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International Conference on

Biochemistry

October 10-12, 2016 Kuala Lumpur, Malaysia

Scientific Tracks & Abstracts

(Day 1)

Tracks: 1, 2 & 3

Track 1: Clinical Biochemistry
Track 2: Structural Biochemistry
Track 3: Molecular Biochemistry

Session Chair
Venkataramanan Swaminathan
Management and Science University, Malaysia

Session Introduction

Title: Effects of lipoic acid supplementation on activities of cyclooxygenases and levels of prostaglandins E2 and F2 alpha metabolites, in the offspring of rats with streptozotocin-induced diabetes
Hisham Al-Matubsi, University of Petra, Jordan

Young Researchers Forum

Session Introduction

Title: Homeothermic control based on pre-equilibrium reaction in thermogenic skunk cabbage, *Symplocarpus renifolius*
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Title: The correlation between malondialdehyde concentration level in seminal fluid analysis and asthenozoospermia among infertile males
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Title: Pyruvate kinase as a new target for anti-caries agents
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Title: *Aloe-vera* leaf extract mediated synthesis of curcumin nanoparticles: Implications in the treatment of type 2 diabetes in experimental Wistar rat model
Naureen Fatima, Aligarh Muslim University, India

Title: Thymoquinone attenuates cisplatin induced toxicity and oxidative damage in rat kidney
Zeba Farooqui, Aligarh Muslim University, India

Title: Intestinal fatty acid binding protein Ala54Thr polymorphism is associated with peripheral atherosclerosis combined with type 2 diabetes mellitus
Eman T Mehanna, Suez Canal University, Egypt

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Effects of lipoic acid supplementation on activities of cyclooxygenases and levels of prostaglandins E2 and F2 alpha metabolites, in the offspring of rats with Streptozotocin-induced diabetes

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Background & Aim: Uncontrolled diabetes mellitus (DM) is an etiological factor for recurrent pregnancy loss and major congenital malformations in the offspring. Antioxidant therapy has been advocated to overcome the oxidant-antioxidant disequilibrium inherent in diabetes. Our aims were to evaluate the protective effect of lipoic acid (LA) on fetal outcome and to elucidate changes that may be involved in the mechanisms implicit diabetic fetopathy.

Methods: Female rats were rendered hyperglycemic using streptozotocin and then mated with normal male rat. Pregnant non-diabetic (group-1; n=9 and group-2; n=7) or pregnant diabetic (group-3; n=10 and group-4; n=8) rats were treated daily with either LA (30 mg/kg body weight; groups-2 and 4) or vehicle (groups-1 and 3) between gestational days 0 and 15. On day 15 of gestation, the rats were sacrificed and the fetuses, placentas and membranes dissected out of the uterine horns. Following morphological examination, the fetuses, placentas and membranes were homogenized and used to measure cyclooxygenase (COX) activities and metabolisms of prostaglandin (PG) E2 (PGEM) and PGF2α (PGFM) levels. Maternal liver and plasma and in the fetuses of all groups..

Results: Supplementation of diabetic rats with LA was found to significantly ($p<0.05$) reduced resorption rates in diabetic rats and increased mean fetal weight compared to vehicle-treated diabetic (V-TD) group. Treatment of diabetic rats with LA (LA-TD) leads to a significant ($p<0.05$) increase in liver and plasma total glutathione, in comparison with V-TD rats. Decreased levels of PGEM and elevated levels of PGFM in the fetuses, placentas and membranes were characteristic of experimental diabetic gestation associated with malformation. LA treatment to diabetic mothers failed to normalize levels of PGEM to the vehicle-treated control rats. However, the levels of PGEM in malformed fetuses from LA-TD mothers was significantly ($p<0.05$) higher than those in malformed fetuses from V-TD rats.

Conclusions: LA can reduce congenital malformations in the offspring of diabetic rats at day 15 of gestation. Thus, LA treatment did not completely prevent the occurrence of malformations, other factors such as arachidonic acid deficiency and altered prostaglandin metabolism may be involved in the pathogenesis of the diabetes-induced congenital malformations.

Biography

Hisham Al-Matubsi has completed his PhD from Victoria University-Australia and worked at different academic levels in different reputable academic organizations such as Victoria University-Victoria, Australia, Cincinnati University-Ohio, USA and now at The University of Petra-Amman, Jordan. Dr Al-Matubsi's professional interests are in the area of reproductive physiology research, with a specific emphasis on ovarian hormones and changes that may be involved in the mechanism(s) underlying diabetic fetopathy. He has published more than 20 papers in reputed journals and is serving as an editorial board member of repute journal Diabetes and related Disorders.

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(Day 1)

Yui Umekawa et al., Biochem Anal Biochem 2016, 5:3(Suppl)
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Homeothermic control based on pre-equilibrium reaction in thermogenic skunk cabbage, *Symplocarpus renifolius*

Yui Umekawa and **Kikukatsu Ito**
Iwate University, Japan

Temperature is one of the most important requirements for all living organisms. To survive in severe environments in which temperature changes continuously, some animals have gained the ability to maintain their temperature during the evolutionary process, called homeothermy, which is performed by a complex mechanism involving thermal receptors throughout the body and integration in the hypothalamus that controls shivering and non-shivering thermogenesis. Interestingly, flowers of some plants show a similar homeothermic behavior by inversely controlled respiration to temperature. To clarify the thermoregulatory mechanism in thermogenic plants, we investigated the temperature response of respiration in vivo using modified Arrhenius model using homeothermic spadices of skunk cabbage (*Symplocarpus renifolius*). Our results clearly showed that overall thermodynamic activation energy exhibits a negative value in the temperature range in which respiration control occurs. Our results suggest that respiratory control in this plant is achieved by a pre-equilibrium chemical reaction in response to temperature. Moreover, citrate-driven respiration analysis using isolated mitochondria from thermogenic spadices further suggests that chemically endothermic reactions, such as NADPH production catalyzed by mitochondrial isocitrate dehydrogenase are involved in our proposed pre-equilibrium reaction. A law of chemical equilibrium known as Le Chatelier's principle may govern the homeothermic control in skunk cabbage.

Biography

Yui Umekawa is currently pursuing PhD in Biochemistry, Bioenergetics, Molecular Biology at the United Graduate School of Agricultural Sciences, Iwate University, Japan.

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Debora Roselita Karo Sekali, Biochem Anal Biochem 2016, 5:3(Suppl)
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The correlation between malondialdehyde concentration level in seminal fluid analysis and asthenozoospermia among infertile males

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In Indonesia, approximately 20% of couples are infertile and 40% of the cases caused by male infertility. Impaired sperm motility (asthenozoospermia) is the leading cause of inability to conceive after regular unprotected sex in one year. Reactive Oxygen Species (ROS) is associated with male reproductive health. However, biochemical analysis on infertile males are rarely done in a clinical practice and WHO laboratory manual ranges of seminal fluid characteristic can be different in various races and ethnicities. Objective of this study is to compare malondialdehyde concentration as an indicator of ROS level in seminal plasma between normozoospermia and asthenozoospermia and to find the correlation between level of malondialdehyde and sperm motility among infertile males. Case control study analyzes 15 asthenozoospermic males and 20 normozoospermic males' seminal plasma in a fertility clinic in Jakarta. Thiobarbituric acid assay is used to measure the concentration of malondialdehyde. Mann-Whitney test shows, there is no correlation between concentration of malondialdehyde and asthenozoospermia p value=0.194. However, average of malondialdehyde concentration in normozoospermia is lower than in asthenozoospermia. The future research with the same topic should be done by choosing fertile men as the control group and by taking minimal two samples for each subject since the population variances are unequal.

Biography

Debora Roselita Karo Sekali has completed her Bachelor in Medical Science from Universitas Indonesia in 2016. She is currently pursuing her Honors Degree in Research of Reproductive Physiology of Women with prolonged labor in Monash University, Australia.

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Notes:

Palina Vyhouskaya et al., Biochem Anal Biochem 2016, 5:3(Suppl)
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Pyruvate kinase as a new target for anti-caries agents

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Background: In oral cavity conditions, cariogenic bacteria *Streptococcus mutans* are characterized by altered metabolism compared to cells found in physiological flora. The metabolism of *Streptococcus mutans* is based on glycolysis, which also occurs in presence of oxygen (a phenomenon known as the Warburg effect). The low concentration of oxygen (<2%), i.e., hypoxia inside the biofilm, increases expression of genes encoding glycolytic enzymes and inhibits the oxidative phosphorylation. Pyruvate kinase (PK), one of the enzymes involved in glycolysis, is considered as an enzyme conditioning the rate of the whole process since it is activated by glucose-6-phosphate, a substrate of glycolysis.

Material & Methods: Pyruvate kinase from *S. mutans* ATCC and 40 clinical strains was purified, precipitated and estimated fluorimetrically. Here, we revealed the activity and regulation of PK in mixed bacterial biofilm species, and discussed how these properties enabled the regulation of PK for cariogenic biofilm proliferation and caries progression consequently. Clinical strains were isolated from children with caries. Mixed biofilm assay was carried out according to current protocols in microbiology.

Results: PK activity was higher (1.65 mU/mg of protein) in the mixed cariogenic biofilm species compared to the single and mixed physiological biofilm types (1.15 mU/mg of protein vs. 1.33 mU/mg of protein).

Conclusions: It was demonstrated that the pyruvate kinase activity is increased in mixed cariogenic biofilm species. *Streptococcus mutans* are more resistant to glycolytic enzyme inactivation occurring in mixed cariogenic biofilm species (including *Streptococcus sobrinus*, *Lactobacillus acidophilus* and *Actinomyces viscosus*) compared to mixed physiological biofilm types. Inhibition of glycolytic enzymes might be an essential step in the reduction of mixed cariogenic biofilm species which could be a useful tool in caries prophylaxis.

Biography

Palina Vyhouskaya is currently a PhD student at the Jagiellonian University, Poland. She is a Member of the Scientific Students Association of Laboratory Diagnosticians, where she gains experience and practice connected with modern research methods used in Medicine.

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Naureen Fatima et al., Biochem Anal Biochem 2016, 5:3(Suppl)
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Aloe vera leaf extract mediated synthesis of curcumin nanoparticles: Implications in the treatment of type-2 diabetes in experimental Wistar rat model

Naureen Fatima, Syed Mohd Faisal, Owais Mohammad and **Shagufta Moin**
Aligarh Muslim University, India

Background: Curcumin, an active component of turmeric has caught tremendous attention as a potential therapeutics for diabetes because it is a relatively safe and inexpensive drug that reduces glycemia and hyperlipidemia in rodent models of diabetes.

Aim: To study the effect of in-house synthesized curcumin nanoparticles (Cur NPs) in the treatment of type 2 diabetes in experimental Wistar rat model.

Method: The Streptozotocin (STZ)-induced experimental rat model of diabetes were used to evaluate the effect of in-house synthesized curcumin nanoparticles (Cur NPs) on glycemia, body weight, glycosylated hemoglobin (HbA1c), oxidative stress and inflammatory immunological markers.

Results: In this study, we developed *Aloe vera* leaf extract (AVLE) mediated curcumin nano-formulation for highly effective diabetes therapy. Polyphenol (AVLE) mediated bio-functional, Cur NPs showed excellent dispersibility and outstanding stability in physiological environments. The data of biochemical and inflammatory biomarkers revealed the ameliorative effect of Cur NPs on STZ-induced diabetic experimental Wistar rat model. Interestingly, administration of Cur NPs for four weeks was able to prevent body weight loss, reduce the levels of glucose, hemoglobin (Hb), and HbA1C in blood and improve insulin sensitivity.

Conclusions: The data of the present study clearly showed that the therapeutic efficacy of the AVLE synthesized Cur NPs were found better than that of free form of curcumin as well as with the AVLE alone. Cur NPs were also found to be effective in ameliorating the increased levels of fasting blood glucose, urine sugar, and urine volume in STZ-induced diabetic rats. Polyphenol mediated green synthesis of Cur NPs with effective and efficacious anti-diabetic potential may open new prospects for type 2 diabetes therapy.

Biography

Naureen Fatima has completed her studies from the Aligarh Muslim University (AMU), India. She has completed her graduation in 2009 and Post-graduation in 2011. In 2013, she has joined for her PhD at the Department of Biochemistry, Jawaharlal Nehru Medical College, Aligarh Muslim University, under the supervision of Dr. Shagufta Moin, Department of Biochemistry and co-supervision of Professor M Owais, Interdisciplinary Biotechnology Unit, Aligarh Muslim University. She has two research publications, one in Elsevier Journal, *Appetite* in 2013 as a second author and another in *PLOS One* in 2016 as a co-author. She has received the Best Poster Award in the 3rd Annual Meeting of Indian Academy of Biomedical Sciences and Symposium on Modern Trends in Human Diseases in December, 2013 held at the Department of Biochemistry, J.N. Medical College, AMU, India.

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Zeba Farooqui et al., Biochem Anal Biochem 2016, 5:3(Suppl)
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Thymoquinone attenuates cisplatin induced toxicity and oxidative damage in rat kidney

Zeba Farooqui, Faaiza Shahid and **Farah Khan**
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Nephrotoxicity is a severe complication in patients undergoing cisplatin (CP) chemotherapy. Thymoquinone (TQ), a monoterpene isolated from volatile oil of *Nigella sativa* seeds has been shown to exhibit strong antioxidant properties and protective effects against oxidative damage induced by several drugs and toxicants. The present study was undertaken to investigate whether TQ can prevent the CP-induced nephrotoxic effects or not. Rats were divided into four groups: Control, CP, TQ and CP+TQ. Rats in the groups CP+TQ and TQ were administered TQ (1.5 mg/kg bwt orally), prior to and simultaneously with and without, multiple doses of CP (3 mg/kg bwt, i.p) every fourth day for 20 days, respectively. CP nephrotoxicity was evident by increased serum creatinine (Scr) and blood urea nitrogen (BUN). CP treatment caused oxidant/antioxidant imbalances as reflected by increased lipid peroxidation (LPO), decreased enzymatic and non-enzymatic antioxidants. Furthermore, the activities of brush border membrane (BBM) marker enzymes like alkaline phosphatase (ALP), γ-glutamyl transferase (GGTase) and leucine aminopeptidase (LAP) were significantly declined in renal cortical and medullary homogenates and in isolated BBM vesicles (BBMV) in CP treated rats. Oral TQ administration, significantly attenuated CP induced increase in Scr and BUN and decrease in BBM enzymes activities. TQ administration also precluded CP induced alterations in the enzymatic and non-enzymatic antioxidant parameters. Histopathological observations showed extensive kidney damage in CP treated animals and remarkably reduced renal injury in CP and TQ co-treated group. The results suggested that TQ alleviates CP induced nephrotoxicity and oxidative damage by strengthening antioxidant defense mechanism in the kidney.

Biography

Zeba Farooqui is currently pursuing PhD at the Department of Biochemistry, Aligarh Muslim University (AMU), India. She is currently working on "protective effect of *Nigella sativa* and thymoquinone on cisplatin induced toxicity in rat kidney". She has published a research article in an international journal. She has presented her work in several scientific meetings and conferences.

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Eman T Mehanna, Biochem Anal Biochem 2016, 5:3(Suppl)
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Intestinal fatty acid binding protein *Ala54Thr* polymorphism is associated with peripheral atherosclerosis combined with type-2 diabetes mellitus

Eman T Mehanna
Suez Canal University, Egypt

The intestinal fatty acid binding protein (*FABP-2*) is expressed in enterocytes and binds with saturated and unsaturated long-chain fatty acids. *FABP-2 Ala54Thr* polymorphism was reported to have an influence on lipid metabolism. This study aimed to assess the relation of this polymorphism with peripheral atherosclerosis combined with type 2 diabetes mellitus in an Egyptian population. The study included 100 diabetic patients with peripheral atherosclerosis and 100 control subjects. The *Ala54Thr* polymorphism was analyzed by PCR-RFLP. FABP-2 level was measured by ELISA technique. FBG, fasting serum insulin, HbA1c lipid profile, BMI, systolic and diastolic blood pressure were all determined. The Thr54 allele had higher frequency among the patients group (p=0.002). The heterozygote *Ala54/Thr54* and the rare *Thr54/Thr54* genotypes showed significant increase in BMI and *FABP-2*. Carriers of *Thr54/Thr54* genotype had significantly decreased HDL-C. Carriers of *Thr54/Thr54* genotype had significantly higher systolic and diastolic blood pressure than carriers of both *Ala54/Ala54* and *Ala54/Thr54* genotypes. FABP-2 level had positive correlation with BMI, systolic and diastolic blood pressure and negatively correlated with HDL-C. The *Thr54 allele* of *FABP-2 Ala54Thr* polymorphism was associated with increased incidence of peripheral atherosclerosis combined with type-2 diabetes mellitus in the studied population.

Biography

Eman T Mehanna is a Lecturer of Biochemistry and Molecular Biology at the Faculty of Pharmacy, Suez Canal University, Egypt. She has 6 internationally published papers.

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Kavitha Kannan et al., Biochem Anal Biochem 2016, 5:3(Suppl)
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The effect of aqueous extract eclipta prostrata on norfloxacin induced cholestatic jaundice male abino rats

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Norfloxacin (fluroquinolones, noroxin) admission complex from claiming bigger dosage from claiming Norfloxacin might bring about Cholestatic jaundice. Eventually Tom's perusing hindering alternately decreased bile stream in the liver. Those instruments from claiming Cholestatic jaundice might a chance to be comprehensively arranged under hepatocellular, the place an impedance for bile structuring happens also obstructive, the place impedance will bile stream happens after it is structured. Eclipta Prostrata may be recognized an essential liver herb clinched alongside Ayurveda. Those Eclipta Prostrata need been extensively mulled over for its hepatoprotective movement. The hepatoprotective movement of the watery extricate from claiming Eclipta Prostrata might have been investigated against Norfloxacin prompted Cholestatic jaundice clinched alongside rats. Level for serum ALT, AST also aggregate bilirubin might have been measured on normal, control (disease/toxicity induced), Furthermore watery extricate for Eclipta Prostrata dealt with rats. During the measurement from claiming 400 mg/kg, Norfloxacin prompted Cholestatic jaundice Previously, rats Concerning illustration showed Eventually Tom's perusing statistically huge ($p<0.05$) decline over serum ALT, AST Also downright bilirubin level contrasted with control bunch. Oral pre-treatment about rats for the watery extricate for Eclipta Prostrata during the doses from claiming 150 mg/kg, 250 mg/kg and 350 mg/kg body weight former on Norfloxacin dosing in 400 mg/kg gotten huge distinction in the exercises for serum ALT, AST also downright bilirubin level of the test bunches. These present outcomes recommend that the watery extricate for Eclipta Prostrata might have a powerful hepatoprotective impact against Norfloxacin prompted Cholestatic jaundice rats.

Biography

Kavitha has double master's in Bioinformatics and bachelor in Chemistry, currently doing phd in VIT,INDIA.She has been actively engaged in research and done few international conferences and startup publishing work in various international publications.

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Scientific Tracks & Abstracts

(Day 2)

Tracks: 4, 5 & 6

Day 2 October 11, 2016

Track 4: Nano Biochemistry
Track 5: Pharmaceutical Biochemistry
Track 6: Medical Genetics

Session Chair
Suresh Kumar
Management & Science University, Malaysia

Session Introduction

Title: **Computational functional and structural annotation of hypothetical proteins of *Neisseria Meningitidis* MC58**
Suresh Kumar, Management & Science University, Malaysia

Title: **Nano-porous three dimentional metal-organic frameworks with potential for drug delivery, selective gas adsorption and heavy metal ion removal**
Ali Morsali, Tarbiat Modares University, Iran

Title: **Nano-magnetite L-proline as an efficient nano-biocatalyst for the synthesis of tetrahydrobenzo[b] pyran derivatives**
Ali Ramazani, University of Zanjan, Iran

Suresh Kumar, Biochem Anal Biochem 2016, 5:3(Suppl)
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Computational functional and structural annotation of hypothetical proteins of *Neisseria Meningitidis* MC58

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Management & Science University, Malaysia

Neisseria meningitidis is a parasitic gram-negative bacterium best known for its role in meningitis and other forms of meningococcal disease such as meningococcemia. It is important to identify possible novel drug targets and to thrive serogroup B vaccines against the potential pathogen because one of *Neisseria meningitidis*'s strains, MC58, has natural transformation capacity. Because of the emergence of new drug resistant strains, even though several generic drugs and vaccines have been developed over time, *Neisseria meningitidis* infections remain a global health problem that appeals for the development of novel drugs and vaccines against the pathogen. In the complete genome of *Neisseria meningitidis* strain MC58, there are 2158 coding genes out of which 681 encodes for hypothetical proteins (HPs). With the help of various bioinformatics tools, the extensive functional analysis of these HPs was performed. We have analyzed 681 hypothetical proteins using various functional prediction tools like CDART, Interproscan, SMART, Interpro, CATH and pfam. Among 682 total hypothetical proteins, we successfully annotated 436 proteins present in *Neisseria meningitidis* genome. It was observed that out of 436 proteins, 13 proteins are enzymes, 26 proteins are transporters, 11 are assembly proteins, 6 proteins involve in cell division, 70 proteins are binding proteins, 15 proteins are integral membrane proteins, 6 proteins are catalytic domains, 15 proteins are factors, 24 proteins regulators, 3 are structural proteins, 3 are ion channels, 42 are RNA proteins, 111 proteins sequences contain a domain of unknown function (DUF), remaining proteins cannot be functionally determined by any of the tools. These analyses suggest a possible role of hypothetical proteins in the survival, development and pathogenesis of the organism. Further we have identified 38 hypothetical proteins as virulence causing factors using VICMpred tool. Virulence causing proteins can serve as potent drug targets for the drug discovery process. The outcomes of this comprehensive study will be useful for better understanding of pathogenesis, drug resistance, adaptability to host, epidemic causes and drug discovery for treatment of the disease.

Biography

Suresh Kumar is Senior Lecturer in bioinformatics at Management and Science University, Malaysia. He previously worked as Senior Lecturer at National University of Malaysia, Malaysia. He has obtained his PhD from the University of Vienna, Vienna, Austria. He did his post-doctoral work at Texas State University, USA. He has six years of experience in teaching and research. His research interests include structural bioinformatics, sequence analysis, Next-generation sequence data analysis.

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Nano-porous three dimentional metal-organic frameworks with potential for drug delivery, selective gas adsorption and heavy metal ion removal

Ali Morsali and **Vahid Safarifard**
Tarbiat Modares University, Iran

In the domain of health, one important challenge is the efficient delivery of drugs in the body using non-toxic nanocarriers. Up until now, two routes have been set up: The "organic route", which uses either biocompatible polymers and the "inorganic route", in which the hosts are inorganic porous solids, such as zeolites or mesoporous silicate materials. Most of the existing carrier materials show poor drug loading and rapid release of the proportion of the drug that is simply adsorbed at the external surface of the nanocarrier. Herein, we introduce a third way: Porous inorganic-organic hybrid solids. Metal-organic frameworks (MOFs) are a new class of hybrid crystalline materials composed of organic linkers and metal nodes, with a diversity of structural characteristics and the nature of the pore surface. These materials have unquestionably enormous potential for many practical structure-related applications. This includes the more traditional areas of storage, separation or controlled release of gases, catalysis, sensing, and drug delivery. In this regards, we would like to introduce our azine/amide-functinalized pillar-layered TMU MOFs (TMU = Tarbiat Modares University) as potential drug delivery systems. For instance, the two 3D porous Zn(II)-based MOFs, containing azine-functionalized pores, $[Zn_2(oba)_2(4\text{-bpdb})]\cdot(DMF)_2$ (TMU-4) and $[Zn_2(oba)_2(4\text{-bpdh})]\cdot(DMF)_2$ (TMU-5) have showed acceptable capture of CO_2 with CO_2/N_2 selectivities of ~25 at 298 K. Moreover, a new MOF, TMU-30, based on isonicotinate N-oxide as an adsorptive site has been used for fast and highly efficient aqueous phase adsorption of Cr(VI) over a pH range of 2–9. Combination of high and regular porosity with the presence of functionalized-organic groups within the TMUs can cumulate the advantages to achieve both a high drug loading and a controlled release.

Biography

Ali Morsali received his BS (1995) and MS (1999) in Coordination Polymers from Kharazmi (Tarbiat Moallem) and Zanjan Universities respectively, and his PhD (2003) in Inorganic Chemistry from Tarbiat Modares University under the supervision of Professor Alireza Mahjoub. He is currently a faculty member in the Department of Chemistry of Tarbiat Modares University. He has been a Full Professor at the Tarbiat Modares University since 2011. His research interests include the solid-state reactivity involving coordination polymers and rational design and synthesis of metal-organic frameworks and their application in clean energy field and gas storage.

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Nano-magnetite L-proline as an efficient nano-biocatalyst for the synthesis of tetrahydrobenzo[b]pyran derivatives

Ali Ramazani and **Hamideh Aghahosseini**
University of Zanjan, Iran

L-proline is known as the most favored catalyst in enamine-mediated reactions. This simple amino acid as a bifunctional catalyst is efficiently applied in variety of organic transformations. The simplicity of this small molecule contrasts with the complex structure of the natural enzymes, which are capable of promoting similar transformations. A secondary amine, functionality refers to its enhanced nucleophilicity over the other amino acids, which is the particular feature in nucleophilic catalysts. From the catalytic performance point of view, proline is termed "the simplest enzyme", meanwhile it is a building block or catalytic center of some of natural enzymes. The surprising versatility and specificity of this simple natural amino acid against toxic organometallic catalysts convert it to a promising candidate for artificial enzyme designing. Magnetic functionalization of L-proline gives recoverability and reusability to this efficient organocatalyst. Herein, we report the synthesis and use of magnetite L-proline as an efficient and reusable nano-biocatalyst in the coupling reaction of dimedone, malononitrile and aromatic aldehydes to afford the corresponding benzo-[*b*]-pyran derivatives in aqueous media and in good yields. Pyran derivatives have great biological and pharmacological importance that is organized as a significant class of heterocyclic compounds. Despite the catalytic role of proline in chemical reactions, it has been known for several decades, but its significance in biochemistry and biogenesis has still remained uncovered.

Biography

Ali Ramazani has completed his PhD under the supervision of Professor Issa Yavari in the Department of Chemistry at the Tarbiat Modares University (TMU), Iran. He currently works as a Full Professor in Chemistry at the University of Zanjan, Iran. His studies focused on Organic Synthesis and Nanochemistry. He has published more than 350 papers and is an Editorial Board Member of the international journal *Nanochemistry Research*. He has received several national and international awards, including the 2013 Khwarizmi International Award, Several Top-Cited Author Awards and Best-Paper Awards from leading ISI Journals, Best Researcher Awards and the Best Lecturer Awards at the University of Zanjan.

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