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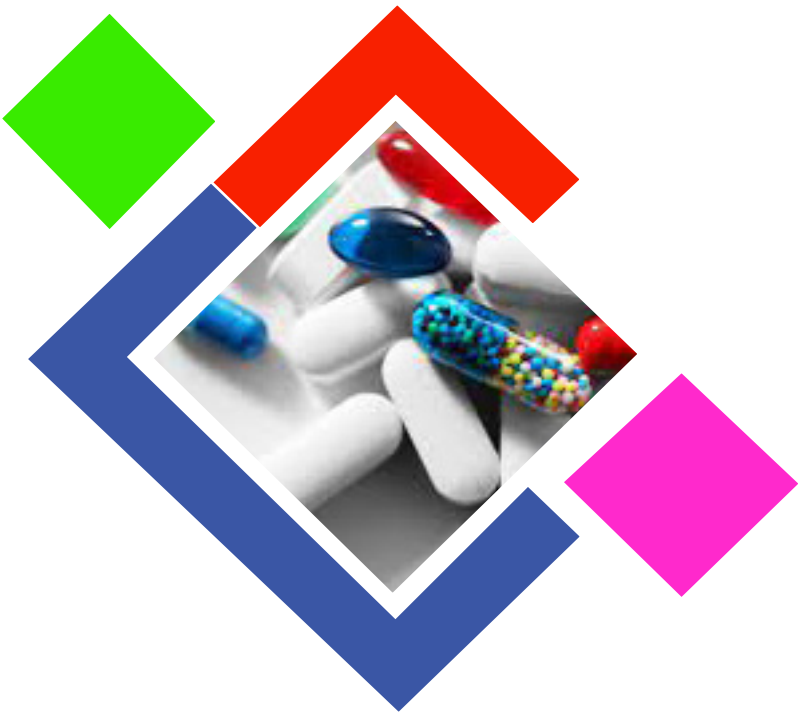
Scientific Tracks & Abstracts



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Immune cell-mediated cell and drug delivery platform

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Efficient drug delivery strategies into solid tumors that target primarily malignant cells and avoid damaging healthy tissue are limited by the pharmacokinetics, solubility and specificity of the chemotherapeutic drugs. Drug delivery into brain tumors is significantly more challenging due to the presence of the blood brain barrier. Glioblastoma, with a 5-year survival rate of only 5% is the most aggressive type of brain tumor. Despite modern treatment techniques (e.g. chemotherapy, radiation, and surgical removal), the prognosis remains dismal. To address this clinical challenge, we designed a targeted drug delivery system using genetically modified chimeric antigen receptor (CAR)-T cells to target glioblastoma tumors and polymeric nanoparticles to encapsulate the therapeutic drug. Nanoparticles provide a great opportunity to develop a targeted delivery system that in conjunction with immune cells can specifically deliver drugs to brain tumors.

Keywords

Blood-brain Barriers, CAR-T cells, Drug Delivery, Nanoparticles,

Biography

Cheng Dong received his Ph.D in Engineering Science and Bioengineering in 1988 from Columbia University, New York USA. He is now a Department Head of the Penn State Biomedical Engineering Department, and a Distinguished Professor of Biomedical Engineering. His research is to elucidate biomechanical, biophysical and biochemical aspects of cellular function in the circulatory systems, with particular interest in cell signalling. Current research at Penn State University includes studies of micro-hemodynamics, coagulation, leukocyte rheology, intercellular and intracellular signalling, cancer immunology and metastases. In particular, he is investigating how fluid dynamics, adhesion kinetics and tumor microenvironment change leukocyte and/or endothelial immune functions which subsequently affect tumor cell extravasation in the microcirculation and subsequent metastasis. He is also collaborating with material scientist and neural science biologist on most-recent designs of immune cell-mediated nanoparticle and drug delivery targeting brain tumors.

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A novel recovery: Characterisation of Progranulin in FTD human pluripotent stem cells and inhibition of nonsense-mediated RNA decay

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FTD is a presenile neurodegenerative disorder, genetically FTD is complex and up to 40% of patients report a family history, which suggests a large genetic element in the aetiology of the disease. Research conducted into characterising the mutations present on chromosome 17q21, has cast doubt and evidence led research groups to exclude MAPT. Considering an alternative explanation, that there may be a second gene on chromosome 17q21, sequencing 80 genes ranked on known function, PGRN was discovered.

Further understanding PGRN is imperative to design potential therapeutic-targets for neurodegenerative disease as it is implemented in multiple processes. Here, we model PGRN-mutations in iPSC-derived neurons, allowing us to demonstrate a disease-specific model for FTD.

Once mutations were sequenced, we found that the novel c.77delG was not present and both mutants were Q337x mutations. A 24-hour drug treatment was conducted, an NMD inhibitor was provided for the treated and DMSO supplement for untreated. Cells were harvested for subsequent qPCR. Immunocytochemistry was conducted to measure changes in intensity.

Results are questionable however it is clear that the NMD inhibitor had a promising effect on recovering levels lost in the untreated samples, that said without another set of data is not possible to confirm. A better understanding of the complexity of progranulin and its role within the brain will help to direct the development of progranulin-modulating therapies not only for FTD familial patients but those with neurodegenerative disease. This finding creates a potential target for pharmaceuticals to mediate the debilitating symptoms FTD presents. Future directions will be considered and discussed.

Biography

Katie Marie Case is a successful Neuroscience Masters graduate, obtaining an additional specialism in Neural stem cells and nervous system repair from King's College London. Conducting her research in neurodegenerative disease progression and potential therapeutic targets using the cutting edge of technology. She is passionate about the potential power of Stem cells and is an advocate for empowering women in science. An experienced STEM communicator she believes that we need to educate and empower the next generation so that they can answer the questions we leave behind.

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Emergence of 3D printed dosage forms: A focus on FDM 3D Printing and Multi-material Printing

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Since its initial use, 3D printing technology has evolved to such an extent that it is currently being used in a wide range of applications including in tissue engineering, dentistry, construction, automotive and aerospace. However, in the pharmaceutical industry this technology is still in its infancy and its potential yet to be fully explored.

The presentation provides a highlight review of previous attempts at using 3D printing technologies on the manufacturing dosage forms with a particular focus on multi-drug oral tablets and capsules. An insight into the technical challenges facing 3D printing technologies with particular focus on FDM and multi-material 3D printing. The author will present the disruptive and ground breaking potential of this technology for transferring personalizing dosage form for pediatrics and geriatrics.

Recent Publications

Rycerz, Alhnan et al, Embedded 3D printing of novel bespoke soft dosage form concept for pediatrics Pharmaceutics, 2019, 11 (12), 630

A Isreb, Alhnan et al., 3D printed oral theophylline doses with innovative 'radiator-like' design: Impact of polyethylene oxide (PEO) molecular weight International journal of pharmaceutics. 2019, 564, 98-105

Pereira, Alhnan et al., 'Temporary Plasticiser': A Novel Solution to Fabricate 3D Printed Patient-Centred Cardiovascular 'Polypill' Architectures European Journal of Pharmaceutics and Biopharmaceutics, 2019, 135, 94-103

Sadia, Alhnan et al., Channelled tablets: An innovative approach to accelerating drug release from 3D printed tablets Journal of Controlled Release 269, 355-363

Okwuosa, Alhnan et al., On demand manufacturing of patient-specific liquid capsules via co-ordinated 3D printing and liquid dispensing, European Journal of Pharmaceutical Sciences 118, 134-143

Biography

Mohamed A Alhnan joined KCL as a Senior Lecturer in Pharmaceutical Medicine in the School of Cancer

& Pharmaceutical Sciences in Sep 2018. Mohamed has been a registered pharmacist in the UK since 2011. He worked on site-specific oral drug delivery for this PhD project in London School of Pharmacy (now UCL School of Pharmacy). After working on several industrial projects, he worked as lecturer then as a senior lecturer in the School of Pharmacy and Biomedical Sciences in University of Central Lancashire.

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Personalised cannabinoids based treatments transforming healthcare delivery for EU ageing population

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Europe will be the largest medical cannabis market in the world with a market of over 739 million people, and total healthcare spend of €1.49t. Both business and government realize that this thriving industry has a future but the development of new treatment methods based on cannabinoids medications must be based on conclusive research. A record level of investment in research has been seen in new medical cannabis cultivation facilities opening across Europe. One of the results has been an ever increasing list of predominantly chronic conditions of ageing population that cannabinoid based therapies can treat. As the list grows, so does the potential patient base. Clinical experience and initial evidence significantly indicate needs for personalisation of cannabis treatment with eHealth tools to provide efficient cure while keeping the quality of life on ambient level for EU ageing population.

Keywords-Cannabis, Cannabinoid Medication, Ageing Population, Personalisation

Biography

Pavel Kubu is the expert in the fields of medical informatics and adictology. In 2001, graduated in general medicine with a focus on diseases prevention at Charles University in Prague, 3rd Medical Faculty. Since 2005 to 2015 worked for Intel Corporation as the Business Development Manager leading projects of for Healthcare and Education in Central and Eastern Europe. In 2006 apointed as chairman of the Ethical Commission of the National Monitoring Center for Drugs and Drug abuse.

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Neuroprotective effects of clenbuterol against experimentaly -induced epileptic seizures in rats

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Epilepsy is a neurological condition described by repeated unpredictable interruptions of normal brain function, named epileptic seizures. Oxidative stress, nitrosative stress, inflammation and apoptosis are considered as potential mechanisms underlying the pathogenesis of epilepsy. In this study, we used Levetiracetam (LEV) as a standard anti-epileptic treatment. Clenbuterol (CLEN), a lipophilic B2-adrenoceptor agonist is a therapeutic drug for asthma and COPD. The possible neuroprotective actions of CLEN were investigated by unveiling its potential in preventing oxidative stress, inflammation and apoptosis compared to LEV. Rats were allocated into 4 groups. In the convulsive group, rats received a single i.p. injection of 3 mEq/kg lithium chloride 20 hours prior to a single i.p. injection of 150 mg/kg pilocarpine-hydrochloride. The control group received 3 mEq/kg lithium-chloride dissolved in normal saline. The third and fourth group, rats received i.p. 500 mg/kg LEV 30 minutes and 0.5 mg/kg CLEN for 7 days before lithium-pilocarpine (Li-PIL) administration respectively. Both drugs alleviated Li-PIL seizures and motor deficits, represented as open field parameters, in rats, which attributed to preservation of hippocampal reduced glutathione and decrease in total thiobarbituric acid reactive substances and nitric oxide contents. Furthermore, a reduction in tumor necrosis factor-a, interleukin-1B was observed. Moreover, both drugs protected hippocampal neurons against apoptotic death assured by a decrease in caspase-3 and cytochrome-c levels. Collectively, our results suggest that CLEN might possess a promising therapeutic effect in Li-PIL -induced epileptic experimental model and other pathological aberrations in epilepsy via significant neuroprotective effects mediated by antioxidant, anti-inflammatory and anti-apoptotic effects.

Keywords-Clenbuterol, Epilepsy, Inflammation, Oxidative stress,

Biography

Sarah has completed her Master at the age of 27 years from Cairo University Faculty of Pharmacy. She is Assistant Lecturer at Faculty of Pharmacy Cairo University, Egypt & Ph.D. Candidate in Pharmacology and Toxicology Department. She is interested in investigating new approaches in the treatment of epilepsy disease and at the same time being safe and affordable therapies in a experimental scientific manner. She is looking forward a safe and effective therapy firstly tested on experimental animals in an ethical protocol through the facilitation offered by Faculty of Pharmacy Cairo University, Egypt. She is hoping for all epilepsy patients all over the world to be safely cured.

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