



4th Annual University of Kentucky
Postdoctoral Research Symposium

June 1st, 2018

ABSTRACTS

Oral Presentations

10:00 am – Lindsey Hammerslag, Ph.D., UK Psychology

Fentanyl demand decreases after activation or blockade of mu opioid receptors in male rats

Individuals exhibiting high levels of economic demand for abused illicit opioids, such as fentanyl, in the month preceding treatment are more likely to use illicit opioids during medication-assisted therapy (MAT). Because MAT directly affects the reinforcing properties of opioids, it may alter demand in those who fail to achieve abstinence during treatment. We examined demand for fentanyl in rats following pre-treatment with buprenorphine, naltrexone, or morphine. Although these drugs have different effects on μ opioid receptors, we found that each of the drugs increased elasticity (price sensitivity) and decreased demand intensity. Interestingly, buprenorphine's effect on intensity was only present 24 and 48h after the initial test. Taken together, the results suggest that fentanyl demand is highly sensitive to μ opioid manipulation. The protracted effects of buprenorphine on demand suggest that patients who do not achieve abstinence from illicit opiates may still benefit from MAT.

10:15 am – Vishnu Modur, Ph.D., Cincinnati Children's Hospital Medical Center

Defective transcription elongation in a subset of cancers confers immunotherapy resistance

We report a phenotype in a significant portion of cancers characterized by widespread defects in mRNA transcription elongation (TE). Cancers with TE defects (TEdeff) were characterized by spurious transcription and defective mRNA processing, specifically in a large set of genes characterized by long genomic lengths, such as interferon/JAK/STAT and TNF/NF- κ B pathways, were consistently suppressed in TEdeff tumors. These, TEdeff tumors (renal cell carcinoma and metastatic melanoma patients) significantly correlated with the poor response and outcome in immunotherapy, but not chemo- or targeted therapy. Further, forced pharmacologic or genetic induction of TEdeff in tumor imposed resistance to the innate and adaptive anti-tumor immune responses and checkpoint inhibitor therapy in vivo. Therefore, defective TE is a novel epigenetic mechanism in the tumor arsenal of immune resistance tools, which warrants its assessment in cancer patients undergoing immunotherapy.

2:00 pm – Mark J. Garcia, Ph.D., UK Entomology

Neuromuscular Performance as Measures of Thermal Tolerance

Thermal tolerance is an important predictor of current species distributions, the potential to invade new environments, and species' responses to rapid climate change. Here we sought to validate a novel, behavioral assay, Rapid Iterative Negative Geotaxis (RING), for measuring thermal tolerance in *Drosophila melanogaster*. We exposed flies to chilling conditions, and examined how exposure duration, recovery time, and cold acclimation influenced physical performance. Exposure duration had a significant impact on physical performance, with reaction time increasing and rate of climbing decreasing as cold exposure increased from 2-24 h. Increasing recovery time improved performance gradually, with flies regaining most functionality within 24 h. Finally, cold acclimation showed no effect on post-exposure performance, with acclimated and non-acclimated showing similar declines in performance. Our results show that RING is a robust assay for non-invasively assessing insect thermal tolerance.

2:15 pm – Mike Petriello, Ph.D., UK Saha Cardiovascular Research Center

Serum levels of dioxin-like pollutants are positively associated with the cardiometabolic disease risk biomarker TMAO in leaner individuals

Cardiovascular disorders are largely caused by genetic and environmental factors. Well-studied determinants of increased CVD risk include smoking and poor nutrition, but emerging data now implicate exposures to pollutants as an important contributor to inter-individual variability in CVD risk. It is also critical to identify biomarkers of exposure and CVD. Emerging biomarkers such as trimethylamine-N-oxide (TMAO) have been associated with increased risk of CVD. We published exposure to dioxin-like chemicals can increase circulating levels of TMAO in mice. Dioxins strongly increased the enzyme responsible for TMAO production, FMO3, resulting in amplified increases in TMAO. To investigate if these associations are evident in humans, we used mass spectrometry to quantitate TMAO in the highly exposed Anniston Alabama cohort. We determined that exposure is significantly associated with increased circulating TMAO. These associations are evident only in women and diminish as BMI increases.

2:30 pm – Kenton Sena, Ph.D., UK Forestry and Natural Resources

Phytophthora cinnamomi Colonized Reclaimed Surface Mined Sites in Eastern Kentucky: Implications for the Restoration of Susceptible Species

Appalachian forests are threatened by a number of factors, especially introduced pests and pathogens. Among these is *Phytophthora cinnamomi* (Pc), a soil-borne oomycete pathogen known to cause root rot in American chestnut, shortleaf pine, and other native tree species. This study was initiated to characterize the incidence of Pc on surface mined lands in eastern Kentucky, USA, representing a range of time since reclamation (10, 12, 15, and 20 years since reclamation). Pc was detected in only two of the four sites studied, aged 15 and 20 years since reclamation. These sites were generally characterized by higher organic matter accumulation than the younger sites in which Pc was not detected. These results demonstrate that Pc is capable of colonizing reclaimed mine sites in

Appalachia; additional research is necessary to determine the impact of Pc on susceptible tree species at these sites.

2:45 pm – Shogo Mori, Ph.D., UK Pharmaceutical Sciences

How are non-ribosomal peptides methylated? A tale of interrupted adenylation domains

Natural products (NPs) are the most important sources of drugs. They are produced by various enzymes including non-ribosomal peptide synthetases, modular enzymes that contain multiple catalytic domains in each module. Each domain normally has a specific function, but the adenylation (A) domains sometimes embed another functional domain within their structures. Such A domains, called interrupted A domains, play an important role in tailoring NP structures. We have now biochemically and structurally characterized interrupted A domains found in the biosynthetic pathway of thiocoraline and thiochondrilline A, which contain unique N,S-dimethyl-L-cysteine residues, whose dimethylation was proposed to be catalyzed by two different methylation domains embedded in two different interrupted A domains. We identified the pathway for constructing the residue and solved the crystal structure of an interrupted A domain. Doing so gained insight into the mechanism by which interrupted A domains work.

3:15 pm – Naser Pourakbar Sharifi, Ph.D., UK Civil Engineering

Application of a PCM-Rich Concrete Overlay to Control Thermal-Induced Curling Stresses in Concrete Pavements

This study aims to evaluate the application of a PCM-rich concrete overlay to reduce curling stresses in concrete pavements. Curling stresses are the results of temperature gradient in pavements. The weather conditions, which have a cyclic nature, are the source of curling stresses, and they cause cyclic tensile and compressive stresses in pavements. This phenomenon causes fatigue damage in concrete pavements and reduces their service life. The PCMs have a high latent heat of fusion and can increase the thermal inertia of concrete. When PCM is used in a concrete overlay, it tends to moderate the temperature gradient in the slab, and thus mitigate the curling stresses. The findings of this research demonstrated that the cumulative fatigue Damage Index resulted from repetitive curling stresses can be up to 22% in a concrete slab with the service life of 35 years. However, using a 7.6 cm bonded concrete overlay with 25 vol.% PCM can moderate the curling stresses.

3:30 pm – Keisha Nicole Hardeman, Ph.D., Vanderbilt University

Proliferation and Bioenergetics Are Uncoupled in BRAF-mutated Melanomas

The metabolic landscape of cancer resistance remains largely unknown, particularly in the context of oncogenic lesions such as mutant BRAF kinase. Using substrate-inhibitor combinations targeting fatty acids, glutamine, and pyruvate, we found that these melanomas have an absolute requirement of fatty acid oxidation (FAO) for ATP-linked oxygen consumption. Interestingly, however, FAO is not necessary for these cells to proliferate: inhibition of the rate-limiting FAO enzyme with inhibitor Etomoxir has no effect

on growth. Considering the requirements of fatty acids for membrane physiology, inhibition of FAS robustly decreases proliferation. Proliferation assays with the other two inhibitors (UK5099 and BPTES for mitochondrial pyruvate and glutamine, respectively) showed only sensitivity to BPTES. Conceptually, our model suggests a dichotomized view of fatty acids broken down and oxidized for ATP and fatty acids synthesized through reductive carboxylation of possibly glutamine.

3:45 pm – Melise C. Lecheta, Ph.D., UK Entomology

Insects help to solve crimes: a real use case from Brazil

Hundreds of arthropods species are attracted by corpses, and the use of insects and other arthropods in forensic investigations is called forensic entomology. In criminal-medical investigations the main use of the insects is to determine the postmortem interval (PMI), i.e. the time elapsed between the time at which an insect lays eggs on a body and its discovery. On December 13, 2011, a body in an advanced state of decomposition was found in a house in the city of Curitiba, Brazil. The only access to the body by insects was apparently through the back door, which was half open when the crime scene investigators arrived. Investigators collected several insect samples from the crime scene. Samples in more advanced stages of development were used to estimate the time of death and belonged to two different species of blowfly. Using both species found at the site, the minimum PMI was estimated at 7–8 days.

4:00 pm – Yasir Alsiraj, Ph.D., UK Pharmacology and Nutritional Sciences

Inhibition of neprilysin attenuates AngII-induced abdominal aortic aneurysms (AAAs) and atherosclerosis in hypercholesterolemic male mice

Objective: Abdominal aortic aneurysm (AAA) is a symptomatic deadly vascular disease of elderly men. In this study, we examined the effect of the neprilysin inhibitor, sacubitril, on AngII-induced AAAs in male LDLr^{-/-} mice.

Methods and Results: Male LDLr^{-/-} mice were fed a Western diet for the duration of the study. Vehicle or sacubitril (S, 1, 6 or 20 mg/kg/day) were administered for one week, and then vehicle or S (at respective doses) in combination with AngII were administered for 28 days. Sacubitril decreased systolic blood pressure in a dose-dependent manner. Sacubitril dose-dependently reduced suprarenal aortic lumen diameters and maximal AAA diameters at study endpoint. AAA incidence was significantly reduced by S20 mg/kg/day. Similarly, sacubitril reduced atherosclerosis in a dose-dependent manner.

Conclusions: These results demonstrate that inhibition of neprilysin protects against AngII-induced atherosclerosis and AAAs in male LDLr^{-/-} mice.

4:15 pm - Megan Johnstone, Ph.D., Cincinnati Children's Hospital Medical Center

DEK Over-Expression in Breast Epithelial Tissue Creates a Pro-Oncogenic Environment

Dense breast tissue has an increased risk for developing breast cancer (BC). Currently, no biomarkers exist that distinguish dense from transformed breast tissue. DEK, a classic oncoprotein, is upregulated in BC. Previous findings reveal DEK over-expression (DEK

OE) promotes proliferation and invasion through WNT/ β -catenin signaling. Conversely, DEK knockdown mitigates xenograft tumorigenesis. Our novel conditional mammary specific DEK OE murine model develops dense epithelial breast tissue similar to human conditions. Longitudinal findings reveal DEK OE results in transformation of mammary epithelial tissue with carcinoma in situ development. Histological findings reveal elevated canonical WNT targets- β -catenin and AXIN. Our data suggest that DEK OE promotes proliferation of mammary epithelium through aberrant WNT signaling- consistent with human pathology. These findings indicate the prospective use of DEK as a biomarker for potentially transformative dense breast tissue.

Printed Posters

1. Naser Jafari, Ph.D., UK Toxicology and Cancer Biology

De novo fatty acid synthesis driven sphingolipid metabolism promotes metastatic potential of colorectal cancer

The purpose of this study is to determine the functional significance of the FASN/SPHK axis in CRC. Expression of FASN, SPHK1 and SPHK2 was evaluated in CRC TMA. Primary CRC cells were treated with TVB-3664, a novel FASN inhibitor, or with FTY-720, an S1P mimetic that inhibits SPHK1 and the S1P receptor, and proliferation and migration capabilities of cells were assessed. Formation of focal adhesions was evaluated by TIRF microscopy.

We showed that FASN, SPHK1 and SPHK2 are highly expressed in primary tumors and liver metastasis as compared to normal colon tissues. TVB-3664 and FTY-720 treatments significantly inhibited cellular proliferation and reduced migration capabilities of primary CRC cells. Consistently TVB-3664 and FTY-720 significantly reduced formation of focal adhesions and reduced activation of p-MET, p-FAK, and p-PAX.

2. Kai Zhang, UK Pharmacology and Nutritional Sciences

Inhibition of MCP-1/CCR2 Signaling Protects Developing Brain Against EtOH-Induced Damage

Neuroinflammation and microglia activation have been implicated in both alcohol use disorders (AUD) and fetal alcohol spectrum disorders (FASD). MCP-1 and its receptor CCR2 are critical mediators of neuroinflammation and microglial activation. One of the most devastating outcomes of FASD is the loss of neurons in the CNS. The underlying molecular mechanisms, however, remain unclear. We hypothesized that MCP-1/CCR2 signaling mediates ethanol-induced neuroinflammation and microglial activation, which exacerbates neurodegeneration in the developing brain. We showed that treatment of MCP-1 or CCR2 inhibitor significantly reduced EtOH-induced microglia activation and neuroinflammation, and neuroapoptosis in the developing brain. Moreover, ethanol and MCP-1 caused more neuronal death in a neuron/microglia co-culture system than neuronal culture alone. Bindarit and RS504393 attenuated ethanol-induced neuronal death in the co-culture system.

3. Jiaying Weng, UK Statistics

Fourier Transform in Sufficient Dimension Reduction

Most inverse dimension reduction techniques of sufficient dimension reduction require the number of slices in the slicing method or bandwidth in the kernel approach, which could be problematic. We develop an optimal inverse regression estimator by optimizing the quadratic discrepancy function using Fourier transforms: Fourier transform inverse regression estimation. Using Fourier transform avoid the idea of using slicing or bandwidth. The degenerate and robust Fourier transform inverse regression estimators are developed for less computational and robust cases, as well as the partial Fourier transform inverse regression estimator for predictors with categorical and continuous. In addition, the shrinkage and the sparse group LASSO Fourier transform inverse regression are used for variable selection.

4. Vira Pravosud, UK Epidemiology

Hepatitis C Virus and Risk of Chronic Kidney Disease: A Systematic Review

This was a systematic literature review of population-based studies whose aim was to find associations between HCV and risk of early onset of CKD. Fifteen studies conducted in Japan (n=1), Taiwan (n=5), and in the U.S. (n=9) were included. The number of participants ranged from 865 to 1021049. The prevalence of HCV ranged from 0.3% to 63.8%. Median follow-up time to observe development of CKD ranged from 2.1 to 11.4 years for the cohort studies. The percentage of observed CKD ranged from 0.6% to 31.8%. Ten studies: 5 cohort studies (1 prospective and 2 retrospective cohort studies from Taiwan, and 2 retrospective cohort studies from the U.S.) as well as 5 cross-sectional (1 from Japan, 2 from Taiwan, and 2 from the U.S.) studies showed that individuals infected with HCV were significantly more likely to present with CKD. Three cross-sectional and 2 retrospective cohort studies from the U.S. found either no associations or decreased odds of development of CKD.

5. Marion Coe, UK Pharmacology and Nutritional Sciences

Still too Drugged to Drive: Nighttime Use of Alprazolam Results in Next-Day Driving Impairment

The prevalence of drugged driving has increased in the United States, and some prescription medications cause impairment after the predicted duration of therapeutic action has elapsed. The aim of this study is to determine if bedtime administration of alprazolam impacts driving performance the next day. Participants were healthy adult volunteers who completed a 6-session, double-blind, double-dummy within-subjects design study comparing the effects of bedtime alprazolam (.5, 1 & 2mg) to positive and negative controls on next-day driving performance, and other measures of drug effect. Outcomes were collected the afternoon before drug administration and repeatedly 1-7 hours after waking the next day. Dose-related decrements in driving and other task performance were observed for bedtime-administered alprazolam—indicating that alprazolam used at night may pose an as yet unrecognized public safety risk in the form of residual next-day drugged-driving.

6. Hsuan Peng, UK Pharmacology and Nutritional Sciences

Biodegradable Polymer Enhances Stem Cell Retention After Transplant

Mesenchymal Stem Cells (MSCs) are promising sources of cellular therapy owing to their angiogenic and immunomodulatory potential. However, MSC mediated therapeutic benefits in cardiac repair are strongly correlated with their engraftment efficiency at the transplantation sites. To enhance MSC based cellular therapy, we coated MSCs with 100nM biodegradable gelatin polymer (gelMA) on cell surface to improve retention without compromising survival and metabolic activity. To evaluate engraftment efficiency of gelMA coated MSCs in vivo, we injected coated and uncoated GFP+ MSCs into a mouse heart post induced myocardial infarction. Retention of MSCs was evaluated by flow cytometry and immunohistochemistry. Our data provide first evidence that biodegradable coating can enhance the retention of transplanted MSCs and provide the basis for more successful regenerative therapies.

7. Laura Peterson, UK Physiology

The potential role of ribosome specialization in striated muscle

Both eukaryotes and prokaryotes require ribosomal protein L3 (RPL3) for ribosome maturation and function; however, striated muscle breaks this rule and instead substitutes its own ribosomal protein. RPL3-like (MRP). During periods of muscle growth, such as post-natal development, there is a rapid switch from MRP to RPL3 containing ribosomes. Both the robust specificity and the dynamic nature of MRP expression portend an important role in skeletal muscle. Preliminary data from ribosome footprinting suggests that MRP may preferentially associate with muscle-specific transcripts through a 5'UTR-mediated mechanism. We hypothesize the loss of MRP containing ribosomes will lead to the disruption of transverse tubule structure resulting from the mis-expression of proteins involved in transverse tubule formation and maintenance. In support of our hypothesis, live cell imaging of cardiomyocytes from MRP knockout mice revealed a significant disruption of transverse tubule organization.

8. Christina Savage, UK Microbiology, Immunology and Molecular Genetics

Nucleic acid-binding proteins SpoVG and c-di-GMP-binding PlzA modulate response to environmental cues in the Lyme disease spirochete B. burgdorferi

Our lab is focused on elucidating the cues that inform *B. burgdorferi* of its environment, and the mechanisms by which it remodels its cellular programs. SpoVG is a DNA-binding protein, which binds to numerous sites on the chromosome, and binds RNAs that contain the same sequence as its known DNA-binding sites. Moreover, SpoVG interacts with the borrelial c-di-GMP binding protein, PlzA. The signaling molecule c-di-GMP is essential for survival in the tick. We demonstrated that PlzA also binds DNA. These two proteins influence expression of numerous genes important for various life cycle stages. SpoVG and PlzA also influence their own expression. We hypothesize that, together, they broadly affect how *B. burgdorferi* is able to adapt to different environments through mechanisms

such as influencing the structure of the chromosome and modulating efficiency of translation.

9. Yalda Khosravi, Ph.D., The Ohio State University

Management of Oral Biofilms by Microspray Disruption of Pathogenic Microenvironments

Dental plaque biofilms are the causative agents of caries, gingivitis and periodontitis. Recently we have shown that when subject to high velocity fluidjets and sprays, biofilms can be fluidized allowing the more efficient delivery of antimicrobial agents and microparticles into the depths of a *Streptococcus mutans* biofilm. We hypothesize that this same process may disrupt anaerobic niches reducing the abundance of anaerobic pathogens in the biofilm. We used planar optodes to measure the oxygen concentration at the base of biofilms grown from human dental plaque and saliva that were subject to repeated “shooting” treatments with a commercial Philips Sonicare AirFloss (AF). We assessed the impact on the biofilm community by Real Time (RT) and normal PCR of 6 target species. After each shooting much of the biofilm was removed and the base of the biofilm became aerobic. PCR showed a reduction in all of the monitored species.

10. Namal Wanninayake, UK Chemistry

Cellulose - Graphene Quantum dot composite membranes using ionic liquid

In this work, a membrane that can efficiently remove small molecules (> 300 Dalton) was created by incorporating graphene quantum dots (GQDs) into a cellulose membrane using an ionic liquid (1-ethyl-3-methylimidazolium acetate) via phase inversion. GQDs play a vital role in this process. 1) GQDs strongly bind with cellulose and form a stable composite membrane. 2) The negative surface charge of GQDs prevents aggregations during phase inversion. 3) Due to the small size of GQD (~5 nm), they form fewer defects on the membrane. In this study, the membrane pore size was varied by adjusting gelation bath temperature during phase inversion. It was noted that the membrane cast at 4 °C showed the rejection of methylene blue up to 80%, and 5000 Da blue dextran to 95.9%. These results indicate that GQD cellulose membrane can be modified to tune the rejection of small molecules and thus capable of closing the performance gap between nanofiltration and ultrafiltration membranes.

11. Praveen Kumar Chintakunta, Ph.D., UK Entomology

Synthetic Stereoisomers of Western Corn Rootworm Pheromone: A Sustainable Defense Against the Billion-Dollar Beetle.

The western corn rootworm (WCR) is one of the most invasive insect species against maize crop. Because of its immense damage to the crop, this American beetle is often referred to as “billion-dollar beetle”, or the “nightmare beetle”. Our present study is to understand the stereochemistry of WCR pheromone in attracting western corn root worms. A new, simple and more convenient synthetic method has been developed for the synthesis of all stereoisomers of WCR pheromone. Prepared pheromones are being

tested in the corn field for WCR trapping experiments. Initial interesting field test results are presented.

12. Rakshamani Tripathi, Ph.D., UK Pharmacology and Nutritional Sciences

Abl and Arg mediate cysteine cathepsin secretion to facilitate melanoma invasion and metastasis

The incidence of melanoma is increasing, particularly in young women, and the disease remains incurable for many because of its aggressive, metastatic nature and its high rate of resistance to conventional, targeted, and immunological agents. Cathepsins are proteases that are critical for melanoma progression and therapeutic resistance. We investigated the signaling pathways leading to increased cathepsin secretion in melanoma cells. We found that the nonreceptor tyrosine kinases Abl and Arg promoted the secretion of cathepsin B, L by activating transcription factors (Ets1, Sp1, and p65). As an indication of clinical relevance, Abl/Arg-driven invasion in culture and metastasis in vivo required cathepsin secretion. These data suggest that drugs targeting Abl kinases, many of which are FDA-approved, might inhibit cathepsin secretion in melanomas and potentially other aggressive cancers harboring activated Abl kinases.

13. Fei Liu, UK Mining Engineering

Numerical Simulation and Testing of Explosion Strain Waves

A numerical simulation with erosion model was created for the research of the propagation of stress waves and cracks by using ANSYS/LS-DYNA. The diagonals of top and sides surface were broken completely for the stress concentrating and tensile waves. The simulated curves were compared with the measured wave-forms and anatomized very well. The results showed that the explosion strain waves were formed by the joint action of shock wave and reflected tensile wave caused by the explosion gas. The duration of them was about 5 μ s and 15 μ s, respectively. The strain of shock wave was about $-3.5 \times 10^4 \mu\epsilon$ and $-1.0 \times 10^4 \mu\epsilon$ at the distance of 50 mm and 150mm from the explosive source, respectively. And that of explosion gas was about $5 \times 10^4 \mu\epsilon$ for simulated waves and $9 \times 10^4 \mu\epsilon$ for measured waves. The radial strain wave caused by shock wave was attenuated obviously with the distance increasing while the reflected tensile wave caused by the explosion gas almost keep the same within the certain range.

14. Cagney Coomer, UK Biology

Loss of function of Her9 causes retinal, craniofacial, and digestive system

To investigate the role of Her9 during development, we generated *her9* mutants using CRISPR technology and characterized their phenotypes. Two mutant alleles of *her9* were isolated – a 1bp deletion and a 1bp insertion that both produce early stop codons resulting in a truncated Her9 protein. Using qPCR we show a decrease in *her9* mRNA expression in the homozygous mutants compared to their wild type siblings, suggesting the mutations result in nonsense-mediated decay. In the retinas of *her9* homozygous mutants, we observed a reduced number of rod photoreceptors, cone photoreceptors with an abnormal morphology and a reduced ciliary marginal zone. In addition to retinal defects,

her9 mutants also have an enlarged liver, abnormal digestive tract, and abnormal or missing pharyngeal arches. Our results indicate that Her9 has an important role in retinal development and may regulate neural crest cell lineages that contribute to craniofacial structures and parts of the developing digestive system.

15. Robert-Marlo Bautista, UK Markey Cancer Center

Pharmacological cAMP induction induces melanization of the skin and improves recovery from UV injury in MC1R heterozygous skin

Melanoma is the deadliest form of skin cancer and represented 5.2% of all US cancer cases in 2017. Melanoma disproportionately affects individuals with fair complexions and red hair due to the individuals' defective melanocortin 1 receptor (MC1R). MC1R is a G protein-coupled receptor found on melanocytes and regulates melanin synthesis and DNA repair. Inheritance of one or more defective MC1R allele raises one's risk of melanoma due to dysfunctional melanocyte UV responses. MC1R heterozygous individuals comprise a sizable portion of Melanoma patients. We are interested in reducing melanocyte UV injury through cAMP signaling onto Mc1r-heterozygous animals modeling the melanoma-prone MC1R-heterozygous human. Daily topical applications of Forskolin (FSK) onto Mc1r^{E/e} transgenic mice resulted in a darkening of the skin over the course of three weeks. We are studying the degree of photoprotection from UV-B radiation and the extent of FSK induced DNA repair of UV-induced DNA damage.

16. Ahmed Al-Darraj, UK Pharmacology and Nutritional Sciences

Azithromycin as Cardiovascular Immunotherapy

Myocardial infarction (MI) is a primary cause of morbidity and mortality globally. In the exacerbated post-MI inflammation, the inflammatory macrophages can lead to heart failure while the reparative ones is protective. Azithromycin (AZM) can shift macrophages to the reparative phenotype. So that, we hypothesized that AZM modulates post-MI inflammation and improves cardiac remodeling. Methods and results: Male mice were treated with either oral AZM or vehicle for 10 days. We observed a significant reduction in mortality with AZM therapy. AZM decreases the inflammatory and increases the reparative macrophages in the heart as assessed. This drug significantly declines pro- and increases anti-inflammatory cytokines expression. Finally, AZM treatment improved cardiac recovery, scar size, and angiogenesis. Conclusion: AZM plays a protective role post-MI by modulating inflammation. Human translational studies are warranted to examine the therapeutic applications of AZM.

17. Nader El Seblani, M.D., UK Neuroscience

Neuro-Avatar: A reverse translational model of an ongoing cell therapy clinical trial for Parkinson's disease

Parkinson's disease (PD) is a progressive, neurodegenerative disorder with an annual incidence of 50,000 and costs of \$ 25 billion in US alone. There is no current cure for PD. Pre-clinical research shows that at earlier pathological stages, brain neurons retain some characteristics to recover if they are in an optimal neural repair media. Our research

investigates a new therapeutic approach to provide such media using autologous peripheral nerve (PN) grafts as a source of the neural repair cells. Two clinical trials are currently underway which feature the grafting of PN in the brain in combination with Deep Brain Stimulation (DBS) for the treatment of patients with Parkinson's disease. The grafts are harvested from the sural nerve in the ankle of PD patients. RNA sequencing of the grafts shows changes into neural repair phenotype of Schwann cells. To assess the regenerative activity and survival of the grafts tissue, athymic rats were implanted with the same human nerve tissue.

18. Erin Jackson, Ph.D., UK Pharmacology and Nutritional Sciences

Sex differences in response to PCB-induced toxicity and AhR deficiency in obese mice during weight loss

Coplanar polychlorinated biphenyls (PCBs) are ligands of the aryl hydrocarbon receptor (AhR). Lipophilic PCBs biosequester in adipocyte lipids, resulting in greater body burdens in obese individuals. When lipids are mobilized from adipocyte stores of obese subjects during weight loss, liberated PCBs can act via AhR to negatively influence health. We demonstrated previously that PCB administration to obese mice resulted in impairment of glucose tolerance when obese mice underwent weight loss. In this study, we tested the hypothesis that whole body AhR deficiency in obese male and female mice exposed to PCB-77 would diminish PCB-induced impairment of glucose homeostasis during weight loss. The results suggested that male and female mice respond differently to PCB-77 and whole body AhR deficiency in the regulation of body weight. Results also demonstrated that PCB-77 impaired glucose homeostasis during weight loss through an AhR-mediated mechanism in obese male mice, but not females.

19. Eva Gatineau, Ph.D., UK Pharmacology and Nutritional Sciences

The prorenin receptor and its soluble form stimulate hepatic triglyceride and cholesterol metabolism in male mice

We previously demonstrated that mice lacking adipose prorenin receptor (PRR) have elevated hepatic triglycerides (TG) and cholesterol contents, associated with an increase in hepatic PRR and plasma soluble PRR (sPRR). This study aimed to determine if PRR and sPRR stimulate hepatic triglycerides and cholesterol synthesis. PRR floxed mice were injected with an adeno-associated virus thyroxine-binding globulin Cre or saline to knock-out (KO) PRR in liver. Hepatic TG levels were decreased in KO mice, likely due to the decrease in PPAR α expression. Surprisingly, liver-PRR KO increased plasma sPRR but also hepatic total cholesterol levels and SREBP-2 expression. To determine whether sPRR stimulated cholesterol synthesis, HepG2 cells were treated with sPRR and sPRR was infused in mice. Both approaches showed that sPRR up-regulated hepatic SREBP2 expression. Overall, we showed that hepatic PRR positively regulated TG contents via PPAR α and that sPRR stimulated cholesterol synthesis via SREBP2.

20. Caleb Calvary, University of Louisville

Synthesis and Characterization of New Bis(thiosemicarbazonato)Ni(II) Complexes for Electrocatalytic Hydrogen Evolution

Two new bis(thiosemicarbazonato) nickel(II) complexes NiATSM/TMAEDA (1) and NiATSTMAEDA (2) were obtained by transamination of the parent ligand, diacetyl-2,3-bis(N4-methyl-3-thiosemicarbazone) (ATSM) with N,N-dimethylethylenediamine and followed by alkylation to create the quaternary amine. Complexes 1-2 were fully characterized by elemental analysis, NMR spectroscopy, mass spectrometry, cyclic voltammetry, and X-ray crystallography. Both Ni(II) complexes crystallize as orange plates and display a square-planar geometry in the solid state. Cyclic voltammetry studies indicate that complexes 1-2 act as catalysts for the electrochemical hydrogen production with acetic acid. The electrochemical effects of quaternarization of the amine moiety on the ligand framework will be discussed.

21. Madhur Agrawal, Ph.D., UK Pharmacology and Nutritional Sciences

Diet high in fat and salt recapitulates the type 2 diabetes-predictive human Th17 cytokine profile in mice

Inflammation plays critical roles in type 2 diabetes (T2D) pathogenesis. We demonstrated one T-cell subset, Th17s, produce a cytokine signature that predicts T2D in people. The failure of animal models to recapitulate the dominance of Th17s in obesity-associated metabolic decline makes preclinical tests on roles for Th17s in T2D challenging. Since salt promotes development of Th17 cells, we hypothesized that feeding mice a diet high in fat and salt would yield a mouse model that recapitulates the Th17-inflammatory profile. We fed mice high fat/low salt (HFD) or high fat/high salt (HSD) diet. HFD and HSD mice were similar in body weight, glycemic control and fat distribution. T-cells from HSD mice secreted more IL-17A, IL-17F, IL-22, IL-13 and GM-CSF, which approximate the human T2D-predictive Th17 signature. Our data suggest the possibility that this mice model could be useful for testing of Th17 blocking drugs like secukinumab for T2D pathogenesis.

22. Mohamed Abo-Aly, M.D., UK Gill Heart Institute

Percutaneous Coronary Intervention vs Coronary Artery Bypass Grafting in coronary artery disease: Meta-analysis.

Objective: Compare the efficacy of percutaneous coronary intervention (PCI) with coronary artery bypass grafting (CABG) in patients with coronary artery disease. Methods: Databases were searched for relevant Randomized controlled trials (RCTs). Clinical outcomes were assessed beyond 1-year follow-up. Results: Nine RCTs were identified. CABG showed a significant reduction of MACCE (OR 1.53; 95% CI: 1.37-1.7; P= 0.0001), recurrent MI (OR 1.78; 95% CI: 1.23-2.57; P=0.002), a composite endpoint of death, stroke and MI (OR 1.24; 95% CI: 1.06-1.46; P= 0.008), and repeated revascularization (OR 2.14; 95% CI: 1.7—2.6; P=0.0001). No significant difference was found between both strategies in terms of all-cause mortality, cardiac mortality, and stroke. Meta-regression analysis showed a strong trend favoring CABG in terms of all-cause mortality over time. Conclusion: CABG is superior to PCI in terms of cardiovascular outcomes. However, our data are inconclusive regarding mortality benefits.

23. Kayla Titiali, UK Biology

Elucidating the effects of embryonic hyperglycemia on retinal development in Danio rerio

Poor blood glucose regulation has been linked tissue damage in the eye. Yet, little is known about the effects of embryonic hyperglycemia on retinal development. To address this question, our lab has established a protocol for inducing hyperglycemia in zebrafish embryos. XOPS:GFP zebrafish embryos were submerged in 50mM glucose or fructose, mannitol, +/- 10µM dexamethasone from 10 to 96 hours post fertilization (hpf). At 96 hpf larval heads were fixed and tail used to quantify glucose concentration using a glucose assay from Biovision. The fixed heads were processed for sectioning and immunohistochemistry to label and quantify cell types in the retina. Our results show that glucose + dex increased whole body glucose concentration by 2.5-fold and a reduction in rod and cone photoreceptor cells. Fructose + dex treated embryos had an increase in rod and cone photoreceptors. Our evidence results suggest that embryonic hyperglycemia results in abnormal retinal development in the zebrafish.

24. Huangjie Gong, UK Electrical Engineering

Optimal Battery Sizing for Net Zero Energy Homes Operating as Constant Sources or Sinks of Power

Net zero energy (NZE) homes, which supply and absorb zero power from the grid over a year, commonly employ solar panels, and the local power company faces challenges of distribution asset overloading during periods of peak availability of solar power, which coincides with periods of small load demand. This work discusses the operation of homes in Net zero energy (NZE) communities as controllable sources and sinks of power, thereby eliminating all challenges related to solar power variability. This is achieved by the controlled charging and discharging of batteries installed in NZE homes, and the work also proposes a method for their optimal sizing.

25. Wen Wen, Ph.D., UK Pharmacology and Nutritional Sciences

MANF Protects Neurons from Alcohol Induced Neurodegeneration

Alcohol exposure leads to significant neurodegeneration in the developing brain due to elevated endoplasmic reticulum (ER)-stress. Mesencephalic astrocyte-derived neurotrophic factor (MANF) is an ER-stress inducible protein. We hypothesize that MANF may act to maintain ER homeostasis in response to alcohol exposure and deficiency of MANF makes neurons more susceptible to alcohol-induced neurodegeneration. Mouse N2a cells were used as an in vitro model. MANF deficient N2a cells were generated by CRISPR/Cas9. Purkinje cell specific MANF knockout mice were used for locomotor behavior tests. We found that alcohol exposure induced ER-stress and MANF expression in N2a cells. MANF deficient N2a cells exhibit reduced cell viability. Purkinje cell specific MANF deficient mice showed reduced numbers of Purkinje cells and deficits in their locomotor behavior after alcohol exposure. These results indicate that MANF can protect neurons from alcohol-induced neurodegeneration.

26. Qi Ying, Ph.D., UK Toxicology and Cancer Biology

HDAC6 plays a critical role in Sulfiredoxin-mediated activation of the epidermal growth factor receptor signaling in human colorectal cancer

Epidermal growth factor receptor (EGFR) plays important role in colorectal cancer by stimulating cell proliferation and survival. Binding of extracellular ligands, mainly EGF, leads to the dimerization of EGFR that triggers the activation of downstream mitogen activated protein kinases. In addition to the amount of ligand binding, the strength and duration of EGFR signaling are also affected by the posttranslational modifications of the receptor itself, such as phosphorylation, ubiquitination, acetylation, etc. Previous, we demonstrated that Srx enhances the activation of EGFR signaling in colorectal cancer cells through the inhibition of receptor acetylation at lysine residue 1061. However, the molecular mechanism by which Srx regulates EGFR acetylation is still unclear. In this study, we investigated (1) the mechanism of EGFR acetylation and its regulation by Srx; (2) the functional consequence of EGFR acetylation on EGF-induced receptor dimerization, trafficking and degradation.

27. An-Hsuan Lin, Ph.D., UK Physiology

Mechanisms underlying the stimulatory effect of sulfur dioxide on rat vagal bronchopulmonary sensory neurons

Transient exposed to sulfur dioxide (SO₂) can causes cough reflex, indicating a stimulatory effect of SO₂ on airway nerves. Recently, our lab has proved pulmonary C-fibers are the key target of inhaled SO₂. This study aimed to examine the mechanism of the stimulatory effect of SO₂ on pulmonary C-fibers. Single-unit fiber activities of these afferent nerves to SO₂ were measured in anesthetized rats. Our preliminary results showed: 1) SO₂ evoked a stimulatory effect on pulmonary C-fibers. 2) Intravenous infusion of sodium bicarbonate raised the arterial pH to abolish the SO₂-induced pulmonary C-fibers activation. 3) The stimulatory effect of SO₂ was blocked by amiloride (an ASICs blocker) and AMG9810 (a TRPV1 blocker). 4) SO₂ evoked a dose-dependent increase in the fluorescent ratio (340/380) in isolated rat pulmonary sensory neurons. In conclusion, inhaled SO₂ lowered the pH in lung tissues causing the stimulatory effect on pulmonary C-fibers by activating ASICs and TRPV1 channels.

28. Narges Taran, UK Electrical and Computer Engineering

A Novel Optimization Algorithm for Electric Machines with 3D FEA, Differential Evolution and Surrogate Models

This poster discusses optimization studies on electric machines requiring 3D models. Electric machine design requires an optimization algorithm to achieve the best design. Conventional optimization algorithms often use thousands of design evaluations. Hence, 3D model is not affordable. However, 2D models are not accurate for machines with 3D flux paths. The proposed method outperforms conventional algorithms by substantial reduction in the number of expensive model evaluations. This algorithm, unlike most surrogate assisted optimizations, does not solely rely on estimated values; it has a dynamic sample pool, and gradually improves the kriging model resolution only around

best designs. These make it possible to achieve accurate final results, avoid unnecessary expensive evaluations, and converge faster.

29. Hossam El-Sheikh Ali, D.V.M., Ph.D., UK Gluck Equine Research Center

Characterization of Myometrial Gene Expression Associated with Equine Placentitis by RNA sequencing

This study aimed to discover differentially expressed genes in the myometrium (muscular layer of uterus) during equine placentitis using RNA sequencing. Placentitis was induced using intra-cervical inoculation with *Streptococcus equi* ssp *zooepidemicus* in mares at approximately 290d of gestation (Placentitis group; n=5) with control mares of similar gestational age (Control group; n=4). Mares in the placentitis group were euthanized when they displayed sufficient signs of disease, and myometrial samples were collected from both groups. RNA-Seq analysis revealed that 427 genes (67 of which are novel genes) were differentially expressed (FDR <0.05) in placentitis. Pathway analysis revealed that placentitis is associated with upregulation of the inflammatory pathway and the Toll-like receptor activation pathway. In conclusion, myometrial activation during placentitis is associated with a characteristic gene expression pattern which is largely dominated by inflammatory events.

30. Monica Chau, Ph.D., UK Neurology

Microenvironmental Homing of Glioblastoma Stem Cells in the Brain

Glioblastoma (GBM) is the most aggressive brain tumor, and GBM stem cells (GSC) account for much of its behavior. GSCs are tumorigenic and reside in hypoxic zones. Pseudopalisades are hypoxic cells that border necrosis and are enriched with GSCs. Hypoxia increases GSC self-renewal, survival. We hypothesized that GSCs home towards hypoxia to support their stemness, survival. Patient-derived GBM cells were treated with hypoxia and probed for stem cell, migratory markers. We found that hypoxia increased stem cell, migration markers. To reproduce pseudopalisade conditions in vivo, we created an assay by inducing hypoxia in one area of the mouse brain and grafting GBM cells and showed that grafted GBM cells migrated preferentially towards hypoxia. We showed that GBM cells upregulate stem cell, survival, and migration markers under hypoxia and also migrate towards hypoxia. Identifying the microenvironments that support GBM stem cells has implications for targeting these tumorigenic cells.

31. Adina Cox, Ph.D., UK Landscape Architecture

Bronfenbrenner's Bioecological Model and Children's Independent Mobility

Bronfenbrenner's Bioecological Model of Human Development is used to evaluate factors that impact children's development. Independent Mobility is defined as the ability of children to move about the environment without the presence of an adult. We know that children have lost many freedoms available to their parents and grandparents as rates of independent mobility have decreased dramatically. This loss of freedom may adversely impact children's development as their ability to be physically active, experience nature, take risks, socialize with peers, and develop decision making skills are affected by the

loss of neighborhood independent mobility. This poster presents a visual model of the Bioecological Model in relation to the factors that impact Independent Mobility. It is the foundation for future research that seeks to find environmental modifications at multiple levels that will allow children to regain mobility and freedom to explore and engage with others in their neighborhoods.

32. David J. Braun, Ph.D., UK Sanders-Brown Center on Aging

Targeting neuroinflammation in the context of Alzheimer's disease with comorbid vascular pathology

Of the potential comorbidities present in Alzheimer's disease (AD) patients, vascular pathology is the most prominent. Preclinical therapeutic development studies will therefore benefit from validation in systems where AD-type pathology is not the only factor contributing to cognitive dysfunction. To this end, we have been using a transient dietary hyperhomocysteinemia (HHcy) model to induce vascular dysfunction in a transgenic amyloid overexpression model of AD. Mice were placed on HHcy diet for 8 weeks beginning at around 7.5 months of age, after the beginning of plaque deposition. Mice were then recovered on normal chow for 2 weeks, before beginning two weeks of treatment with our novel anti-inflammatory, MW151. In the final week of treatment, mice underwent a battery of behavioral testing. Characterization of the underlying interactive effects of the comorbid pathologies will help inform future therapeutic strategies.

33. Marc Aaron Guest, UK Graduate Center on Gerontology

Aging in Kentucky: The LGBTQ Needs Assessment

LGBT individuals face unique challenges as they age. These challenges are exacerbated by pre-existing health inequalities and social conditions. While ongoing work continues to increase our understanding, much work still needs to be done. Recognizing this, the community-based Kentucky Aging LGBTQ Needs Assessment was developed to understand the needs of aging LGBTQ individuals in Kentucky. Following a period of community feedback, the assessment was launched in September of 2017. Recruitment has focused on targeted community promotion. Early results indicate a departure from expected outcomes. The recruited participants in phase one are ~ 80% higher than the total expected participants for the entire project. As one of the few statewide LGBT assessments focusing on the older population, there exist an opportunity for the development of best-research practices and the translation of recruitment and intervention strategies focused on improving aging LGBTQ individuals health equity.

34. Magda Javakhishvili, UK Family Sciences

The Long Arm of Infancy Socialization on the Development of Self-Control

The present longitudinal study tested whether infancy socialization experiences impacted the development of self-control during childhood and adolescence. Using the NICHD's Study of Early Child Care and Youth Development data (N = 1,109), it examined the effects of maternal sensitivity and of positive home environment during infancy (at 6-15 months), and attachment history (at 15-, 24-, and 36-months) on children's self-control

development over time, at ages 4.5-, 6.5-, 8.5-, 11.5-, and 15-years. Findings indicated that greater maternal sensitivity, an enriched home environment, and a secure attachment each and all simultaneously positively predicted children's self-control at age 4.5 years, explaining 17% of the variance. Remarkably, the positive effects were found on developmental changes in self-control at age 8.5- as well as at 15-years. The current findings highlight the long reach of early childhood experiences on the developmental course of self-control until middle adolescence.

35. Dan Liu, UK Family Sciences

Bedtimes, Self-Control, and Deviance among Rural Adolescents

Studies have shown how sleep is associated with both adolescent self-control and deviance. However, less is known about the influence of late bedtimes in particular, as well as the specific mechanisms underlying the bedtime-deviance link. The current study tested whether low self-control mediated this link, and whether the association varied by sex and age. A sample of 940 adolescents were recruited from a middle school and a high school in rural Kentucky (53% female, Mage=14.8 years). Model tests were completed in SPSS using PROCESS. Bedtime was negatively associated with self-control and positively to deviance; self-control was negatively associated with deviance; and the bedtime-deviance link was significantly mediated by self-control. Age and sex significantly moderated the self-control-deviance link, not the bedtime-self-control link. Findings provided evidence that sleep behaviors may also have some importance theoretically, related to self-control theory and its interpretation.

36. Oluwaseun M. Akeyo, UK Electrical Engineering

The Largest Multi-MW PV System in Kentucky Integrated with Battery Energy Storage

Renewable energy sources are variable in nature, and energy storage could be used, in principle, for mitigating related issues. This work analyzes the configuration, design and operation of multi-MW grid connected solar PV systems with practical test cases provided by a 10MW field development. The PV system under study is divided into modular sections, each connected to the grid through its own inverter and transformer. The proposed configuration also incorporates a utility scale battery energy storage system (BESS) connected to the grid through an independent inverter. The BESS power smoothing and frequency regulation capabilities are illustrated through combined theoretical and experimental studies on a 1MW 2MWh demonstrator. The behavior of the grid connected PV and BESS combined system is also studied using a modified IEEE 14-bus test system implemented in PSCAD/EMTDC.

42. Taylor Kessinger, UK Theoretical Evolution & Ecology

Valley crossing in rapidly adapting asexual populations

Fitness landscapes are frequently rugged. This means that, in order to adapt, populations cannot simply accumulate successive beneficial mutations: they must instead acquire intermediate mutations that lower their fitness en route to a higher fitness state. In a

sense, they cross a fitness "valley" in order to find a higher fitness "peak": the deeper the valley, the more deleterious the intermediate state. This process is one mechanism by which "irreducibly complex" adaptations can arise, and it may be a common process in evolution. There are a variety of modes by which valley crossing can occur, including sequential fixation, deterministic fixation, and tunneling, wherein deleterious mutant subpopulations persist for short times, affording a small window in which a complex adaptation can arise and sweep to fixation. Previous studies of valley crossing have focused on populations with little fitness variation, in which genetic drift governs the dynamics of intermediate mutations. However, in many organisms of interest including many pathogens, there is substantial variation in fitness, meaning populations adapt rapidly: as a consequence, the fate of a mutation depends less on its own intrinsic fitness effect and more on the genetic background on which it arose. In such populations, a process called "genetic draft" is more important than genetic drift. Using heuristics and direct simulations, we characterize the time it takes for a particular fitness valley to be crossed in both drifting and drafting populations. We find that genetic draft causes valley crossing to take more time. However, it also "flattens" fitness landscapes, meaning that even very deep valleys can be crossed at a high rate: the crossing time almost does not depend on the depth of the fitness valley. We also find that genetic draft can favor valley crossing over simpler forms of adaptation such as stepwise accumulation of beneficial mutations, meaning that in rapidly adapting populations, valley crossing may be the rule rather than the exception.

Digital Posters

37. Farshid Etaee, M.D. UK Gill Heart Institute

Junctional ectopic rhythm after atrioventricular nodal reentrant tachycardia ablation: An underrecognized complication

Ablation is an effective treatment for atrioventricular nodal reentrant tachycardia (AVNRT). The occurrence of junctional ectopic rhythm (JER), following AVNRT ablation has been described as an extremely rare phenomenon, but may be underestimated. We reviewed our adult ablation institutional experience for the occurrence of JER after AVNRT ablation from 2009 to 2016. Additionally, we conducted an extensive literature search using different databases looking for AVNRT ablation case series. Our institutional data revealed 6/126 patients developed JER post-AVNRT ablation. 4 patients were asymptomatic. 2 patients had persistent symptoms, with 1 patient requiring repeat ablation. The literature review included 149 adult and pediatric studies. There were 3 cases of reported JER, out of 37,541 patients. JER might be an underreported complication of AVNRT ablation. It seems most often to be transient and self-limited, but may also be debilitating, requiring more aggressive management.

38. Jake Hutton, UK Forestry and Natural Resources

Diet Composition Explains Reductions in Stream Salamander Occupancy and Abundance along a Conductivity Gradient

Mountaintop removal mining with valley fills (MTR/VF) affects chemical, physical, and hydrological properties of streams. Although numerous taxa have experienced significant declines from MTR/VF, stream salamanders appear to be particularly sensitive. Yet, the specific mechanism responsible for their declines has eluded researchers. We sampled salamanders across a continuous specific conductivity (SC) gradient in SE KY and estimated occupancy and abundance. We also examined if autochthony, total prey volume, and body condition is influenced by SC. As SC increased, occupancy and abundance declined among all salamanders. Diet composition explained the declines; larval salamanders experienced declines in autochthony, prey volume, and body condition as SC increased. Our results indicate that SC indirectly affects stream salamander populations by eliminating an adequate availability of aquatic prey, which in turn lead may lead to reduced population persistence in streams with elevated SC.

39. Yatta Boakari, UK Gluck Equine Research Center

Serum concentration and mRNA expression of Serum Amyloid A and Serum Amyloid A1 in mares and their fetuses after experimental induction of placentitis

SAA has been used as a biomarker for placentitis. SAA1 is not very well studied in horses but it might be a valuable biomarker for placentitis. Our objectives were to evaluate maternal and fetal concentrations of SAA and mRNA expression of SAA and SAA1 in maternal liver, fetal liver, endometrium and chorioallantois in 5 pregnant mares with experimental placentitis and 4 controls. Mares were euthanized 3-5 days after inoculation (around 295 days). SAA concentrations in serum were analyzed with an immunoturbidometric assay and mRNA expression of SAA and SAA1 was determined by RT-qPCR. Serum concentrations of SAA were analyzed by a Kruskal-Wallis test. mRNA expression was analyzed with a mixed model followed by a t-test. Maternal plasma SAA concentrations were increased, whereas fetal concentrations were not. SAA expression was increased in maternal and fetal liver, SAA1 was increased in chorioallantois. SAA1 had a distinct mRNA expression in the chorioallantois of placentitis mares.

40. Sana Naheed, D.M.D., UK Orthodontics

Exploration of Possible Links between Sella Turcica Morphology, Palatally Displaced Canine Impaction and Insulin-like Growth Factor-1 Genetics (IGF1)

Objective: Literature suggests a possible connection between the shape of Sella Turcica (ST) and a number of craniofacial phenotypes, yet a proposed biological pathway to explain these correlations is lacking. In this study, we would like to determine whether ST bridging (fusion of anterior & posterior Clinoid process) and/or the occurrence of palatally displaced & impacted canines (PDC) are associated with genetic variation in the (IGF1) gene. Methods: Cephalometric of 50 Caucasian patients diagnosed with PDC (11-20 years) will be compared with 150 age, sex & ethnicity-matched controls with normal canine eruption. The dimensions of ST are being measured. The occurrence of the ST bridging will be analyzed by Chi-square test, & the association of IGF1 genotype(s) with ST bridging and/or PDC will be examined by Chi-square & logistic regression. Results: Cases & controls are being identified, ST measurements taken, & IGF1 genotypes are being assayed. We will report on our findings to date.

41. Nirmalya Thakur, University of Cincinnati

An Emotion Recognition Algorithm for Implementation of Affect Aware Systems in a Smart Home Context

In the context of a smart home environment, affect aware systems hold the potential to address the different challenges in the creation of an assistive and context-aware living space to improve the quality of life experienced by the increasing population of the elderly people. The ability of systems to understand the emotional response of different user interactions, which are an indicative of the associated user experience is one of the key challenges in this field. Therefore, this work proposes an algorithm that can effectively analyze the emotional response of user interactions through analysis of user behavior. To understand the effectiveness of this proposed approach, typical scenes in a smart home scenario from the UK DALE Dataset have been analyzed and the results obtained uphold the relevance for the practical implementation of this approach in a real-time scenario for improving the quality of life and creating better user experiences for elderly people in a smart home.