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283. Chitosan and anisodamine improve the immune efficacy of inactivated infectious spleen and kidney necrosis virus vaccine in Siniperca chuatsi/ **Zhang, Jiacheng; Fu, Xiaozhe; Zhang, Yanqi; Zhu, Wentao; Zhou, Yong; Yuan, Gailing; Liu, Xiaoling; Ai, Taoshan; Zeng, Lingbing; Su, Jianguo**. Fish & Shellfish Immunology. ISSN:1050-4648 (2019) v.89 p.52-60Fish & Shellfish Immunology

DOI: 10.1016/j.fsi.2019.03.040

Link: http://www.sciencedirect.com/science/article/pii/S1050464819301883

Abstract: Siniperca chuatsi is an economically important fish in China, but infectious spleen and kidney necrosis virus (ISKNV) causes high mortality and significant economic losses. Currently, vaccination is the most promising strategy to prevent infectious diseases, while adjuvant can effectively enhance immune responses. In this study, inactivated ISKNV vaccine was prepared, then poly (I:C), chitosan, anisodamine and ims1312 were used as adjuvants to evaluate the effect on the immune responses and ISKNV replication. Chitosan could strongly boost the protection of liver and spleen tissues by pathological sections. In serum, poly (I:C) and chitosan group had protective effect on catalase, acid phosphatase, blood urea nitrogen. mRNA expressions showed these adjuvants induced the cytokines of early immune responses (TNF-α, Viperin) in both spleen and mesonephron by real time quantitative RT-PCR assays. Meanwhile, poly (I:C), chitosan and anisodamine were significantly improved the antiviral function and inhibited ISKNV replication. Chitosan and anisodamine played a significantly protective role in the immune protective rate test. The results indicated that all the four adjuvants are valid in the inactivated ISKNV vaccine, and chitosan is recommended preferentially. The present study provides reference for other animal vaccine adjuvants.

Keyword: Chitosan; Adjuvant; Anisodamine; ims1312; ISKNV; poly(I:C)

284. Prevalence of bovine trypanosomosis and vector density in a dry season in Gamo-Gofa and Dawuro Zones, Southern Ethiopia/ **Sheferaw, Desie; Abebe, Rahmeto; Fekadu, Amene; Kassaye, Surafel; Amenu, Kebede; Data, Daniel; Geresu, Ephrem; Olbamo, Getachew; Anjulo, Ayele; Yigebahal, Zelalem; Estiphanos, Esayas; Mekuria, Solomon**. Veterinary Parasitology: Regional Studies and Reports. ISSN:2405-9390 (2019) v.18 p.100343Veterinary Parasitology: Regional Studies and Reports

DOI: 10.1016/j.vprsr.2019.100343

Link: http://www.sciencedirect.com/science/article/pii/S2405939018302740

Abstract: Trypanosomosis remains one of the biggest constraints of livestock productivity in sub-Saharan Africa. It is of particular concern in Ethiopia where crop production is largely dependent on animal traction power. This study was conducted between November 2015 and March 2016 to estimate the prevalence of bovine trypanosomosis and vector density in Gamo-Gofa and Dawuro Zones located in Southern Ethiopia. For the entomological survey, a total of 305 NGU traps were deployed for three consecutive days at different positions in the two study areas. For parasitological study, blood samples were collected from 2402 cattle and examined for the presence of trypanosomes by the buffy coat technique (BCT). Blood samples that were positive in the BCT were further tested with Giemsa-stained thin smears for identification of Trypanosoma species. In the entomological survey, a total of 4113 flies were captured of which 1605 (39%) were tsetse flies while 2508 (61%) were other biting flies of the genus Stomoxys and Tabanus. Glossina pallidipes was the only tsetse fly identified in the study areas. The overall mean apparent density of G. pallidipes was 1.8 flies per trap per day (FTD). The overall prevalence of trypanosomosis in the study areas was 5.1% (95% CI: 4.2–6.0); however, it was significantly ($p < 0.001$) higher in Dawuro Zone (10%) than Gamo-Gofa (1.9%). Prevalence was also noted to be significantly ($p < 0.001$) higher in cattle with black coat colour and those with poor

body condition. Trypanosomosis was caused mainly by Trypanosoma congolense (61.8%) and to a lesser extent by T. vivax (28.5%). Mixed infection by the two spp. was seen in 9.8% of the total positive animals. Evaluation of the mean packed cell volume (PCV) of the study animals with infection status revealed a significantly ($p < 0.001$) lower mean PCV in parasitaemic animals (21.5 ± 0.46SE) than aparasitaemic ones (24.3 ± 0.11SE). Generally, the prevalence noted in the current study is moderate. However the observation of such level of infection in a dry season suggests that the disease is still an important constraint of cattle production in the study areas. Thus, we recommend that theexisting parasite and vector control interventions need to be strengthened with special emphasis to Dawuro Zone where the prevalence was significantly higher. As the current sampling was done only once and in a dry season only, further longitudinal studies including all the seasons of the year need to be considered in the future.

Keyword: Prevalence; Vector; Cattle; Trypanosomosis; Dawuro; Ethiopia; Gamo-Gofa

285. Long lasting behavioural effects on cuprizone fed mice after neurotoxicant withdrawal/ **Tomas-Roig, J.; Torrente, M.; Cabré, M.; Vilella, E.; Colomina, M.T.**. Behavioural Brain Research. ISSN:0166-4328 (2019) v.363 p.38-44Behavioural Brain Research

DOI: 10.1016/j.bbr.2019.01.036

Link: http://www.sciencedirect.com/science/article/pii/S0166432818315948

Abstract: Destruction of the myelin sheath in the central nervous system (CNS) is prominent in many clinico-pathologic conditions. Among animal models that reproduce the pathological features of de- and remyelination processes, the mouse model of cuprizone administration is widely used. Both hyperactivity and motor impairment have been reported upon cuprizone exposure. The aim of the present study was to assess behaviour in mice after CPZ withdrawal.To summarize, animals showed hypo-activity and deficits in motor coordination when they were subjected to acute demyelinating insult while minor exploratory activity, impairment in motor coordination and lower anxiety levels emerged when remyelination was reached following cuprizone withdrawal. A recovery period of 6 weeks after removal of CPZ was not accompanied by a similar return of normal activity indicating long lasting behavioural effects caused by this neurotoxicant. Specifically, the recovery group showed impairments in neurological functions involved in sensorimotor, neuromuscular, motor coordination and the capacity to cope with a stress-inducing event.

Keyword: Demyelination; Cuprizone; Motor coordination and anxiety; Neurobehavioral screening; Remyelination

286. The effect of curcumin on cognition in Alzheimer's disease and healthy aging: A systematic review of pre-clinical and clinical studies/ **Voulgaropoulou, S.D.; van Amelsvoort, T.A.M.J.; Prickaerts, J.; Vingerhoets, C.**. Brain Research. ISSN:0006-8993 (2019) v.1725 p.146476Brain Research

DOI: 10.1016/j.brainres.2019.146476

Link: http://www.sciencedirect.com/science/article/pii/S000689931930530X

Abstract: Alzheimer's disease constitutes a growing cause of cognitive impairment in aging population. Given that current treatments do not produce the desired therapeutic effects, the need for finding alternative biological and pharmacological approaches is critical. Accumulating evidence suggests inflammatory and oxidative stress responses as potential causal factors of cognitive impairments in Alzheimer's disease and healthy aging. Curcumin has received

increased interest due to its unique molecular structure that targets inflammatory and antioxidant pathways as well as (directly) amyloid aggregation; one of the major hallmarks of Alzheimer's disease. Therefore, this review summarizes preclinical and clinical findings on curcumin as a potential cognitive enhancer in Alzheimer's disease and normal aging. Databases used for literature searches include PubMed, EMBASE and Web of Science; in addition, clinicaltrials.gov was used to search for clinical studies. Overall, animal research has shown very promising results in potentiating cognition, both physiologically and behaviourally. However, human studies are limited and results are less consistent, complicating their interpretation. These inconsistencies may be related to differences in methodology and the included population. Taking into account measurements of important inflammatory and antioxidant biomarkers, optimal dosages of curcumin, food interactions, and duration of treatment would increase our understanding on curcumin's promising effects on cognition. In addition, increasing curcumin's bioavailability could benefit future research.

Keyword: Cognition; Alzheimer's disease; Aging; Clinical trials; Curcumin (curcuma longa); Preclinical studies

287. Beyond the limits to governance: New rules of engagement for the tentative governance of the life sciences/ **Lyall, Catherine; Tait, Joyce**. Research Policy. ISSN:0048-7333 5(2019) v.48 p.1128-1137Research Policy

DOI: 10.1016/j.respol.2019.01.009

Link: http://www.sciencedirect.com/science/article/pii/S0048733319300174

Abstract: 'Governance' is a highly plastic concept that has spilled over from the political sciences and has been adopted, in some cases rather uncritically, by scholars from other social science traditions. We argue that there are limits to this all-pervasive notion of governance. Some of these limitations could potentially be addressed by the 'tentative governance' approach if it can create new opportunities for learning in order to cope with the problems of uncertainty at an early stage of new and emerging technologies in areas such as the life sciences. In order to move beyond these limits, we may be able to use the heuristic device offered by tentative governance as a step towards developing and adopting new rules of engagement. These new rules of engagement need (i) to recognise that consensus may not always be possible in areas of new and emerging technology and (ii) to accept a more balanced approach to governance that acknowledges the role of policy and politics. In order to achieve this, we need to go beyond science and technology studies (STS) and innovation studies and adopt a more interdisciplinary approach that acknowledges the contributions already made to this governance debate by a wide range of scholars, including those in the political sciences.

Keyword: Life sciences; Consensus; Governance; Public engagement

288. Performance, carcass features, and non-carcass components of sheep grazed on Caatinga rangeland managed with different forage allowances/ **Pinto Filho, J.S.; Cunha, M.V.; Souza, E.J.O.; Santos, M.V.F.; Lira, M.A.; Moura, J.G.; Rodrigues, J.M.C.S.; Silva, C.S.**. Small Ruminant Research. ISSN:0921-4488 (2019) v.174 p.103-109Small Ruminant Research

DOI: 10.1016/j.smallrumres.2019.03.010

Link: http://www.sciencedirect.com/science/article/pii/S0921448819300458

Abstract: This study aimed to evaluate the performance, carcass features, and non-carcass components of sheep managed with different levels of forage allowance [2.0; 2.5; 3.0; 3.5 kg DM/kg body weight (BW)] in the semi-arid Caatinga rangelands of northeastern Brazil. Two trials were conducted during 2013 and 2014, with stocking periods of 39 and 84 days, respectively. The experimental site was designed as a randomized whole block with split-plot array. Animals were slaughtered at the end of the stocking season. Absolute weights of the non-carcass components, empty BW, and hot carcass weights were measured. Morphometric measurements of the whole carcasses were taken. The left-hand half of each carcass was butchered into commercial cuts. A quadratic effect was seen for forage allowance levels and intake, as well as for dry matter digestibility, total and daily weight gain, BW and carcass weight, and loin cut. The optimum level of forage allowance was 2.8 kg DM/ kg BW. The characteristics of the non-carcass components (except blood and small intestines) of the sheep remained unchanged under the different forage allowance regimes.

Keyword: Small ruminants; Meat; Pasture; Semi-arid rangeland

289. Inducible rodent models of glaucoma/ **Pang, Iok-Hou; Clark, Abbot F.**. Progress in Retinal and Eye Research. ISSN:1350-9462 (2019) v. p.100799Progress in Retinal and Eye Research

DOI: 10.1016/j.preteyeres.2019.100799

Link: http://www.sciencedirect.com/science/article/pii/S1350946219300862

Abstract: Glaucoma is one of the leading causes of vision impairment worldwide. In order to further understand the molecular pathobiology of this disease and to develop better therapies, clinically relevant animal models are necessary. In recent years, both the rat and mouse have become popular models in glaucoma research. Key reasons are: many important biological similarities shared among rodent eyes and the human eye; development of improved methods to induce glaucoma and to evaluate glaucomatous damage; availability of genetic tools in the mouse; as well as the relatively low cost of rodent studies. Commonly studied rat and mouse glaucoma models include intraocular pressure (IOP)-dependent and pressure-independent models. The pressure-dependent models address the most important risk factor of elevated IOP, whereas the pressure-independent models assess “normal tension” glaucoma and other “non-IOP” related factors associated with glaucomatous damage. The current article provides descriptions of these models, their characterizations, specific techniques to induce glaucoma, mechanisms of injury, advantages, and limitations.

Keyword: Pathogenesis; Animal model; Rodent; Glaucoma; In vivo; Intraocular pressure

290. Apelin-13 attenuates motor impairments and prevents the changes in synaptic plasticity-related molecules in the striatum of Parkinsonism rats/ **Haghparast, Elham; Sheibani, Vahid; Abbasnejad, Mehdi; Esmaeili-Mahani, Saeed**. Peptides. ISSN:0196-9781 (2019) v.117 p.170091Peptides

DOI: 10.1016/j.peptides.2019.05.003

Link: http://www.sciencedirect.com/science/article/pii/S0196978119300634

Abstract: The striatum plays a critical role in motor control and also learning and memory of motor skills. It has been reported that striatal synaptic components are significantly decreased in dopaminergic-denervated striatum. In this study the effects of apelin-13 were investigated on motor disorders and striatal synaptosomal expression of PSD-95,

neurexin1, neuroligin, metabotropic glutamate receptor (mGlu R1) and dopaminergic receptors (DR1 and DR2) in rat parkinsonism experimental model. 6-hydroxydopamine (6-OHDA) was injected into the substantia nigra. Apelin-13 (1, 2 and 3 μg/rat) was administered into the substantia nigra one week after the 6-OHDA injection. Accelerating rotarod, beam-balance, beam-walking and bar tests were performed one month after the apelin injection. Immunohistochemistry staining of dopaminergic neurons was performed. The levels of synaptic proteins were determined by immunoblotting. 6-OHDA-treated animals showed a significant impairment in motor-skill tasks and a dramatically change in the expression levels of mentioned proteins. Apelin-13 (3 μg/rat) significantly attenuates the motor impairments and prevents the changes in striatal synaptic elements in 6-OHDA-treated animals. In addition, it could rescue the dopaminergic neurons of the substantia nigra. The data will potentially extend the possible benefic aspect of apelin in neurodegenerative disorders.

Keyword: Parkinson's disease; Synaptic plasticity; 6-OHDA; Apelin-13; Motor impairment; Striatum

291. Beliefs about error rates and human judgment in forensic science/ **Ribeiro, Gianni; Tangen, Jason M.; McKimmie, Blake M.**. Forensic Science International. ISSN:0379-0738 (2019) v.297 p.138-147Forensic Science International

DOI: 10.1016/j.forsciint.2019.01.034

Link: http://www.sciencedirect.com/science/article/pii/S0379073818307072

Abstract: Forensic science techniques are often used in criminal trials to infer the identity of the perpetrator of crime and jurors often find this evidence very persuasive. Unfortunately, two of the leading causes of wrongful convictions are forensic science testing errors and false or misleading forensic testimony (Saks and Koehler, 2005). Therefore, it is important to understand jurors' pre-existing beliefs about forensic science, as these beliefs may impact how they evaluate forensic evidence in the courtroom. In this study, we examine people's perceptions of the likelihood of error and human judgment involved at each stage of the forensic science process (i.e., collection, storage, testing, analysis, reporting, and presenting). In addition, we examine people's perceptions of the accuracy of — and human judgment involved in — 16 different forensic techniques. We find that, in contrast to what would be expected by the CSI effect literature, participants believed that the process of forensic science involved considerable human judgment and was relatively error-prone. In addition, participants had wide-ranging beliefs about the accuracy of various forensic techniques, ranging from 65.18% (document analysis) up to 89.95% (DNA). For some forensic techniques, estimates were lower than that found in experimental proficiency studies, suggesting that our participants are more skeptical of certain forensic evidence than they need to be.

Keyword: Accuracy; CSI effect; Error rate; Forensic evidence; Forensic science

292. Novel copy number variation of the KLF3 gene is associated with growth traits in beef cattle/ **Xu, Jia-Wei; Zheng, Li; Li, Li-Juan; Yao, Yu-fei; Hua, He; Yang, Shi-Zhen; Wen, Yi-Fan; Song, Cheng-Chuang; Cao, Xiu-Kai; Liu, Kun-Peng; Zhang, Gui-min; Yang, Jia-meng; Hao, Dan; Dang, Rui-Hua; Lan, Xian-Yong; Lei, Chu-Zhao; Qi, Xing-Lei; Chen, Hong; Huan**. Gene. ISSN:0378-1119 (2019) v.680 p.99-104Gene

DOI: 10.1016/j.gene.2018.08.040

Link: http://www.sciencedirect.com/science/article/pii/S0378111918309028

Abstract: Copy number variation (CNV) related to complex traits, such as disease and quantitative phenotype, is considered an important and wealthy source of genetic and phenotypic diversity. It suggests that the copy number variation of function gene maybe leads to the phenotypic changes. Kupple like factor 3 (KLF3) gene is a vital transcription factor associated with the growth and development of muscle and adipose tissue. It has been mapped in a CNV region by animal genome re-sequencing. In this study, we detected the distribution diversity of KLF3 gene copy numbers in six Chinese cattle breeds (QC, NY, XN, PN, QDM and JX) and associated the phenotypic traits with it. Then, we analyzed the KLF3 gene transcription expression level in different tissues of Jiaxian (JX) cattle. Furthermore, we detected mRNA expression level of muscle and fat tissues of Jiaxian cattle (JX), Angus × Jiaxian (AJ). The results showed that the copy number in CNV loss was more frequent in QC than others. And we revealed a positive effect of KLF3 CNV on growth traits, such as body mass and heart girth ($P < 0.05$). In a word, we ascertained the significance between CNVs of KLF3 gene and growth traits in different cattle breeds, and our data indicates that the CNVs of KLF3 gene may as a marker for the future molecular breeding of Chinese beef cattle.

Keyword: Growth traits; mRNA expression; gene; Association; Chinese cattle; Copy number variations (CNVs)

293. Acute exposure to deoxynivalenol inhibits porcine enteroid activity via suppression of the Wnt/β-catenin pathway/ **Li, Xiang-Guang; Zhu, Min; Chen, Ming-Xia; Fan, Hong-Bo; Fu, Hou-Long; Zhou, Jia-Yi; Zhai, Zhen-Ya; Gao, Chun-Qi; Yan, Hui-Chao; Wang, Xiu-Qi**. Toxicology Letters. ISSN:0378-4274 (2019) v.305 p.19-31Toxicology Letters

DOI: 10.1016/j.toxlet.2019.01.008

Link: http://www.sciencedirect.com/science/article/pii/S0378427419300104

Abstract: The intake of food containing deoxynivalenol frequently causes damage to the intestine, the renewal of which is driven by intestinal stem cells (ISCs). Nevertheless, the toxicity of deoxynivalenol on ISCs and its underlying mechanisms remain to be elucidated. As pigs are the most sensitive animals to deoxynivalenol, we used piglets for investigation in this study. Here, we show that intestinal epithelial cell activity, B cell-specific Moloney murine leukemia virus insertion site 1 (Bmi1) protein level, and Wnt/β-catenin pathway activity were suppressed with acute expose to deoxynivalenol. We further established a novel system for porcine crypt isolation and ex vivo cultivation. Crypts and crypt cells expanded and budded with typical enteroid morphologies under this system. Our results show that both acute in vivo and in vitro administration of deoxynivalenol significantly decreased enteroid activity. Simultaneously, protein levels of β-catenin and leucine-rich-repeat-containing G-protein-coupled receptor 5 (Lgr5) in enteroids were reduced by deoxynivalenol exposure. In conclusion, we established a reliable culture system for porcine enteroids and demonstrated for the first time that the activity of ISCs and the Wnt/β-catenin pathway is sensitively suppressed by acute deoxynivalenol exposure.

Keyword: Deoxynivalenol; Porcine; Enteroids; Intestinal stem cells; Wnt /β-catenin pathway

294. In vitro fermentation of Cucumis sativus fructus extract by canine gut microbiota in combination with two probiotic strains/ **Belà, Benedetta; Coman, Maria Magdalena; Verdenelli, Maria Cristina; Bianchi, Cinzia; Pignataro, Giulia; Fiorini, Dennis; Silvi, Stefania**. Journal of Functional Foods. ISSN:1756-4646 (2019) v.63 p.103585Journal of Functional Foods

DOI: 10.1016/j.jff.2019.103585

Link: http://www.sciencedirect.com/science/article/pii/S1756464619305092

Abstract: There is a growing public interest in the use of fibre, probiotics and combinations of both of them to potentially improve the gut microbiota composition and the digestive health of dogs; however, there are limited studies on the effects of these supplements in companion animals. Using 24 h in vitro fermentation, the effects of probiotic strains, Lactobacillus paracasei JCM8130 and Lactobacillus acidophilus C8.1, and the fructus extract of Cucumis sativus on modulation and activities of healthy dogs' microbiota were investigated, either individually or in combination, to evaluate their possible synergism. Real-Time PCR was performed for enumeration of the selected bacterial groups. Gas chromatographic analysis was conducted to quantify short chain fatty acids (SCFAs) production. The studied supplements showed some prebiotic-like effects especially the ability to promote a significant increase of Bifidobacterium spp. and Lactobacillus spp. counts and also the production of acetic, propionic and butyric acids.

Keyword: Fermentation; Prebiotics; Canine gut microbiota; Probiotic strains

295. Molecular characterization of highly pathogenic Eimeria species among beef cattle on Java Island, Indonesia/ **Ekawasti, Fitrine; Nurcahyo, Wisnu; Wardhana, April Hari; Shibahara, Tomoyuki; Tokoro, Masaharu; Sasai, Kazumi; Matsubayashi, Makoto**. Parasitology International. ISSN:1383-5769 (2019) v.72 p.101927Parasitology International

DOI: 10.1016/j.parint.2019.101927

Link: http://www.sciencedirect.com/science/article/pii/S1383576919300297

Abstract: Gastrointestinal parasites including Eimeria spp. are known to affect domestic animal productivity causing watery or lethal bloody diarrhea. However, there are few reports on the detailed distribution of bovine Eimeria spp. in cattle, particularly in developing tropical and sub-tropical areas. Using a total of 289 fecal samples collected from beef cattle on Java Island, one of the five main islands of Indonesia, fecal examinations by the Whitlock and sugar flotation methods and molecular surveys were conducted to reveal the prevalence of 6 Eimeria spp. As a result of morphological screening using Whitlock methods and sugar flotation, Eimeria spp. prevalences of 9.4% and 52.3% were confirmed, respectively. The prevalence was higher in younger cattle [under 1 year (63.9%), 1–2 years (75.0%) and more than in 2 year old cattle (42.3%)]. The prevalences of identified species were as follows: 10.4% for E. bovis, 2.8% for E. ellipsoidalis, 2.1% for E. alabamensis, 1.4% for E. zuernii, 1.1% for E. auburnensis, and 0.4% for E. cylindrica. Moreover, prevalences of 12.8% for Strongyloides papillosus, 7.3% for Trichuris globulosa, and 0.3% for Capillaria bovis were detected. Although the average number of oocysts per gram of feces was <100 among the positive samples, and cases of heavy infection were limited, the endemicity of these pathogenic Eimeria species among farms in Indonesia should be noted.

Keyword: Indonesia; Cattle; Java Island

296. The application of seaweeds in environmental biotechnology/ **Michalak, Izabela**. . ISSN: (2019) v. p.Advances in Botanical Research

DOI:

Link: http://www.sciencedirect.com/science/article/pii/S0065229619301120

Abstract: Apart from being applied as a source of human food, animal feed, fertilizers, components of cosmetics, pharmaceuticals and nutraceuticals, biofuels, fast-growing seaweeds can also be used to prevent environmental pollution, for bioremediation of polluted environment and in environmental biomonitoring (bioindication of marine

ecosystem pollution). They are known to effectively remove toxic metals (e.g., arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, zinc) and organic compounds (e.g., DDT, PCB) from contaminated soil, industrial effluents and wastewater treatment. Biosorption of toxic metal ions by dry seaweeds is a kind of biotreatment of polluted water. Also the bioremediation of nutrients, generated by intensive aquaculture (e.g., fish, shrimps and other aquatic animals) in so-called integrated multitrophic aquaculture makes use of seaweeds. Macroalgae derived from unpolluted water – e.g., eutrophicated natural water reservoirs or remediated wastewater from aquaculture can be used for the production of components of fertilizers, feed additives and biochar which provides a multitude of benefits in terms of environmental management, e.g., climate change mitigation due to carbon sequestration, remediation of contaminated sites (water, soil) due to very good sorption properties, plus the mitigation of contaminants movement in soil due to action as a landfill filter medium. The proposed biotechnological tools based on seaweeds biomass can improve the environment and assure its sustainability.

Keyword: Aquaculture; Biomonitoring; Bioremediation; Biosorption; Environmental contamination; Seaweeds

297. Improving the quality of data presentation in health sciences/ **Castelo, Paula Midori**. Archives of Oral Biology. ISSN:0003-9969 (2019) v.98 p.123-125Archives of Oral Biology

DOI: 10.1016/j.archoralbio.2018.11.016

Link: http://www.sciencedirect.com/science/article/pii/S0003996918306733

Abstract:

Keyword: Statistics; Methods; Research Design

298. The behavioral paradigm to induce repeated social defeats in zebrafish/ **Nakajo, Haruna; Tsuboi, Takashi; Okamoto, Hitoshi**. Neuroscience Research. ISSN:0168-0102 (2019) v. p.Neuroscience Research

DOI: 10.1016/j.neures.2019.11.004

Link: http://www.sciencedirect.com/science/article/pii/S0168010219305905

Abstract: Social subordination, which causes severe stress in animals, can affect animal's behaviors, homeostasis, and mental health. In rodents, experiences of repeated social defeats, but not a single defeat, induce a depression-like state. However, it is unclear whether such experiences similarly affect behaviors of other model animals than rodents. Here, we established a behavioral paradigm for repeated social defeats with zebrafish, an emerging model for behavioral neuroscience and pharmacological analysis. We put fish into repeated social subordination for 6 consecutive days. Using behaviors during fighting as indicators, we observed that experiencing repeated social defeats led to a reduction in fight frequency and duration. The continuously-defeated zebrafish failed to win even against the transgenic fish with an impaired winning-associated neural pathway. These results suggest that repeated social defeats led to demotivation to fight and to win against opponents. Moreover, they showed strong activity in the ventral habenula, an evolutionary homolog of the mammalian lateral habenula. However, unlike the mice model, the continuously-defeated zebrafish showed no change in anxiety level and sociability. Our established behavioral paradigm will be a new tool to investigate neural mechanisms underlying social defeats.

Keyword: Chronic stress; Zebrafish; Depression-like state; Habenula; Social conflict; Social defeat model

299. Epidemiological survey on the occurrence of Anaplasma phagocytophilum infection in sheep reared in central Italy/ **Moretta, Iolanda; Veronesi, Fabrizia; Diaferia, Manuela; Morganti, Giulia; Giusepponi, Valentina; Sechi, Paola; Ciampelli, Antonio; Cenci-Goga, Beniamino**. Small Ruminant Research. ISSN:0921-4488 (2019) v.181 p.103-106Small Ruminant Research

DOI: 10.1016/j.smallrumres.2019.06.001

Link: http://www.sciencedirect.com/science/article/pii/S0921448819300987

Abstract: Anaplasma phagocytophilum is a tick-borne pathogen of sheep and other ruminants, humans, horses and dogs. Current data on the prevalence and diffusion of A. phagocytophilum among domestic animals in Italy are fragmentary, especially those related to sheep, considered a natural domestic reservoir. We investigated the prevalence of A. phagocytophilum infection in dairy sheep from Tuscany (Italy), by testing 624 sera with the immunofluorescent antibody (IFA) test. The sera belonged to 33 different flocks distributed throughout the province of Grosseto (Tuscany). Positive results were found in 21 out of the 33 flocks tested (63.63%, 95% IC 47.22–80.05%) with a prevalence rate within flocks ranging from 3.33% to 59.26%. The seroprevalence against A. phagocytophilum within the sheep population was 8.01% (95% IC 6.13–10.41%), and most of the positive cases showed low antibody titres (1/40-1/80). The multivariate analysis identified "small flock" (<300 animals) as the factor most closely related to serological positivity. Our results reveal a moderate circulation of A. phagocytophilum among sheep flocks in central Italy.

Keyword: Sheep; Italy

300. The effects of Momordica balsamina methanolic extract on haematological function in streptozotocin-induced diabetic rats: Effects on selected markers/ **Ludidi, A.; Baloyi, M.C.; Khathi, A.; Sibiya, N.H.; Ngubane, P.S.**. Biomedicine & Pharmacotherapy. ISSN:0753-3322 (2019) v.116 p.108925Biomedicine & Pharmacotherapy

DOI: 10.1016/j.biopha.2019.108925

Link: http://www.sciencedirect.com/science/article/pii/S0753332219307577

Abstract: Background Chronic hyperglycaemia-induced haematological changes increase the risk of cardiovascular complications in diabetic patients. The administration of insulin injection as a bolus is accompanied with increased blood viscosity, which is not recommended for patients with congestive heart failure. Momordica balsamina methanolic extract (MB) has previously been shown to possess anti-hyperglycaemic and renal dysfunction ameliorative effects; however, the haematological effects of MB have not been shown. The current study therefore, investigated the short-term effects MB on selected haematological parameters in streptozotocin (STZ)-induced diabetic rats. Methods Briefly, the air-dried Momordica balsamina leaves were sequentially extracted with methanol to yield a methanolic extract. STZ-induced diabetic rats were divided into untreated and treated groups with insulin (170 μg kg−1 s.c.) and metformin (500 mg kg−1 p.o.) MB (250 mg kg−1 p.o.). MB was administered twice daily for the 5-week experimental period. Blood glucose concentration was monitored weekly. Animals were sacrificed terminally. Blood and kidneys were collected for haematological and biochemical analysis respectively. Results Treatment with MB significantly decreased blood glucose concentration and improved erythropoietin secretion, thus significantly increasing red blood cell production in treated diabetic animals by comparison to untreated animals. MB also significantly improved haemoglobin concentrations and moderately increased erythrocyte indices specifically, mean

corpuscular volume (MCV), mean corpuscular haemoglobin concentration (MCHC) and mean corpuscular haemoglobin (MCH) to no significance by comparison to untreated diabetic animals. MB treatment decreased the oxidative stress evoked by the induction of diabetes while improving the antioxidant status of treated animals by comparison to untreated animals respectively. Conclusions Administration of Momordica balsamina methanolic extract protects against some injurious haematological changes induced by hyperglycaemia, which may reduce the risks of cardiovascular complications.

Keyword: Oxidative stress; Streptozotocin; Erythropoiesis; Hyperglycaemia

301. Nuclear magnetic resonance biosensor for rapid detection of Vibrio parahaemolyticus/ **Hash, Sara; Martinez-Viedma, M. Pilar; Fung, Fred; Han, Jee Eun; Yang, Paul; Wong, Charlene; Doraisamy, Loganathan; Menon, Suresh; Lightner, Donald**. Biomedical Journal. ISSN:2319-4170 3(2019) v.42 p.187-192Biomedical Journal

DOI: 10.1016/j.bj.2019.01.009

Link: http://www.sciencedirect.com/science/article/pii/S2319417017303761

Abstract: Background Vibrio parahaemolyticus is a Gram-negative bacterium widely distributed in marine environments and a well-recognized invertebrate pathogen frequently isolated from seafood. V. parahaemolyticus may also spread into humans, via contaminated, raw, or undercooked seafood, causing gastroenteritis and diarrhea. Methods A Nuclear Magnetic Resonance (NMR)-based detection system was used to detect pathogenic levels of this microorganism (105 CFU/ml) with Molecular Mirroring using iron nanoparticles coated with target-specific biomarkers capable of binding to DNA of the target microorganism. The NMR system generates a signal (in milliseconds) by measuring NMR spin–spin relaxation time T2, which correlates with the amount of microorganism DNA. Results Compared with conventional microbiology techniques such as real-time PCR (qPCR), the NMR biosensor showed similar limits of detection (LOD) at different concentrations (105–108 CFU/ml) using two DNA extraction methods. In addition, the NMR biosensor system can detect a wide range of microorganism DNAs in different matrices within a short period of time. Conclusion NMR biosensor represents a potential tool for diagnostic and quality control to ensure microbial pathogens such as V. parahaemolyticus are not the cause of infection. The “hybrid” technology (NMR and nanoparticle application) opens a new platform for detecting other microbial pathogens that have impacted human health, animal health and food safety.

Keyword: Aquaculture; Biosensors; Food safety; Nuclear magnetic resonance (NMR)

302. Histopathological Findings in the Viscera of Malformed Neotropical Viperids/ **Carvalho, M.P.N.; Sant’Anna, S.S.; Díaz-Delgado, J.; Grego, K.F.; Gogone, I.C.V.P.; Queiroz-Hazarbassanov, N.G.T.; Catão-Dias, J.L.**. Journal of Comparative Pathology. ISSN:0021-9975 (2019) v.167 p.73-81Journal of Comparative Pathology

DOI: 10.1016/j.jcpa.2018.10.174

Link: http://www.sciencedirect.com/science/article/pii/S0021997518301154

Abstract: Summary Congenital malformations (CMs) or developmental abnormalities are pathological processes defined as morphological defects that originate during embryonic stages. A wide variety of CMs is observed in reptiles, most of which are incompatible with normal life. Characterization of CMs and their pathogenesis are of great importance for the conservation of reptiles, including neotropical viperids (NVs). External CMs are often reported in

these species, but little is known about concomitant microscopical findings in the viscera of malformed individuals. In order to partially fill in this gap in knowledge, we aimed to investigate and characterize histopathological findings in the viscera of malformed NVs, jararacas (Bothrops jararaca) and South American rattlesnakes (Crotalus durissus), correlating these findings with features of external CMs. From 78 malformed snakes analysed, 100% (19/19) of rattlesnakes and 98.3% (58/59) of jararacas had histopathological changes in the viscera. Liver and/or kidney fatty degeneration was the most common finding in malformed and control animals. Renal glomerulocystic and tubular disease was significantly correlated with brachygnathia ($P < 0.05$) in jararacas. These results add to the body of knowledge of snake pathology and demonstrate some associations between external CMs and visceral histopathological findings, some of which could have implications for individual survival.

Keyword: congenital anomalies; teratology

303. Proteomics insights into the effects of MSTN on muscle glucose and lipid metabolism in genetically edited cattle/ **Xin, Xiang-Bo; Yang, Shu-Ping; Li, Xin; Liu, Xin-Feng; Zhang, Lin-Lin; Ding, Xiang-Bin; Zhang, Sheng; Li, Guang-Peng; Guo, Hong**. General and Comparative Endocrinology. ISSN:0016-6480 (2019) v. p.113237General and Comparative Endocrinology

DOI: 10.1016/j.ygcen.2019.113237

Link: http://www.sciencedirect.com/science/article/pii/S0016648019301364

Abstract: The molecular mechanism underlying myostatin (MSTN)-regulated metabolic cross-talk remains poorly understood. In this study, we performed comparative proteomic and phosphoproteomic analyses of gluteus muscle tissues from MSTN-/- transgenic cattle using a shotgun-based tandem mass tag (TMT) 6-plex labeling method to explore the signaling pathway of MSTN in metabolic cross-talk and cellular metabolism during muscle development. A total of 72 differentially expressed proteins (DEPs) and 36 differentially expressed phosphoproteins (DEPPs) were identified in MSTN-/- cattle compared to wild-type cattle. Bioinformatics analyses showed that MSTN knockout increased the activity of many key enzymes involved in fatty acid β-oxidation and glycolysis processes in cattle. Furthermore, comprehensive pathway analyses and hypothesis-driven AMP-activated protein kinase (AMPK) activity assays suggested that MSTN knockout triggers the activation of AMPK signaling pathways to regulate glucose and lipid metabolism by increasing the AMP/ATP ratio. Our results shed new light on the potential regulatory mechanism of MSTN associated with metabolic cross-talk in muscle development, which can be used in animal breeding to improve meat production in livestock animals, and can also provide valuable insight into treatments for obesity and diabetes mellitus in humans.

Keyword: cattle; AMPK; metabolic cross-talk; proteomic

304. FGF-2 isoforms influence the development of dopaminergic neurons in the murine substantia nigra, but not anxiety-like behavior, stress susceptibility, or locomotor behavior/ **Hövel, Friederike Freiin von; Leiter, Ina; Rumpel, Regina; Langenhagen, Alina; Wedekind, Dirk; Häger, Christine; Bleich, André; Palme, Rupert; Grothe, Claudia**. Behavioural Brain Research. ISSN:0166-4328 (2019) v.374 p.112113Behavioural Brain Research

DOI: 10.1016/j.bbr.2019.112113

Link: http://www.sciencedirect.com/science/article/pii/S0166432819309702

Abstract: Background Loss of fibroblast growth factor 2 (FGF-2) is responsible for the development of an increased number of dopaminergic (DA) neurons in the murine substantia nigra pars compacta (SNpc). Furthermore, dysregulation of its expression patterns within the central nervous system (CNS) is associated with behavioral abnormalities in mice. Until now, the contributions of the individual FGF-2 isoforms (one low (LMW) and two high molecular weight (HMW) isoforms) in the CNS are elusive. Methods To unravel the specific effects of FGF-2 isoforms, we compared three knockout mouse lines, one only deficient for LMW, one deficient for HMW and another lacking both isoforms, regarding DA neuronal development. With this regard, three time points of ontogenic development of the SNpc were stereologically investigated. Furthermore, behavioral aspects were analyzed in young adult mice, supplemented by corticosterone measurements. Results Juvenile mice lacking either LMW or HMW develop equal supernumerary DA neuron numbers in the SNpc. Compensatory increased LMW expression is observed in animals lacking HMW. Meanwhile, no knockout mouse line demonstrated changes in anxiety-like behavior, stress susceptibility, or locomotor behavior. Conclusions Both FGF-2 isoforms crucially influence DA neuronal development in the murine SNpc. However, absence of LMW or HMW alone alters neither anxiety-like nor locomotor behavior, or stress susceptibility. Therefore, FGF-2 is not a determinant and causative factor for behavioral alterations alone, but probably in combination with appropriate conditions, like environmental or genetic factors.

Keyword: Behavior; Glucocorticoids; Dopaminergic system development; FGF-2; HMW; LMW

305. Effects of early maternal care on adolescent attention bias to threat in nonhuman primates/ **Morin, Elyse L.; Howell, Brittany R.; Meyer, Jerrold S.; Sanchez, Mar M.**. Developmental Cognitive Neuroscience. ISSN:1878-9293 (2019) v.38 p.100643Developmental Cognitive Neuroscience

DOI: 10.1016/j.dcn.2019.100643

Link: http://www.sciencedirect.com/science/article/pii/S1878929318301488

Abstract: Attention bias towards threat using dot-probe tasks has mainly been reported in adults with stress-related disorders such as PTSD and other anxiety disorders, in some cases associated with early life stress or traumatic experiences. Studies during adolescence are scarce and inconsistent, which highlights the need to increase our understanding of the developmental processes that predict attentional biases, given that this is a time of emergence of psychopathology. Here, we use a translational nonhuman primate model of early life stress in the form of infant maltreatment to examine its long-term impact on attentional biases during adolescence using the dot-probe task and identify interactions with early life risk factors, such as prenatal exposure to stress hormones and emotional/stress reactivity during infancy. Maltreated animals showed higher reaction times to social threat than animals that experienced competent maternal care, suggesting interference of negative valence stimuli on attentional control and cognitive processes. Higher emotional reactivity during infancy in Maltreated animals predicted attention bias towards threat, whereas higher levels of prenatal cortisol exposure was associated with bias away (avoidance of) threat in maltreated and control groups. Our findings suggest that different postnatal experiences and early biobehavioral mechanisms regulate the development of emotional attention biases during adolescence.

Keyword: Early life stress; Rhesus monkey; Attention bias

306. Effects of hyaluronidase on ropivacaine or bupivacaine regional anaesthesia of the canine pelvic limb/ **Gray, Travis R.; Dzikiti, Brighton T.; Zeiler, Gareth E.**. Veterinary Anaesthesia and Analgesia. ISSN:1467-2987 2(2019) v.46 p.214-225Veterinary Anaesthesia and Analgesia

DOI: 10.1016/j.vaa.2018.09.041

Link: http://www.sciencedirect.com/science/article/pii/S1467298718302605

Abstract: Objective To determine the effect of hyaluronidase on time to onset and offset of anaesthesia in ropivacaine or bupivacaine femoral–ischiatic nerve blocks. Study design Blinded randomized crossover trial. Animals Eight dogs. Methods Each dog underwent four treatments separated into two blocks – initially, the ropivacaine treatment block: RS (ropivacaine 0.5% plus saline 0.9%) and RH (ropivacaine 0.5% plus hyaluronidase 100 IU mL–1), followed 3 weeks later by the bupivacaine treatment block: BS (bupivacaine 0.5% plus saline) and BH (bupivacaine 0.5% plus hyaluronidase). The local anaesthetics were administered at 0.1 mL kg–1 per site. Hyaluronidase and saline were administered at 0.02 mL kg–1 per site. Performance of femoral–ischiatic blocks was aided by a combined ultrasound–electrolocation technique. The mechanical nociceptive threshold was measured, until offset or 360 minutes, using an algometer to ascertain baseline, onset and offset of anaesthesia. Onset and offset of anaesthesia were defined as a 25% increase above and as a return to <25% above baseline nociceptive threshold readings, respectively. Results The median (range) onset of anaesthesia for RS and RH was 21 (3–60) and 12 (3–21) minutes, respectively (p = 0.141), and offset was 270 (90–360) and 180 (30–300) minutes, respectively (p = 0.361). By contrast, the median (range) onset of anaesthesia for BS and BH was 24 (3–60) and 9 (3–27) minutes, respectively (p = 0.394), and offset was 360 (240–360) and 330 (210–360) minutes, respectively (p = 0.456). Conclusion and clinical relevance Hyaluronidase had no effect on the onset and offset times of ropivacaine and bupivacaine femoral–ischiatic nerve blocks in dogs compared with saline. The onset and offset times were highly variable in all treatments. Clinically, the high variability of the onset and offset times of the regional anaesthesia of these local anaesthetic drugs means that clinicians must monitor the animal's response and, if required, provide additional analgesic drugs.

Keyword: bupivacaine; femoral nerve block; hyaluronidase; ischiatic nerve block; ropivacaine

307. Studies on long term behavioural changes in group-housed rat models of brain and spinal cord injury using an automated home cage recording system/ **Yip, Ping K.; Chapman, George E.; Sillito, Rowland R.; Ip, T.H. Richard; Akhigbe, Georgia; Becker, Stephanie C.; Price, Anthony W.; Michael-Titus, Adina T.; Armstrong, J. Douglas; Tremoleda, Jordi L.**. Journal of Neuroscience Methods. ISSN:0165-0270 (2019) v.321 p.49-63Journal of Neuroscience Methods

DOI: 10.1016/j.jneumeth.2019.04.005

Link: http://www.sciencedirect.com/science/article/pii/S0165027019301165

Abstract: Background Neurotrauma patients face major neurological sequelae. The failure in the preclinical-to-clinical translation of candidate therapies could be due to poor evaluation of rodent behaviours after neurotrauma. New Method A home cage automated system was used to study the long term behaviour of individual rats with traumatic brain injury (TBI), spinal cord injury (SCI) and non-CNS injured controls, whilst group-housed in their home cages. Naïve rats were used as baseline controls. Automated locomotor activity and body temperature recordings were carried out 24 h /day for 3 days/week during 12 weeks post-injury. Behavioural patterns, including aggression, rearing, grooming, feeding and drinking were analysed from automated video recordings during week 1, 6 and 12. Results SCI animals showed a lower locomotor activity compared to TBI or control animals during light and dark phases. TBI animals showed a higher aggression during the dark phase in the first week post-injury compared to SCI

or control animals. Individual grooming and rearing were reduced in SCI animals compared to TBI and control animals in the first week post-injury during the dark phase. No differences in drinking or feeding were detected between groups. Locomotor activity did not differ between naïve male and female rats, but body temperature differ between light and dark phases for both. Standard methods Injury severity was compared to standard SCI and TBI behaviour scores (BBB and mNSS, respectively) and histological analysis. Conclusions This study demonstrates the practical benefits of using a non-intrusive automated home cage recording system to observe long term individual behaviour of group-housed SCI and TBI rats.

Keyword: Behaviour; 3Rs; Traumatic brain injury; Spinal cord injury; Neurotrauma

308. Clostridium (Clostridioides) difficile shedding by polar bears (Ursus maritimus) in the Canadian Arctic/ **Weese, J Scott; Salgado-Bierman, Fernando; Rupnik, Maja; Smith, Dale A.; van Coeverden de Groot, Peter**. Anaerobe. ISSN:1075-9964 (2019) v.57 p.35-38Anaerobe

DOI: 10.1016/j.anaerobe.2019.03.013

Link: http://www.sciencedirect.com/science/article/pii/S1075996419300526

Abstract: Clostridium (Clostridioides) difficile has been identified in humans and a wide range of animal species, but there has been little study of remote animal populations with limited human contact. The objective of this study was to determine the prevalence and types of C. difficile in wild and captive polar bears (Ursus maritimus). Fecal samples were collected from two populations of wild polar bears in Nunavut Canada; M'Clintock Channel and Hudson Strait (Davis Strait or Foxe Basin), as well as from a facility (PBJ) in Churchill, Manitoba that temporarily houses nuisance polar bears and from captive bears in a zoological park. Enrichment culture was performed and isolates were characterized by ribotyping and toxinotyping. Clostridium difficile was isolated from 24/143 (16.8%) of samples; 18/120 (15%) wild bear samples, 4/7 (57%) from the PBJ and 2/16 (13%) samples from three zoo bears. The prevalence of C. difficile was significantly higher in bears that were housed at the PBJ vs wild bears (P = 0.0042), but there was no difference between wild bears from M'Clintock Channel (14/100, 14%) and those from Hudson Strait (4/20, 20%) (P = 0.50). Fourteen of the 24 (58%) isolates were toxigenic; 13/18 (72%) wild bear isolates, 0/4 PBJ isolate and 1/2 zoo isolates. Four toxigenic ribotypes were identified, with one that possessed tcdB and cdtA predominating. None of the toxigenic isolates were ribotypes that have been identified previously by the authors. There was no overlap in toxigenic ribotypes between the different populations. Clostridium difficile was not uncommonly identified in polar bears, with differences in type distribution amongst the different regions. The presence of strains that have not been identified in humans or domestic animals suggests that polar bears may be a natural reservoir of unique strains of this important bacterium.

Keyword: Microbiota; Wildlife; Zoonotic; Polar bear

309. Bacterial signatures of productivity decay in Penaeus monodon ponds infected with PirA toxin/ **Infante-Villamil, Sandra; Huerlimann, Roger; Condon, Kelly; Maes, Gregory E.; Jerry, Dean R.**. Aquaculture. ISSN:0044-8486 (2019) v.511 p.734202Aquaculture

DOI: 10.1016/j.aquaculture.2019.734202

Link: http://www.sciencedirect.com/science/article/pii/S0044848618320118

Abstract: The clear relationship between the microbiome and the general well-being of metazoans has motivated the characterization of bacterial communities in cultured species for future microbiome monitoring and modulation to improve productivity. To study the bacterial diversity associated with farmed adult P. monodon at harvest, guts, gastric mills (GM), pond water and sediments were investigated using next-generation sequencing technology in two control ponds (CP1 and CP2) where animals showed a healthy appearance, and two low productive ponds (LP1 and LP2) where animals showed signs of disease. Animals from CP2 were on average at least 4 g heavier than animals from other ponds, and the final yield of both CP was more than double that of LP. LP2 showed the lowest diversity indices, which can potentially be attributed to high abundance of Vibrio spp. and warm water conditions (31.6 ± 0.3 °C on average). The structure of the bacterial community in the gut, GM and water samples was different between CP and LP. Vibrio spp. and anaerobic bacteria (e.g. Fusibacter) were enriched in the gastrointestinal tract of animals from LP (LDA ≥4). While Vibrio can potentially act against the host and other members of the bacterial community, Fusibacter might be an indicator of sulfur compounds accumulation in the animal as the hepatopancreas becomes affected by a PirA toxin. Enrichment of Cyanobacteria in the water (LDA = 4.38) and members of Desulfobacteraceae in sediments of LP (5% on average) could be environmental stress indicators in summer conditions. Characterizing bacterial microbiomes in aquaculture is important to detect indicators of health and productivity that can be used as monitoring tools in the animal's gastrointestinal tract and the environment, ultimately enabling a targeted modulation of the bacterial community for improved production.

Keyword: Aquaculture, PirA; Bacterial microbiome; Pond productivity

310. Effect of protein hydrolysates from carp (Cyprinus carpio) skin gelatine on oxidative stress biomarkers and other blood parameters in healthy rats/ **Tkaczewska, Joanna; Borczak, Barbara; Piątkowska, Ewa; Kapusta-Duch, Joanna; Morawska, Małgorzata; Czech, Tomasz**. Journal of Functional Foods. ISSN:1756-4646 (2019) v.60 p.103411Journal of Functional Foods

DOI: 10.1016/j.jff.2019.06.013

Link: http://www.sciencedirect.com/science/article/pii/S1756464619303299

Abstract: Carp skin gelatine hydrolysates can be a potential source of bioactive peptides with strong antioxidant properties tested in vitro, but there is no information on in vivo activity. Therefore, the objective of this study was to determine the ability of an antioxidant carp skin gelatine hydrolysate to attenuate plasma/serum levels of some oxidative stress markers in healthy adult Wistar rats. Analysis of hydrolysate included safety in an animal organism (haematological blood parameters, CRP, hepatic and kidney function), biological value (BV, TD, NPU), evaluation of the lipid profile (TC, LDL-C, HDL-C, TAG) and antioxidant blood status (TAS, MDA, GSR, HO-1). The results indicate that fish protein hydrolysates are safe for laboratory animals, but have very low biological value. An increase in glutathione reductase activity in the blood serum of healthy animals fed with carp skin gelatine hydrolysate supplements is a promising indicator of its antioxidant in vivo properties.

Keyword: Antioxidant activity; Bioactive peptide; Carp; Gelatine; study

311. Future distribution of wild boar in a highly anthropogenic landscape: Models combining hunting bag and citizen science data/ **Rutten, Anneleen; Casaer, Jim; Swinnen, Kristijn R.R.; Herremans, Marc; Leirs, Herwig**. Ecological Modelling. ISSN:0304-3800 (2019) v.411 p.108804Ecological Modelling

DOI: 10.1016/j.ecolmodel.2019.108804

Link: http://www.sciencedirect.com/science/article/pii/S0304380019303126

Abstract: Wild boar is one of the most widespread mammals of the world and in many regions wild boar populations continue to expand. Especially in highly anthropogenic landscapes, increasing numbers of wild boar lead to a rising number of contacts with human activities causing human-wildlife impacts. In the heavily fragmented landscape of Flanders (northern Belgium) where the wild boar re-appeared in 2006 after more than half a century of absence, it is crucial to get a better understanding of the probable further distribution of wild boar in order to assess potential impacts in the near future. Wild boar occurrences have been collected by two citizen science programs: through an online observation platform and based on the reported locations of wild boar shot by hunters. This allowed us to construct a MaxEnt habitat suitability model. We constructed a new approach to define background manipulation to correct for sampling bias due to uneven sampling effort or due to areas in which hunting is not allowed based on the construction of bias files using this information. Model outcomes based on this new approach for background manipulation were compared with the known method of spatial thinning. All model outcomes were found comparable reflecting the utility of our new approach when limited data are available and spatial thinning would result in insufficient data for modelling. Our MaxEnt models show that coniferous forest, deciduous forest, maize, scrub and other low cover play a key role in increasing the habitat suitability for wild boar. Built up areas and the extent of habitat diversity only had a minor influence on habitat suitability reflecting wild boars' behavioural flexibility to adapt to human-dominated landscapes. Unoccupied suitable habitat is mainly found in the centre of Flanders, although highly scattered. Habitat suitability in the West of Flanders was limited.

Keyword: Citizen science; MaxEnt; Sampling bias; Species distribution modelling

312. Development of a DAS-ELISA for detection of H9N2 avian influenza virus/ **Ming, Fan; Cheng, Yanqing; Ren, Chenwei; Suolang, Sizhu; Zhou, Hongbo**. Journal of Virological Methods. ISSN:0166-0934 (2019) v.263 p.38-43Journal of Virological Methods

DOI: 10.1016/j.jviromet.2018.10.014

Link: http://www.sciencedirect.com/science/article/pii/S0166093418303318

Abstract: H9N2 avian influenza virus is threatening animals and public health systems. Effective diagnosis is imperative to control the disease. Thus, we developed a panel of monoclonal antibodies (Mabs) against the H9N2 avian influenza virus (AIV) and implemented a double-antibody sandwich enzyme-linked immunosorbent assay (DAS-ELISA) to detect the H9 viral antigen. Hybridomas 4D10 and 5G2 were screened to secrete immunoglobulin G (IgG) and IgA, respectively. Antibody 4D10 was used as the capture antibodies and HRP labeled 5G2 as the detector antibody. The specificity of the optimized DAS-ELISA was evaluated by using AIV subtypes H1, H3, H5, H9 and H10. Specimens containing AIV H9 subtype yielded a specific and strong signal above the background, whereas specimens containing all other subtypes yielded background signals. The detection limit of the DAS-ELISA is 10−2.3 TCID50 (50% Tissue culture infective doses). Negative-positive threshold was 0.211 (OD630). In comparison with virus isolation the sensitivity and specificity of DAS-ELISA were found to be 98.9% and 98.1% respectively. Taken together, the newly developed Mab-based DAS-ELISA offers an attractive alternative to other diagnostic approaches for the specific detection of H9 subtype AIV.

Keyword: Hemagglutinin; Monoclonal antibody; Avian influenza virus; DAS-ELISA; H9N2

313. Molecular characterization of the 2′,5′-oligoadenylate synthetase family in the Chinese tree shrew (Tupaia belangeri chinensis)/ **Yao, Yu-Lin; Yu, Dandan; Xu, Ling; Fan, Yu; Wu, Yong; Gu, Tianle; Chen, Jiaqi; Lv, Long-Bao; Yao, Yong-Gang**. Cytokine. ISSN:1043-4666 (2019) v.114 p.106-114Cytokine

DOI: 10.1016/j.cyto.2018.11.009

Link: http://www.sciencedirect.com/science/article/pii/S1043466618304216

Abstract: Virus infection induces type I interferons (IFNs) that in turn exert their pleiotropic effects through inducing a large number of interferon-stimulated genes (ISGs). The IFN-induced 2′,5′-oligoadenylate synthetases (OASs) have been identified as a member of the ISGs family characterized by the ability to synthesize 2′,5′-oligoadenylate (2-5A), which can induce the degradation of viral RNA by activating RNase L within the infected cells to block viral replications. In this study, we characterized the OASs of the Chinese tree shrew (Tupaia belangeri chinensis), a small mammal genetically close to primates and has the potential as animal model for viral infections. We identified 4 putative tree shrew OASs (tOASs, including tOAS1, tOAS2, tOASL1, and tOASL2) and characterized their roles in antiviral responses. Tree shrew lost tOAS3 that was presented in human and mouse. Phylogenetic analyses based on the protein sequences showed a close relationship of tOASs with those of mammals. Constitutive mRNA expression of tOASs was found in seven tissues (heart, liver, spleen, lung, kidney, small intestine and brain). Moreover, tOASs were significantly up-regulated upon various virus infections. Overexpression of tOASs significantly inhibited DNA virus and RNA virus replications in tree shrew primary renal cells. tOAS1 and tOAS2, but not tOASL1 and tOASL2, exerted their anti-HSV activity in an RNase L-dependent pathway. Collectively, our results revealed the evolutionary conservation of tOASs in tree shrew and might offer helpful information for creating viral infection models using the Chinese tree shrew.

Keyword: Innate immunity; Chinese tree shrew; OAS; RNase L; Virus infection

314. The application of antibiotics in broiler production and the resulting antibiotic resistance in Escherichia coli: A global overview/ **Roth, Nataliya; Käsbohrer, Annemarie; Mayrhofer, Sigrid; Zitz, Ulrike; Hofacre, Charles; Domig, Konrad J**. Poultry Science. ISSN:0032-5791 4(2019) v.98 p.1791-1804Poultry Science

DOI: 10.3382/ps/pey539

Link: http://www.sciencedirect.com/science/article/pii/S0032579119301099

Abstract: ABSTRACT The increase in antibiotic resistance is a global concern for human and animal health. Resistant microorganisms can spread between food-producing animals and humans. The objective of this review was to identify the type and amount of antibiotics used in poultry production and the level of antibiotic resistance in Escherichia coli isolated from broilers. Isolate information was obtained from national monitoring programs and research studies conducted in large poultry-producing regions: US, China, Brazil, and countries of EU—Poland, United Kingdom, Germany, France, and Spain. The survey results clearly display the absence of a harmonized approach in the monitoring of antibiotics per animal species and the evaluation of resistances using the same methodology. There is no public long-term quantitative data available targeting the amount of antibiotics used in poultry, with the exception of France. Data on antibiotic-resistant E. coli are available for most regions but detection of resistance and number of isolates in each study differs among regions; therefore, statistical evaluation was not possible. Data from France indicate that the decreased use of tetracyclines leads to a reduction in the detected resistance rates. The fluoroquinolones, third-generation cephalosporins, macrolides, and polymyxins (“highest priority critically important” antibiotics for human medicine according to WHO) are approved for use in large poultry-producing

regions, with the exception of fluoroquinolones in the US and cephalosporins in the EU. The approval of cephalosporins in China could not be evaluated. Tetracyclines, aminoglycosides, sulfonamides, and penicillins are registered for use in poultry in all evaluated countries. The average resistance rates in E. coli to representatives of these antibiotic classes are higher than 40% in all countries, with the exception of ampicillin in the US. The resistance rates to fluoroquinolones and quinolones in the US, where fluoroquinolones are not registered for use, are below 5%, while the average of resistant E. coli is above 40% in Brazil, China, and EU, where use of fluoroquinolones is legalized. However, banning of fluoroquinolones and quinolones has not totally eliminated the occurrence of resistant populations.

Keyword: resistance; poultry; antimicrobial; avian

315. Causes of Mortality and Lesions Observed Post mortem in European Moles (Talpa europaea) in Cornwall, South-west England/ **Simpson, V.R.; Davison, N.J.; Dagleish, M.P.**. Journal of Comparative Pathology. ISSN:0021-9975 (2019) v.167 p.18-25Journal of Comparative Pathology

DOI: 10.1016/j.jcpa.2018.11.006

Link: http://www.sciencedirect.com/science/article/pii/S0021997518302251

Abstract: Summary European moles (Talpa europaea) are a common species in the UK, but there are few published data on the causes of mortality in these animals. An opportunistic post-mortem study was carried out on 44 moles found dead or dying in Cornwall, UK. Assessment of muscle condition and fat reserves, where possible, indicated that most (27 of 37, 73%) were in good nutritive condition. The majority had died of trauma (n = 40, 91%), the principal cause of which was predation (n = 36, 81.8%) by foxes and domestic cats and dogs. The carcases were in a variable state of preservation, but 28 cases were suitable for histopathological examination. This revealed lesions in the lungs of 92.8 % (26 of 28) of the animals. The commonest lesions comprised localized infiltration of the parenchyma by macrophages and eosinophils and in most cases the lesions were unlikely to have been of clinical significance; in two cases they were associated with infection by a parasitic nematode. One mole showed severe pneumonitis and hepatitis caused by infection with Toxoplasma gondii. Adiaspiromycosis was diagnosed in two moles, one by direct microscopical examination of the lung and one by histopathology; the lesions were not considered to be of clinical significance. Severe pleurisy and pericarditis caused by infection with Streptobacillus moniliformis was seen in a mole that had suffered bite wounds to a foot previously. Cholangitis due to infection by a protozoal parasite, provisionally identified as Cyclospora talpae, was a common histopathological finding (11 of 28, 39.3%); infection by the parasite did not appear to affect body condition adversely. Miscellaneous conditions identified were ulcerative dermatitis associated with gram-positive cocci (n = 1), extra medullary haemopoiesis in spleens (six of 12, 50%) and mineralized foci in pulmonary blood vessels (three of 28, 10.7%). No significant pathology was seen in the kidneys. This study suggests that the health status of moles in Cornwall is generally good and predation is a common cause of mortality. Pulmonary disease, associated in some cases with nematode infections, is also prevalent, but probably of little clinical significance. There is a high prevalence of cholangitis due to infection with a protozoan parasite believed to be C. talpae. Other diseases identified include adiaspiromycosis, streptobacillosis and toxoplasmosis.

Keyword: pathology; european mole ()

316. The effect of high-CO2 atmosphere in packaging of pork from pigs supplemented with rapeseed oil and antioxidants on oxidation processes/ **Brodowska, Marta; Guzek, Dominka; Jóźwik, Artur; Głąbska, Dominika;**

Godziszewska, Jolanta; Wojtasik-Kalinowska, Iwona; Zarodkiewicz, Magdalena; Gantner, Magdalena; Wierzbicka, Agnieszka. LWT. ISSN:0023-6438 (2019) v.99 p.576-582LWT

DOI: 10.1016/j.lwt.2018.09.077

Link: http://www.sciencedirect.com/science/article/pii/S0023643818308090

Abstract: This study was conducted to evaluate the effects of the chilled storage under an anoxic, high-CO2 atmosphere (80% CO2/20% N2) for 12 days on oxidation processes in pork from pigs fed with rapeseed oil and antioxidants. Pork necks were derived from animals fed a control fodder (C); a fodder with rapeseed oil (R); a fodder with rapeseed oil, selenium and vitamin E (R + Se + E); a fodder with rapeseed oil and selenium (R + Se); a fodder with rapeseed oil and vitamin E (R + E). The storage in the high-CO2 modified atmosphere packaging (MAP) had an effect on lipid oxidation, related to the diet of animals. The protein oxidation increased during the storage, regardless of animals' diet. The highest increase of protein oxidation (>60%) measured by the free thiol content was found in group R + Se + E. Activity of superoxide dismutase after the storage increased in all groups beyond R + Se + E. The oxidation processes of stored pork meat occurred despite anoxic atmosphere. Probably oxidation was initiated by oxygen present in muscle or by absorbed CO2 from surrounding atmosphere. The clustering data showed that storage of meat even in anoxic MAP cause undesirable changes in pork quality as a result of oxidation processes and prevail over dietary factors.

Keyword: Anoxic atmosphere packaging; Diet supplementation; Oxidation processes; Pork meat; Superoxide dismutase

317. Omega-3 fatty acids protects against chronic sleep-deprivation induced memory impairment/ **Alzoubi, Karem H.; Mayyas, Fadia; Abu Zamzam, Hamza I.**. Life Sciences. ISSN:0024-3205 (2019) v.227 p.1-7Life Sciences

DOI: 10.1016/j.lfs.2019.04.028

Link: http://www.sciencedirect.com/science/article/pii/S002432051930284X

Abstract: Aims The current study aims to evaluate the possible protective effect of omega-3 fatty acids on memory impairment induced by sleep-deprivation in rats. Materials and methods Animals were chronically sleep deprived using the modified multiple platform model (8 h/day for 8 weeks). Omega-3 fatty acids were administered as fish oil via oral gavage at a daily dose of 100 mg omega-3 PUFA/100 g BWT. The spatial learning and memory were evaluated using the radial arm water maze (RAWM). Additionally, the following oxidative stress biomarkers were measured in the hippocampus: glutathione (GSH), oxidized glutathione (GSSG), GSH/GSSG, glutathione peroxidase (GPx), catalase, superoxide dismutase (SOD), and thiobarbituric acid reactive substance (TBARS). Key findings Animals in the SD group committed significantly more errors in both short- and long- term memory tests of the RAWM compared to other groups. On the other hand, animals that were sleep deprived and treated with omega-3 fatty acids committed similar number of errors compared to the control group. This indicates that SD impaired both short- and long- term memories, and that chronic omega-3 fatty acids administration prevented these effects. Omega-3 fatty acids also prevented the decreases in hippocampal GPx, catalase and GSH/GSSG ratio and normalized the increases in GSSG levels, which were impaired by SD model. No changes were observed on hippocampal TBARS levels, or activity of SOD among experimental groups. Significance In conclusion, a protective effect of omega-3 fatty acids administration has been observed against chronic SD-induced memory impairment probably via improving hippocampus antioxidant effects.

Keyword: Hippocampus; Memory impairment; Sleep deprivation; Omega-3 fatty acids

318. Time-dependent changes in cognitive flexibility performance during intermittent social stress: Relevance for motivation and reward-seeking behavior/ **Sullivan, Lauren; Shaffer, Hannah; Hill, Christopher; Del Arco, Alberto**. Behavioural Brain Research. ISSN:0166-4328 (2019) v.370 p.111972Behavioural Brain Research

DOI: 10.1016/j.bbr.2019.111972

Link: http://www.sciencedirect.com/science/article/pii/S0166432819305054

Abstract: Repeated exposure to stress produces cognitive impairments that can lead to psychiatric disorders. How and when these cognitive impairments occur during repeated exposure to stress is not well understood. The present study investigates the time course effects of the exposure to intermittent episodes of social stress on cognitive flexibility performance. Male rats were trained to perform a cognitive flexibility (set-shifting) task. Then they were submitted to intermittent social defeat stress, which consisted of exposing animals to social defeat once every three days for ten days (four stress episodes). Set-shifting performance was evaluated before and in between social stress episodes, and up to ten days after the end of the stress protocol. Plasma levels of corticosterone after tail-pinch were also measured after the last set-shifting session. Intermittent exposure to social stress did not impair cognitive flexibility but produced short-and long-term changes in set-shifting performance. After the third social defeat episode, stressed animals required significantly more time to respond to cues (instrumental action) and to poke in the food-trough when no food pellet was delivered. These effects were reversed ten days after stress and suggest a decrease in motivation to pursue rewards. In contrast, stressed animals responded more accurately to light cues that predicted rewards. This effect, which emerged ten days after stress, suggests an increase in the reactivity to salient cues in the long-term. These time-dependent behavioral changes might help to understand the transition from social stress to stress-related disorders including drug abuse.

Keyword: Motivation; Corticosterone; Prefrontal cortex; Reward-seeking; Social stress; Time-dependent

319. Effects of supplementation of tris-egg yolk extender with different sugars and antioxidants on freezability of ram semen/ **Rostami, Behnam; Ebrahimi, Dariush; Sadeghipanah, Hassan; Masoumi, Reza; Shahir, Mohammad Hossein**. Cryobiology. ISSN:0011-2240 (2019) v. p.Cryobiology

DOI: 10.1016/j.cryobiol.2019.10.198

Link: http://www.sciencedirect.com/science/article/pii/S0011224019301907

Abstract: This study was designed to determine the effects of the combined addition of different levels of certain sugars (trehalose, sucrose and raffinose) and antioxidants (vitamin E, C and taurine), in Tris-egg yolk extender on frozen-thawed ram semen parameters. Semen samples were collected from five healthy, mature and fertile Iranian Afshari rams, twice a week for 8 weeks. Selected samples were pooled and diluted with a Tris-egg yolk extender containing different levels of sugars and antioxidants. In Experiment 1, different levels of trehalose (0, 50 and 100 mM) were tested with different levels of taurine (0, 25 and 50 mM), vitamin E and C (0, 1 and 2 mM). In Experiment 2, different levels of sucrose (0, 60 and 80 mM) were tested with different levels of taurine (0, 25 and 50 mM), vitamin E and C (0, 1 and 2 mM). In Experiment 3, different levels of raffinose (0, 5, 10 mM) were tested with different levels of taurine (0, 25 and 50 mM), and vitamin E and C (0, 1 and 2 mM). In Experiment 4, the selected extenders of experiments 1, 2 and 3 were compared statistically with control (no selected sugar and antioxidant) extender. The results of experiments 1, 2 and 3 revealed that the highest frozen–thawed sperm parameters were

recorded for the selected extenders containing 100 mM trehalose +2 mM vitamin E (T100E2), 60 mM sucrose + 2 mM vitamin E (S60E2) and 10 mM raffinose + 2 mM vitamin E (R10E2), respectively. The results of experiment 4 revealed that the post-thaw sperm total motility in T100E2 (62.41 ± 2.41%), S60E2 (59.52 ± 1.91%) and R10E2 (58.33 ± 2.00%) was higher than that of the control extender (46.00 ± 1.79%; P ≤ 0.05). Similarly, the progressive sperm motility in T100E2 (57.18 ± 1.96%), S60E2 (57.49 ± 1.94%) and R10E2 (55.03 ± 2.99%) was also higher than that of the control extender (41.20 ± 1.70%; P ≤ 0.05). Post-thaw sperm viability in selected extenders of T100E2 (65.20 ± 2.67%), S60E2 (62.00 ± 2.07%) and R10E2 (61.80 ± 2.46%) was higher than that of control extender (51.00 ± 1.88%; P ≤ 0.05). In conclusion, the addition of 100 mM trehalose, 60 mM sucrose and 10 mM raffinose combined with 2 mM vitamin E in Tris-egg yolk extender significantly improved frozen-thawed ram semen parameters.

Keyword: Antioxidants; Freezability; Ram semen; Sugars; Tris extender

320. Pomegranate seed in diet, affects sperm parameters of cloned goats following freezing-thawing/ **Zarepourfard, Hamid; Riasi, Ahmad; Frouzanfar, Mohsen; Hajian, Mehdi; Nasr Esfahani, Mohammad Hossein**. Theriogenology. ISSN:0093-691X (2019) v.125 p.203-209Theriogenology

DOI: 10.1016/j.theriogenology.2018.10.030

Link: http://www.sciencedirect.com/science/article/pii/S0093691X18303078

Abstract: Semen cryopreservation is affected by individual differences and use of cloned animal from the same source is the main tool to eliminate genetic variation. Pomegranate seed (PS) contains fatty acids and phenolic compounds which have antioxidant properties. Essential fatty acids and antioxidants are vital for production of healthy sperm by improving sperm membrane integrity and protecting sperm from oxidative stress. In this study, the effect of dietary supplementation of PS on some blood metabolites and sperm parameters following freezing-thawing of semen of cloned goats were investigated. 5–6 years cloned male goats (N = 9, 50 ± 2 kg) were randomly assigned to three different isocaloric and isonitogenous diet groups: supplemented with 0 (control), 30 and 60% (g/100 g of barley) replaced with PS for a total of 9 weeks. Sperm collection was carried out within 10–14 weeks. Semen samples were diluted whit cryo-protectant and frozen in liquid nitrogen. Sperm parameters, reactive oxygen species (ROS) as well as, ability to induce fertilization were evaluated following freezing/thawing. According to the results of our study, treatment with PS induce higher plasma cholesterol production compared to control group at 8th week. However, testosterone and MDA (malondialdehyde) level of blood plasma were not significantly affected by PS treatment. In comparison to control group, PS supplementation significantly improved total sperm motility and viability in both 30 and 60% PS groups and reduced ROS production. Cleavage rate and developmental competency to blastocyst stage were similar to fresh sperm. In conclusion, dietary supplementation with PS can improve sperm motility and viability following freezing-thawing and maintain developmental competency.

Keyword: Cloned goats; Essential fatty acids; Pomegranate seed; Semen cryopreservation; Sperm motility

321. MRI Quantitative Analysis of Eccentric Exercise-induced Skeletal Muscle Injury in Rats/ **Fu, Congcong; Xia, Yu; Meng, Fan; Li, Fei; Liu, Qiang; Zhao, Heng; Pan, Shinong**. Academic Radiology. ISSN:1076-6332 (2019) v. p.Academic Radiology

DOI: 10.1016/j.acra.2019.05.011

Link: http://www.sciencedirect.com/science/article/pii/S1076633219303010

Abstract: Background The aim of this study was to investigate the value of magnetic resonance (MR) quantitative analysis (MR-T2 mapping technique) for the evaluation of eccentric exercise-induced skeletal muscle injury. Materials and Methods We established an animal model of eccentric exercise-induced damage of Sprague Dawley rat skeletal muscle and evaluated the animals by MR imaging, determined the serum levels of fast skeletal troponin (fsTnI), and examined muscle histopathology, at 0, 1, 2, 4, and 7 days after eccentric exercise. The associations between MR imaging findings, and histopathological and laboratory results were evaluated. Results T2-weighted images (WIs) of quadriceps femoris muscles showed obvious high signal intensities after exercise, and the T2 values and serum fsTnI levels continued to increase, peaking at day 2 after exercise, $p< 0.05$. The histopathological findings in muscle specimens, which included swollen and ruptured cells, enlarged extracellular spaces, inflammation, and regeneration of muscle fibers, showed similar trends. After day 2, muscle specimens began to show evidence of self-repair, the T2WI signals decreased in intensity, and the T2 values and serum fsTnI levels decreased; however, at day 7 post injury, the values remained slightly higher than those in the control animals, $p< 0.05$. The T2 value was significantly correlated with the serum fsTnI level ($r = 0.896$, $p< 0.01$). Conclusion T2 mapping technology accurately reflects the histopathological and fsTnI abnormalities and the degree of skeletal muscle damage associated with eccentric exercise followed by recovery. Because T2 mapping technology is noninvasive and can be quantitatively analyzed, it might become the preferred method for performing the diagnosis of eccentric exercise-induced skeletal muscle injury.

Keyword: skeletal muscle; eccentric exercise; rat; serum fsTnI; T2 value

322. Tsc1/Tsc2 complex: A molecular target of capsaicin for protection against testicular torsion induced injury in rats/ **Javdan, Nasim; Ayatollahi, Seyed Abdulmajid; Choudhary, Muhammad Iqbal; Al-Hasani, Safaa; Kobarfard, Farzad; Mokhtarian, Kobra; Khoshmirsafa, Majid; Ata, Athar**. Chinese Herbal Medicines. ISSN:1674-6384 2(2019) v.11 p.216-221Chinese Herbal Medicines

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Link: http://www.sciencedirect.com/science/article/pii/S167463841930019X

Abstract: Objective The detailed knowledge about protective effects of capsaicin (cap) and involved mechanisms against testicular torsion (TT) is still not available completely. Methods Male Wistar rats were assigned into four major cohorts: (i) sham, (ii) TT, (iii) three subgroups subjected to TT and different doses of cap (100, 500, and 1000 μg/mL), and (iv) three subgroups of healthy animals subjected to various concentrations of cap. The animals were decapitated at 24 h after reperfusion, and the evaluation of protein expression was performed by Western blotting assay. At 72 h after reperfusion, apoptotic cell death and tissue injury were evaluated by TUNEL nuclear and H&E staining, respectively. Results The results showed that cap administration following TT significantly increased the expression of tuberous sclerosis proteins 1 and 2 (Tsc1/Tsc2) in a dose-dependent manner ($P < 0.05$). Cap decreased cell apoptosis at highest dose. Likewise, cap contributed to the preservation of tubular morphology and decreased tissue injury at the highest tested concentration (1000 μg/mL). Conclusion Collectively, our findings demonstrate the validity of cap as a therapeutic agent against TT through targeting Tsc1/Tsc2 in a dose-dependent manner.

Keyword: capsaicin; cell survival; molecular targets; testicular torsion; Tsc1/Tsc2 complex

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