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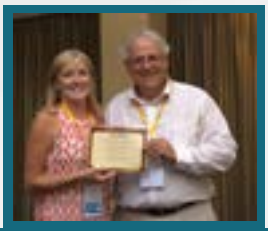


Scientific Tracks & Abstracts

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Fabrication of chitosan/PVP/dihydroquercetin nanocomposite film potential usage in wound healing

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Wound healing is to restore the damaged tissue to its original state through the interaction with biomolecules and cell-matrix. It follows a well-defined, yet complex, cascade of processes that are commonly divided into four major stages: coagulation, inflammation, cell proliferation with matrix repair, and epithelialization with scar remodeling. Because wound complications involve infection, deformity, scar tissue overgrowth, and bleeding, wounds should indeed be covered with a dressing as soon as they are damaged. Traditional dressings cause the wound to become dehydrated and enhance the adhesion to the wound. It also causes the patient discomfort and pain and slows wound healing. The ideal wound dressing should have the following characteristics: a moist environment, rapid wound healing, mechanical protection, noncytotoxicity to healthy tissue, antimicrobial/antifungal effect, ease of use, and patient acceptance. In recent years, nanofiber polymer materials prepared by electrospinning have attracted great attention because of their unique properties such as high specific surface area, high porosity, and controllable structure and function. Chitosan (CS) has been proved to be biocompatible, biodegradable and antibacterial. In recent years, a variety of chitosan hemostatic dressings have been developed. For example, Ren et al., Prepared silk fibroin/chitosan/halloysite nanotube electrospinning composite medical dressings. Polyvinylpyrrolidone (PVP) is a drug polymer for preparing different dosage forms, it is a non-toxic, biocompatible, watersoluble polymer, mainly used as a dissolution accelerator for pharmaceutical preparations. Contardi et al., showed PVP-based hydrogels exhibit biocompatibility and hemocompatibility in vitro and wound healing properties in vivo. Dihydroquercetin, is a flavonoid compound extracted from larch, which has been used in various commercial preparations. Studies have shown that dihydroquercetin has the effects of antibacterial, antiinflammatory, and anti-oxidation. It has the potential to be made into wound excipients. According to reports, utilizing dihydroquercetin liposomal complex to classify burn trauma helped to stabilize the endogenous antioxidant system and reduce the area of secondary necrosis in the wound. Skin regeneration and sebaceous gland repair have also been enhanced. Previous studies have also shown that dihydroquercetin can be combined with chitosan and hyaluronic acid to prepare a multifunctional wound dressing film with antioxidant, antibacterial, and anti-inflammatory properties. In this work, we report the preparation and characterization of chitosan (CS), PVP, and dihydroquercetin (DHQ) nanofiber film used as wound excipients, as well as in vivo and in vitro evaluations, and verify that the film is effective in wounds. The results show that the prepared film has good morphology, thermal stability and hydrophilicity. In vitro studies have shown that it has antibacterial activity against S.aureus and E.coli, and the DPPH free radical scavenging rate proves that the fiber film has antioxidant activity. MTT cytotoxicity test proved that the film is non-toxic to Hacatcells. Animal experiments have proved that wounds treated with CS-PVP-DHQ nanofiber film heal faster. This article also studied the composite nanofiber film by inducing

autophagy pathway and increasing the expression of pan-keratin, vascular endothelial growth factor VEGF and CD31 to promote wound healing. Therefore, the nanofiber film herein show great potential in wound healing applications.

Biography

Kecheng Chen, graduated from the Biology Department of Shenyang Normal University in 1992. He has been employed as a visiting professor by Zhejiang Forestry University, Shenyang Normal University and Biopharmaceutical Research Institute of Liaocheng University. In 2019, he was hired as a researcher follower by the Australian Trefoil Life Research Institute. In 2020, he was hired by the Space-Time Medicine Studio of the Traditional Chinese Medicine Mining and Inheritance Innovation Center of Shanghai Jiaotong University as a member of the expert committee. He was also a co-founder of the Starsky Medical Research Institute in China.

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The effect of bpy/phen on the structure, thermal stability and biological studies of some primary amine Ni(II) dithiocarbamate complexes

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The quest for new and effective compouds with pharmacological potentials can never be exhausted as there continues to be the outbreak of new infectious diseases, new strains and drug resistance of the old ones are also becoming concurrently rampant. Production of new antibiotics, anti inflamatories and anti-coagulants are therefore necessary for the treatment and prevention of the spread of these micro-organisms.

Bipyridine(bpy) and phenanthroline(phen) are N donor atoms which can form complexes with almost all the metals in the periodic table. They are π- deficient and so are good π- acceptors with their complexes stabilized by back bonding into the π* orbitals of the N ring. They are often incorporated into many bridging ligands as classical bidentate chelating heterocyclic ligand to impart significant effects on the properties of their metal complexes. They can expand the coordination numbers of metal dithiocarbamate complexes through the interaction of metal complexes with various ligating Lewis bases. When combined with dithiocarbamates, the adducts formation is influenced through the mesomeric effect of their –NR2 group which help to impart better physical properties and enhanced biological activities because of their resemblance with biomolecules. Dithiocarbamates have proven to be relevant in the synthesis of new supramolecular structural compounds because of their unique properties to stabilize both high and low oxidation states in transition metals, such as to allow manipulations on their bonding and electronic properties through the incorporation of different functionalities on their nitrogen atom. This has made their complexes to be widely studied because of the rich and varied chemistry with diverse applications. Nickel plays an important role in the biochemistry of organisms, since it is part of the active center of enzymes, its pharmacological activities can be enhanced when bound to dithiocarbamate ligands through reaction of the dithiocarbamate with thiol groups. Nickel complexes are capable of existing in higher coordination numbers which is achieved in the present case by adducts formation with available ligands. They easily form adducts with nitrogen, oxygen, phosphorus and sulphur donors and the adduct formation lead to reduction in the original polymeric structures to monomeric adducts.

Primary amine complexes, the homoleptic compounds of phenyl and substituted phenyl dithiocarbamate ligands of group 10 triads have been produced.To study further the effect of coordinating, flexibility and easy kinetic tuning on the properties of this class of compounds, N donor atoms; 2, 2-bypiridine and 1, 10-phenanthroline have been incorporated into their ligand framework and utilizing the advantage of the free Proton from the NH site which can promote the lipophilicity of the compounds for more active biological

properties. The spectral and thermal analyses show the influence of the positive inductive effect of the methyl and ethyl substituents on the phenyl group on the dithiocarbamate. The effect of the N donor atoms of the bipyridine and phenanthroline on the parent complexes also reflected with enhanced antimicrobial and anticancer properties.

Biography

Felicia Bobinihi is a senior Lecturer at the Federal College of Education, Okene, Nigeria. She completed her PhD degree at the North West University, South Africa. She is working on inorganic synthesis for biological applications and material synthesis, their procecessing and applications in various fields. Some of her works have been published in international peer review journals.

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2D DNA nanoporous scaffold promotes osteogenic differentiation of pre-osteoblasts

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Biofunctional materials with nanomechanical parameters similar to bone tissue may promote the adherence, migration, proliferation, and differentiation of pre-osteoblasts. In this study, deoxyribonucleic acid (DNA) nanoporous scaffold (DNA-NPS) was synthesized by the polymerization of rectangular and double-crossover (DX) DNA tiles. The diagonally precise polymerization of nanometer-sized DNA tiles (A + B) through sticky end cohesion gave rise to a micrometer-sized porous giant-sheet material. The synthesized DNA-NPS exhibited a uniformly distributed porosity with a size of 25 ± 20 nm. The morphology, dimensions, sectional profiles, 2-dimensional (2D) layer height, texture, topology, pore size, and mechanical parameters of DNA-NPS have been characterized by atomic force microscopy (AFM). The size and zeta potential of DNA-NPS have been characterized by the zeta sizer. Cell biocompatibility, proliferation, and apoptosis have been evaluated by flow cytometry. The AFM results confirmed that the fabricated DNA-NPS was interconnected and uniformly porous, with a surface roughness of 0.125 ± 0.08035 nm. The elastic modulus of the DNA-NPS was 22.45 ± 8.65 GPa, which was comparable to that of native bone tissue. DNA-NPS facilitated pre-osteoblast adhesion, proliferation, and osteogenic differentiation. These findings indicated the potential of 2D DNA-NPS in promoting bone tissue regeneration.

Keywords: 2D DNA nanoporous scaffolds (DNA-NPSs); Bone tissue regeneration; Pre-osteoblasts; Rectangular and double-crossover (DX) DNA-tiles.

Biography

Baig, MMFA is a registered Pharmacist and did a PhD in Chemistry. His recent research interest is designing nanomaterials for Biomedical Engineering, Mechano Pharmacology, Developmental Biology, Structural Biology, and Neuroscience. He got his post-doctoral training in Nanomedicine at the Faculty of Dentistry, The University of Hong Kong. His postdoctoral work was focused on designing DNA-based functional & bio-active nanomaterials to apply in Restorative Dentistry, Oral Microbiology/ Oncology, Regenerative Therapeutics, Stem Cells Research, Drug Delivery, and Molecular Pharmaceutics. He got a Ph.D. degree in Chemistry (Therapeutical Biochemistry) from the School of Chemistry and Chemical Engineering, Nanjing University (NJU), China. During his Ph.D., he worked on DNA Nanotechnology, Nano-Therapeutics, Biosensing, Bio-imaging, Diagnostics, and Cellular Biophysics. Previously, He received his Doctor of Pharmacy (PharmD) and MPhil (Pharmaceutical Chemistry) degrees from the Faculty of Pharmacy, Bahauddin Zakariya University (BZU), Multan, Pakistan; where he learned about Biochemistry, Phytochemistry, Pharmacognosy, Biotechnology, Polymers, Organic, Medicinal, Bio-analytical, and Material Chemistry.

His research work mainly focused on the construction and function of DNA nanomachines, which are cutting edge and challenging topics. He designed and constructed unique DNA molecular tension probes using a short circular DNA nanotechnology technique and functionalized these probes with fluorophores, gold nanoparticles, small molecular drugs, and peptide ligands. He achieved nano-specific precision in organizing plasmonic nanoparticles on the nano DNA frameworks to achieve plasmon resonance effects. My work on the DNA nanomachines provided an efficient mechanism of fluorescence resonance energy transfer that realizes the bio-imaging, and detection of biological events, and functions of the biomolecules.

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Dynamics of host pathogen interaction in plants

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Till now approximately 102 blast R genes and 500 blast resistance QTLs have been mapped in rice, while only 38 among them have been characterized and cloned (Devana et al., 2022). Disease resistance (R) genes like Pi9, Pita, Pi21, Pi54 are playing important role for broad spectrum blast resistance in rice. Development of near isogenic lines (NILs) using these broad-spectrum genes and understanding their signaling networks is essential to cope up with highly evolving Magnaporthe oryzae strains for longer duration. The genomic plasticity of this pathogen helps it to adapt according to the host. In order to counter the adaptability potential of the pathogen we made extensive effort to understand the mechanism of resistance. Monogenic or near-isogenic lines (NILs) that differ in a single rice-blast resistance gene are useful as differential varieties in pathogenicity tests and as genetic resources in rice breeding programs. However, because the development and phenotyping process is time-consuming and laborious, such lines exist only for a few genes. In this study novel monogenic lines containing Pi9 and Pi54 in the background of Pusa Basmati1 (PB1), a variety released in 1989 as the first high-yielding, semi-dwarf, photoperiod-insensitive, and superior quality scented rice line were used. However, transcriptome profiling studies of rice NILs upon M. oryzae infection are few in number (Sharma et al., 2016). This is the first study in which transcriptional level changes in PB1 and its three NILs carrying Pi1, Pi9, and Pi54 genes upon M. oryzae infection are compared. In this study NILs carrying Pi9 and Pi54 blast resistance gene respectively (in the background of Pusa basmati 1) serves an excellent biological material for understanding the molecular basis of rice-Magnaporthe interactions (Jain et al 2017; Jain et al 2019).

Biography

PhD in Bioinformatics with 3+ years of post-doctoral experience. I am having 14 years' experience on next generation sequencing data analysis (hybrid genome assembly, whole genome sequencing (seq), exome seq, RNA seq, small RNAseq, single cell RNA-Seq, Bisulphite seq, Chip-Seq, ATAC-Seq) of different platforms and interpretation using different omic pipelines. Experience in shell scripting, R, Perl and Python in linux environment use fast high-performance compute (HPC). Experience in next generation sequencing library preparation, array based and florescent dye-based SNP genotyping sample preparation. Worked on animal, human (type 2 diabetes and cancer) and plant genomics data applying statistical methods. Persistent learner with exceptional understanding of genomics and transcriptomics.

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