6th World Congress on Neurology and Therapeutics

April 27, 2022 | Webinar

Scientific Tracks & Abstracts

Sessions

Neuroimmunology, Neurology, Clinical Neurology, Neurological Nursing, Dementia

Session Chair

Marina Komaroff | Nura Pain Clinics | USA

Neuropediatric, Neurodegenerative disorders, Psychiatry, Behavioural Sciences

Session Chair

Caroline A. Sewry | RJAH Orthopaedic Hospital | UK

Title: **Protective effect of An-Gong-Niu-Huang Wan pre-treatment against experimental Cerebral Ischemia Injury via regulating GSK-3?/HO-1 pathway**

Xiaoli Jiang | Hong Kong Baptist University | Hong Kong

Title: **Different electron structures of Pristine CeO_2 mediates distinct human Neural Progenitor Cell survival and Neuronal Differentiation**

Ying Wang | Hong Kong Baptist University | Hong Kong

Title: **Autologous Neural Stem Cell (NSCs) harvest: precision cell therapies for Neurodegeneration in an animal model of Parkinson's disease**

Zhang Zhang | Hong Kong Baptist University | Hong Kong

Title: **Impact of overweight and Hyperglycemia on the Blood-Brain Barrier and Cerebral plasticity: protective effects of extracts from Reunion's biodiversity**

Batoul Ghaddar | University of Reunion | France

Title: **Mitochondrial dysfunction and Alzheimer's disease: Role of Miro protein**

Anand Krishna Tiwari | Institute of Advanced Research | India

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Protective effect of an-gong-niu-huang wan pre-treatment against experimental *Cerebral Ischemia* injury via regulating GSK-3B/HO-1 pathway

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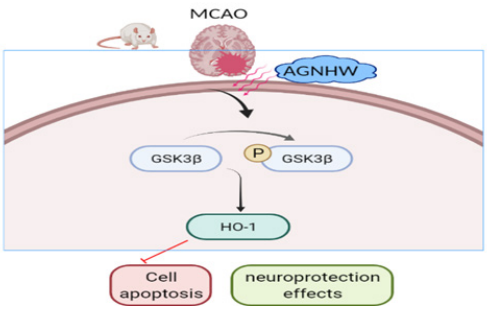
Ischemic stroke has been one of the leading causes of death and disability worldwide and belongs to neurological diseases. A stroke usually leads to permanent brain damage, long-term disability, and even death. It is necessary to find effective treatments and drugs. This study conforms to the theme of the conference on Neurology and Therapeutics, by studying the protective effect of famous Chinese herbs on ischemic stroke prevention. An-Gong-Niu-Huang Wan (AGNHW), a famous Chinese herbal formula, has a clear effect in the treatment of cerebral ischemia and has been used for hundreds of years. In this study, we investigated the preventive effect of AGNHW on cerebral ischemia for the first time by pretreatment. To investigate the preventive protective effect of AGNHW by detecting neurological function score, cerebral infarction area, neuronal apoptosis and cerebral oxidative stress status. AGNHW was administered orally at the doses of 386.26, 772.52, and 1545.04 mg/kg respectively for 7 days to male Sprague-Dawley rats and then cerebral ischemia was induced by middle cerebral artery occlusion (MCAO) for 1.5 h. Pre-treatment with AGNHW significantly ameliorated ischemic damage to the brain in a dose-dependent manner, including reduction of the neurological deficit score and infarct area. AGNHW pretreatment increased the number of Nissl+ cells, NeuN+ and DCX+ cells, and decreased the number of Tunel+ cells. Moreover, AGNHW reversed the up-regulation of ROS and MDA induced by cerebral ischemia. AGNHW pre-treatment increased the expression of p-GSK-3β(Ser9)/GSK-3β (glycogen synthase kinase-3β) ratio and heme oxygenase-1(HO-1). These results firstly revealed that short-term pre-treatment of AGNHW could significantly protect the rats from injury caused by cerebral ischemia-reperfusion, which support further clinical studies for disease prevention. The in vivo protective effect of AGNWH pre-treatment could be associated with its antioxidant properties by the activation of GSK-3β-mediated HO-1 pathway.



Recent Publication

1. Zhang Shiqing,Jiang Xiaoli,Wang Ying et al. An-Gong-Niu-Huang WanProtective Effect of Pre-treatment Against Experimental Cerebral Ischemia Injury via Regulating GSK-3β/HO-1 Pathway.[J] .Front Pharmacol, 2021, 12: 640297.

2. Jiang Xiao-Li,Deng Bo,Deng Sui-Hui et al. Dihydrotanshinone I inhibits the growth of hepatoma cells by direct inhibition of Src.[J] .Phytomedicine, 2022, 95: 153705.

3. Deng Bo,Jiang Xiao-Li,Tan Zhang-Bin et al. Dauricine inhibits proliferation and promotes death of melanoma cells via inhibition of Src/STAT3 signaling.[J] .Phytother Res, 2021, 35: 3836-3847.

Biography

Jiang Xiaoli received the Bachelor of Medicine degree in Integration of Traditional and Western Medicine in 2011 and the Master of Medicine degree in Clinical Discipline of Chinese and Western Integrative Medicine , in 2019 from Guangzhou Medical University, Guangzhou, China. She is currently working toward the Ph.D. degree in Neuroscience with the Department of Biology, Hong Kong Baptist University, Hong Kong, China. Her research interests is to investigate the molecular mechanisms of Traditional Chinese Medicine and its active components in the prevention and treatment of nervous system disease and tumor.

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Different electron structures of Pristine CeO_2 mediates distinct human Neural Progenitor cell survival and Neuronal differentiation

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The survival rate and neural differentiation of after cell transplantation is a huge challenge for neural progenitor cells (NPCs) therapy, a promising therapeutic strategy for neurodegeneration diseases. Reactive oxygen species (ROS) also plays a critical role as signaling molecule for numerous biological processes, including cell differentiation, proliferation and apoptosis. Recently, cerium oxide (CeO2) nanoparticles have been reported for multi-enzyme mimetic activities like that of peroxidase and catalase, and shown to modulate oxidative stress in several neurodegenerative diseases. Although CeO2-based nanozymes has been reported with catalase (CAT)-like activity, the role of its crystal facet is still unclear. In this study, the CeO2 in the shape of cube, rod, octahedron with different facets are prepared and the different antioxidant effect as well as the differentiation on ReNcell CX immortalized human neural progenitor cells are determined. Detailed data shows that the CeO2 nanoshapes are biocompatible for ReNcell CX immortalized human NPCs. In which, the cube (100), with the highest electron density and the highest CAT-like activity, exhibit the best effect on protection NPCs from oxidative stress induced by H2O2. While, the octahedron (111) is most effective to promote the differentiation of ReNcell CX cells into neurons. Our findings clarify the facet-dependent biological effect (e.g. CAT-like activity and enhancement of stem cell differentiation) and might provide a new scientific basis for CeO2 used in stem cell therapy based on the facet-dependent physiochemical properties and catalytic activity.

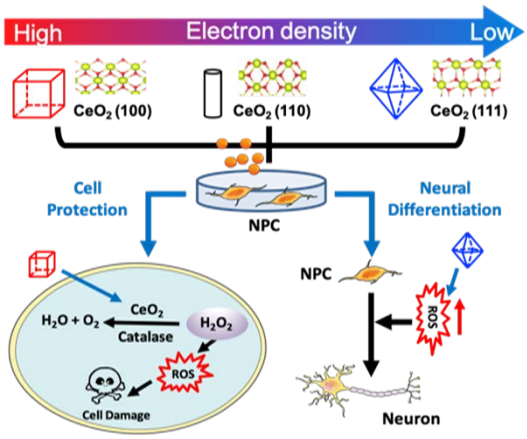

Figure. Effects of facet-dependent CeO_2 nanoparticles on the human neural progenitor cells proliferation under oxidative stress induced by H_2O_2 and differentiation.

Recent Publication

1. Kaili Lin, Zhang Zhang, Ying Wang et al. Oleanolic Acid Alleviates Cerebral Ischemia/Reperfusion Injury via Regulation of the GSK-3β/HO-1 Signaling Pathway. Pharmaceuticals. 2022.15:1.
2. Shiqing Zhang, Xiaoli Jiang, Ying Wang et al. Protective Effect of An-Gong-Niu-Huang Wan Pre-treatment Against Experimental Cerebral Ischemia Injury via Regulating GSK-3β/HO-1 Pathway. Front Pharmacol. 2021, 12:640297.
3. Ying Wang, Mei Zhang, Li Ruijin et al. Fine particulate matter induces mitochondrial dysfunction and oxidative stress in human SH-SY5Y cells. Chemosphere, 2019, 218,577-588.

Biography

Ying Wang received the B.S. degree of Resources Environment and the Management of Urban and Rural Planning from Shanxi University of Finance and Economics in 2016 and the M.S. degree of Environmental Science in 2019. She is currently working toward the Ph.D. degree of Biology at the Hong Kong Baptist University. Her research focuses on exploring possible nanotechnology in neural stem cell therapy by studying the effects of potential nanomaterials with different physicochemical properties on neural stem cells, and provide a new scientific basis for nanomaterials used in stem cell therapy based on the shape-dependent and chirality-dependent properties.

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Autologous Neural Stem Cell (NSCs) harvest: Precision cell therapies for Neurodegeneration in an animal model of Parkinson's disease

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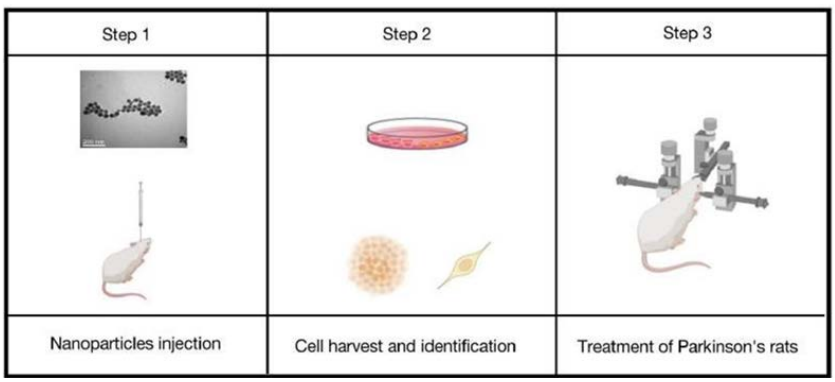
Parkinson's disease (PD) is a movement disorder that affects middle-aged and elderly people and poses a serious health risk due to its high prevalence and disability rate. The treatment of PD and the improvement of motor function and quality of life in PD patients have become a focus of attention. In this study, a PD rat model was established using 6-hydroxydopamine (6-OHDA), and apomorphine hydrochloride was injected at 2 weeks, 3 months and 6 months to induce a rotation test. As well as an open field, rotarod and stepping tests to detect behavioral differences between PD rats and normal rats. It was verified by histological and other experiments that show our PD model was successful. Also, for better autologous neural stem cells (NSCs) transplantation, we evaluated the pharmacological toxicity of the nanomaterial ferric tetroxide. Various indicators of functional observation battery (FOB) were conducted in rats at 2 days, 2 weeks, 3 months and 6 months time points, and the results showed that the method of extracting autologous stem cells using nanoparticles as a carrier is safe and effective. Based on this, the study also performed a series of characterizations of stemness of NSCs extracted by this method in preparation for subsequent transplantation of NSCs for the treatment of PD in rats



Recent Publication

1. Lin, K., Zhang, Z., Zhang, Z., Zhu, P., Jiang, X., Wang, Y., ... & Zhang, S. (2022). Oleanolic Acid Alleviates Cerebral Ischemia/Reperfusion Injury via Regulation of theGSK-3β/HO-1 Signaling Pathway. Pharmaceuticals, 15(1), 1.
2. Lin, K., Sze, S. C. W., Liu, B., Zhang, Z., Zhang, Z., Zhu, P., ... &Zhang, S. (2021). 20 (S)-protopanaxadiol and oleanolic acid ameliorate cognitive deficits inAPP/PS1 transgenic mice by enhancing hippocampal neurogenesis. Journal of ginseng research, 45(2), 325-333.

3. Zhang, S., Jiang, X., Wang, Y., Lin, K., Zhang, Z., Zhang, Z., ... &Yung, K. K. L. (2021). Protective effect of An-Gong-Niu-Huang wan pre-treatment against experimental cerebral ischemia injury via regulating GSK-3β/HO-1 pathway. Frontiers in pharmacology, 12.

Biography

Zhang Zhang received the B.S. degree in clinical medicine from Hubei University of Arts and Science, Xiangyang, China in 2017 and the M.S. degree in environmental and public health management from Hong Kong Baptist University, HongKong, China in 2018. She is currently working toward the Ph.D. degree in neuroscience with the Department of biology, Hong Kong Baptist University, Hong Kong, China. Her research interests include neurodegenerative disease and neurotoxicity.

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Impact of overweight and *hyperglycemia* on the blood-brain barrier and cerebral plasticity: Protective effects of extracts from Reunion's biodiversity

Batoul Ghaddar[1], Matthieu Bringart[1], Christian Lefebvre d'Hellencourt[1], Bryan Veeren[1], Laura Gence[1], Philippe Rondeau[1], Olivier Meilhac[1,2], Jean-Loup Bascands[1], Nicolas Diotel[1]

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[2] Reunion University Hospital, France

Obesity and diabetes are considered global epidemics and are the main risk factors for cardiovascular diseases. They also impair the central nervous system namely brain plasticity. In this work, we used zebrafish as an integrative model to investigate the impact of metabolic disorders on brain homeostasis and plasticity. To this aim, we established the diet-induced obesity (DIO) model by overfeeding fish for 4 weeks. Then we tried to understand the mechanisms behind these cerebral disruptions for finally studying the neuroprotective effects of medicinal plant extracts from Reunion Island pharmacopeia. Our experimental protocol resulted in increased body weight, body mass index, and fasting blood glucose levels testifying of the development of metabolic disruptions. Our extravasation assays as well as immunohistochemistry and gene expression analyses demonstrated that DIO fish suffered from blood-brain barrier leakage, cerebral oxidative stress, neuroinflammation, and blunted neurogenesis. Notch signaling, a neurogenic gatekeeper, does not appear to be involved in decreased neurogenesis. However, DIO fish displayed chronic stress as shown by disrupted locomotion, and increased cerebral expression of fkbp5 (glucocorticoid responsive gene). So, our DIO model induced an imbalanced peripheral and central environment, affecting brain plasticity by mechanisms possibly involving glucocorticoid hormones. Finally, the preventive treatment of DIO fish with aqueous extract of a medicinal plant (A. borbonica at 0.5 g/L) improved the BBB physiology, cerebral redox, and inflammatory status, and partly restored normal neurogenesis. Taken together our data demonstrate that metabolic disorders could impact brain physiology and plasticity. They confirm the preventive effect of the medicinal plant to counteract in part some of these deleterious effects. Consequently, zebrafish could be used as a screening model for finding new therapeutics in order to combat the deleterious effects of metabolic disorders on brain plasticity.

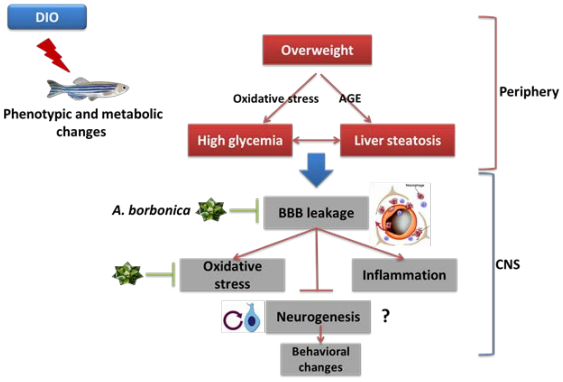

Figure 1: Impact of overweight and hyperglycemia on the blood-brain barrier and cerebral plasticity: Protective effects of extracts from Reunion's biodiversity

Recent Publication

1. Ghaddar B, Lübke L, Couret D, Rastegar S, Diotel (2021) Cellular Mechanisms Participating in Brain Repair of Adult Zebrafish and Mammals after Injury. Cells 10(2):391
2. Ghaddar B, Bringart M, Lefebvre d'Hellencourt C, Meilhac O, Diotel N (2021) Deleterious Effects of Overfeeding on Brain Homeostasis and Plasticity in Adult Zebrafish. Zebrafish 18(3):190-206
3. Ghaddar B, Veeren B, Rondeau P, Bringart M, Lefebvre d'Hellencourt C, Meilhac O, Bascands JL, Diotel N (2020) Impaired brain homeostasis and neurogenesis in diet-induced overweight zebrafish: a preventive role from A. borbonica extract. Sci Rep 10(1):14496

Biography

Batoul Ghaddar is a third-year PhD student at the University of the Reunion Island working at the DeTROI laboratory; working mainly on the effect of obesity and diabetes on the central nervous system and brain homeostasis especially brain plasticity using the zebrafish model.

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Mitochondrial dysfunction and Alzheimer's disease: Role of Miro protein

Anand K Tiwari

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Alzheimer's disease (AD) is one of the most common neurodegenerative diseases characterized by memory loss and cognitive impairment due to the accumulation of amyloid-beta 42 (Aβ42) plaque and the formation of neurofibrillary tangles (NFT) made up of hyperphosphorylated Tau protein in the brain. This disease has emerged as a global health concern due to the significantly increased number of AD patients across the globe (~50 million people worldwide). Till date AD has no permanent cure, this is because still several pathophysiological mechanisms underlying AD are still not well understood. Several studies have suggested that altered mitochondrial biogenesis plays a crucial role in the onset of neurodegenerative diseases including AD. It has been also shown that abnormality in mitochondrial structure, function and improper axonal transport is the first step of the development of AD and related pathologies. Miro, a Rho GTPases and mitochondrial outer membrane protein forms a major protein complex with Milton, an adaptor protein and motor protein and mediates mitochondrial axonal transport. In AD, an abnormal mitochondrial function and altered axonal transport has been reported but the possible genetic interaction between Miro and AD associate genes (Appl, Aβ42, and Tau) is not well studied. Herein, we have demonstrated that the Miro gene genetically interacts with AD-associated genes Appl, Aβ42, and Tau in Drosophila.

Recent Publications

1. Panchal K. Tiwari AK. (2021). Miro (mitochondrial Rho GTPase), a key player of mitochondrial axonal transport and mitochondrial dynamics in neurodegenerative diseases. Mitochondrion. 56:118-135. (Elsevier)
2. Bhatt M, Pandey SS, Tiwari AK, Tiwari BS. (2021). Plastid mediated Singlet Oxygen in Regulated Cell Death. Plant Biology. (Wiley)
3. Panchal K, Tiwari AK. (2020). Miro, a Rho GTPase genetically interacts with Alzheimer's disease-associated genes (Tau, Aβ42 and Appl) in Drosophila melanogaster. Biology Open. 9 (9); (The Company of Biologist)

Biography

Anand K Tiwari is from Institute of Advanced Research; India has expertise in working with Drosophila model for Alzheimer's disease (AD). His research work in the area improves understanding of Alzheimer's disease and its interacting partners. His recent work will help in designing the therapeutic target for AD and related pathologies.

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Association between widespread pain and Dementia, Alzheimer's disease and Stroke: A cohort study from the Framingham heart study

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Objective: Chronic pain may be an early indicator of cognitive decline, but previous studies have not systematically examined the population-level associations between widespread pain and adverse cognitive outcomes and stroke. This study was designed to determine the association between widespread pain, a common subtype of chronic pain, and subsequent dementia, Alzheimer's disease dementia and stroke.

Methods: This retrospective cohort study used data from the US community-based Framingham Heart Study. Pain status was assessed at a single time point between 1990 and 1994. Widespread pain was determined based on the Framingham Heart Study pain homunculus. Dementia follow-up occurred across a median of 10 years (interquartile range, 6-13 years) for persons who were dementia-free at baseline. Proportional hazards models examined associations between widespread pain and incident dementia, Alzheimer's disease dementia and stroke.

Results: A total of 347 (14.1%) subjects fulfilled the criteria for widespread pain, whereas 2117 (85.9%) subjects did not. Of 188 cases of incident all-cause dementia, 128 were Alzheimer's disease dementia. In addition, 139 patients suffered a stroke during the follow-up period. After multivariate adjustment including age and sex, widespread pain was associated with 43% increase in all-cause dementia risk (HR: 1.43; 95% CI: 1.06, 1.92), 47% increase in Alzheimer's disease dementia risk (HR: 1.47; 95% CI: 1.13, 2.20) and 29% increase in stroke risk (HR: 1.29; 95% CI: 1.08, 2.54). Comparable results were shown in the subgroup of individuals over 65 years old.

Conclusion: widespread pain was associated with an increased incidence of all-cause dementia, Alzheimer's disease dementia and stroke.

Recent publications

1. Childhood Secondhand Smoke Exposure and Risk of Dementia, Alzheimer's Disease and Stroke in Adulthood: A Prospective Cohort Study

2. Cardiovascular events and all-cause mortality in surgically or medically treated primary aldosteronism: A Meta-analysis

3. Heightened Cardiovascular Risk in Hypertension Associated With Renin-Independent Aldosteronism Versus Renin-Dependent Aldosteronism: A Collaborative Study

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Design and validation of virtual reality: Task for Neuro-rehabilitation of Distal upper extremities

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Stroke, affecting approximately 15 million people worldwide, has long been a global cause of death and disability. Virtual Reality (VR) has shown its potential as an assistive tool for post-stroke rehabilitation. The objective of this pilot study was to define the task-specific performance metrics of VR tasks to assess the performance level of healthy subjects and patients quantitatively and to obtain their feedback for improving the developed framework. A pilot prospective study was designed. We tested the designed VR tasks on forty healthy right-handed subjects to evaluate its potential. Qualitative trajectory plots and three quantitative performance metrics—time taken to complete the task, percentage relative error, and trajectory smoothness—were computed from the recorded data of forty healthy subjects. Two patients with stroke were also enrolled to compare their performance with healthy subjects. Each participant received one VR session of 90 min. No adverse effects were noticed throughout the study. Performance metrics obtained from healthy subjects were used as a reference for patients. Relatively higher values of task completion time and trajectory smoothness and lower values of relative % error was observed for the affected hands w.r.t the unaffected hands of both the patients. For the unaffected hands of both the patients, the performance levels were found objectively closer to that of healthy subjects. A library of VR tasks for wrist and fingers were designed, and task-specific performance metrics were defined in this study. The evaluation of the VR exercises using these performance metrics will help the clinicians to assess the patient's progress quantitatively and to design the rehabilitation framework for a future clinical study.

Recent publications

1. Wavelet Based De-noising of EEG Signal Acquired from Tele-serial Addicted Persons
2. A Study on Emission Pattern of Semiconductor ICs Using Photon Emission Microscopy
3. Electromagnetic Field due to a Single Electron Avalanche on Transmission Line Conductors

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