stopped pushing (context criterion). Second, skin temperature related to emotional arousal during aggressive interaction generally increased when intruders stopped pushing but was unchanged or decreased when they continued pushing (predictive criterion). Finally, bats preferentially selected stimuli with more tonal syllables, and they spent more time approaching more noisy syllables in a two-choice playback experiment (response criterion). Thus, we propose that the number of noisy/tonal syllables within aggressive vocalizations of female Asian particoloured bats functions to signal aggressive intent.

Keyword: aggressive intent; aggressive vocalizations; skin temperature

162. Early medieval diet in childhood and adulthood and its reflection in the dental health of a Central European population (Mikulčice, 9th–10th centuries, Czech Republic)/ **Jílková, Michaela; Kaupová, Sylva; Černíková, Alena; Poláček, Lumír; Brůžek, Jaroslav; Velemínský, Petr.** Archives of Oral Biology. ISSN:0003-9969 (2019) v.107 p.104526Archives of Oral Biology

DOI: 10.1016/j.archoralbio.2019.104526

Link: <http://www.sciencedirect.com/science/article/pii/S0003996919300287>

Abstract: Objectives The aim of this study is to provide a detailed view of dental health in relationship to the diet of the Great Moravian population, with emphasis on childhood diet. Design We studied skeletal samples of the early medieval population of the Mikulčice agglomeration (Czech Republic) originating from the cemetery of the church VI (91 adults). Stable isotope analysis of carbon and nitrogen (intra-individual sampling - tooth and bone) was performed on this material, and dental characteristics (cariou lesions, intensity of caries (I-CE), dental wear, linear enamel hypoplasia) evaluated. Results Isotopic signals obtained from tooth and bone samples of the same individuals differ significantly. Tooth samples show higher $\delta^{13}\text{C}$ and lower $\delta^{15}\text{N}$ than bone samples. $\delta^{15}\text{N}$ in tooth and bone samples is related to socio-economic status. We discovered a relationship between isotopic signals from tooth or bone and intensity of caries and dental wear. Conclusion We provide the first direct information about the diet of the juvenile part of the Great Moravian population from Mikulčice. The diet of children differed from the diet of adults. Children consumed more millet and less animal protein than adults. The social stratification of this population was obvious in dietary composition from childhood. Elites consumed more animal proteins than non-elite individuals. Tooth decay was related to relative consumption of plant and animal proteins. Greater dental wear is related to a diet based on C3 plants. There was no significant connection between diet composition and the formation of enamel hypoplasia.

Keyword: Diet; Cariou lesions; Dental wear; Early medieval population; Linear enamel hypoplasia; Stable isotopes of carbon and nitrogen