Poster Presentation

Chemistry & Biomedicine 2018





Joint Event

8th World Congress on

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October 22-23, 2018 | Frankfurt, Germany

Shamo Z Tapdiqov, Chemistry and Biomedicine 2018, Volume 8
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Synthesis and investigation of chemical structure of N-methyl N-benzyl chitosan by the co-alkylation method

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Chitosan is a linear cationite type natural polyaminosaccharide produced by N-deacetylation of chitin. Chitosan consists of β-(1,4)-2-amino-2-deoxy-D-glucosamine and β-(1,4)-N-acetyl D-glucosamine units. The non-toxicity, biocompatibility and bone adhesion of chitosan confirm its perfect properties in delivery of genes and drugs in medicine and biotechnology. Solubility of chitosan only in acidic environment limits its use as a carrier in controlled release of some drugs. Chitosan derivatives with new properties were synthesized by graft copolymerization, acylation, carboxymethylation, and alkylation reactions of chitosan macromolecule. Such derivatives have new properties and can be managed from a molecular structural and can easily enter into electrostatic or hydrogen bond with low molecular drug preparations.

In this research synthesis of Schiff derivatitive of chitosan with methyl and benzyl aldehyde at the co-alkylation reaction. The synthesis of N-methyl, N-benzaldehyde chitosan was conducted in two stages - initially by aryl-co-alkylation and then by the reduction process.

The exchange of hydrogen atoms from 85-90% free $–NH_2$ groups on the content of chitosan is commonly found to be substituted by various alkyl and aromatic radicals based on the Schiff reaction. In most cases included of alkyl or aryl group into chitosan macromolecule with the addition of the same radicals. Also, the degree of alkylation or arylation of the amine groups ultimately affect the product's solubility and biological properties. The reaction mechanism and molecular structure of product was studied by the UV-Vis electron spectra was performed. It was determined besides the chitosan, and the reduced chitosan derivatives were very poorly soluble in water. High sensitive method has been used in the discovery of the molecular structure of these polymer modifications. The analysis of samples has been studied in the ultraviolet region due to slight solubility.

Speaker Biography

Shamo Z Tapdiqov in 2011 obtained his Ph.D. degree from the Faculty of Macromolecular Chemistry at the Institute Catalysis and Inorganic Chemistry Azerbaijan National Academy of Sciences in Baku (Azerbaijan) and in 2016 he became the Assoc. Prof. in the same field.

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Video Presentation

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Giancarlo Mendez Agreda, Chemistry and Biomedicine 2018, Volume 8
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Risk assessment by chronic toxicity to exposure of magnesium at a renal level in rats of the species *Rattus Norvegicus*

Giancarlo Mendez Agreda
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A histological examination from kidneys, specifically at the level of renal cortex and medullary thick ascending limb of Henle's loop, in a group of albino rats of the species Rattus norvegicus Holtzman strain, to which were administered orally magnesium chloride Ad. Libitum at concentrations below the LD50 but above the RDA, showed sublethal damage evidenced by a slight swelling that encompassed the medullary and cortical area in the study group compared with the control group. In addition to this, biochemical parameters in blood and urine were also affected, which has demonstrated that the consumption above the RDA and without the guidance of a health professional is detrimental to long-term health.

Speaker Biography

Giancarlo Mendez Agreda has completed his MSc at the age of 30 years old at University of Turku, Finland. He is a pharmacist graduated from Universidad Nacional Mayor de San Marcos (Peru). He also counts with experience at pharmaceutical industry as a formulator.

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Notes:

Sung-Jae Cha, Chemistry and Biomedicine 2018, Volume 8
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Role of the kupffer cell cd68, a plasmodium sporozoite receptor, in modulation of experimental cerebral malaria (ECM)

Sung-Jae Cha
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Malaria infection of a vertebrate host starts with liver infection by Plasmodium sporozoites. Sporozoites move from the mosquito bite site to the liver via the blood circulation and leave the circulation by traversing Kupffer cells that line the liver blood vessels. Traversal requires interaction between the CD68 Kupffer cell receptor and the sporozoite surface-GAPDH ligand. We previously reported that a strong (~70 %) reduction occurs in the efficiency of sporozoite liver invasion in CD68 knockout (KO) mice compared to wild-type controls. We made the unexpected observation that the development of experimental cerebral malaria (ECM) in these CD68 KO mice is strongly inhibited. This inhibition only occurs when the mice are infected with sporozoites, not when infected with blood-stage parasites. Importantly, transfer of plasma from a sporozoite-infected CD68 KO mouse into a wild-type mouse induces the ECM-inhibitory phenotype in the recipient mouse. Our initial experiments found the plasma from sporozoite-infected CD68 KO mice has a dramatically different biomarker activation profile compared to wild-type (WT) mice. We hypothesize that sporozoites traverse Kupffer cells or endothelial cells by breaching them and causing cellular injury in the absence of a CD68 receptor. We have identified soluble plasma factor(s) that are responsible for ECM inhibition in the sporozoite-infected CD68 KO mice and are determining the factors that promote their synthesis. The results may lead to novel approaches for the prevention of cerebral malaria development and malaria death.

Speaker Biography

Sung-Jae Cha have over 20 years' experience as a research scientist in biological science field covering cell and molecular biology, genetics, immunology and molecular parasitology. His recent research has focused on the molecular biology of malaria parasite-mammalian liver cell interactions. Using phage display library screening technique he has identified the Kupffer cell CD68 and the Plasmodium surface GAPDH as a receptor and a ligand for malaria sporozoite liver invasion respectively.

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Tyler Adam Martinez, Chemistry and Biomedicine 2018, Volume 8
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How biomechanics is getting bigger by going smaller

Tyler Adam Martinez
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By observing the kinematics alterations form the norm and by using the reading of EMG patterns we're able to see the big picture of the neuro-musculoskeletal conditions lying underneath within a patient; however, to 'get bigger' or new other words, to see more, you must get smaller. Single cell and single molecule research is the best and most practical way to do so. Unfortunately, many of the techniques for seeing the biomechanics of single cells and single molecules are still experimental and in their early infancy, yet the readings and the potential are beyond promising.

Speaker Biography

Tyler Adam Martinez studies at the University of North Texas in biomedical engineering, and specializes in biomechanics. He started engineering at the age of 14 and continued to experiment, research, and test medical devices for the better part of half a decade. His skills in MATLAB, C, and LabVIEW is endorse by Dr. Porter, the university's instructor on Biocomputing. He oversaw the scheduling of BMEN club and is held in high regards amongst all the club officers. Her as a person with autism, see his greatest accomplishment as motivating and inspiring others with autism to take on roles in STEM fields.

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David A Vaccari, Chemistry and Biomedicine 2018, Volume 8
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Multivariate polynomial regression for response surface analysis – A new tool for empirical data discovery

David A Vaccari
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A novel approach is described for empirically modeling multivariate response surfaces, either timeseries or nontime series. Potential applications in chemistry include structure-property relationships and physicochemical property correlations, among many others. The approach uses multivariate polynomial regression (MPR) with a step-wise algorithm to select terms. The approach includes advantages of multilinear regression such as simplicity and transparency. It also has the advantages of more complex modeling approaches such as artificial neural networks (ANNs) in its ability to model complex response surfaces, including high degree curvilinear interactions. Furthermore, MPR has advantages over ANNs in its transparency, tractability, parsimony and resistance to overfitting. These advantages are illustrated by an example and a freely-available online tool for fitting these models is described. Two applications are described. The first is a non-time-series material property correlation using eight independent variables to predict the strength of a concrete mixture. The second is a vector autoregression (VAR) model to describe tungsten flow in the U.S. economy.

Speaker Biography

David Vaccari is a professor of environmental engineering at Stevens Institute of Technology in Hoboken, NJ. He has a masters and PhD in environmental science and a master's in chemical engineering, all from Rutgers University. Originally focused on waste water treatment and water pollution, he now specializes in modeling global phosphorus resource flows and in nonlinear statistical modeling in general. The specialization in phosphorus grew from involvement in planning bioregenerative life support for long-term space missions for NASA, from research for a textbook in Environmental Biology published by John Wiley, and from work on models of phosphorus pollution in streams. He is a licensed professional engineer, a Board-Certified Environmental Engineer, and is listed in the Who's Who in Environmental Engineering and Science.

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Ermoshkin Vladimir Ivanovich, Chemistry and Biomedicine 2018, Volume 8
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The mechanism of the relationship between obesity and cancer in humans

Ermoshkin Vladimir Ivanovich
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Problem: A working group of scientists convened by the International Agency for cancer research analyzed data from more than 1,000 studies and found that obesity increases the risk of 13 types of cancer.

Purpose: An attempt to find and justify the true mechanism of the relationship between obesity and cancer in humans.

Methods: Participation in international scientific conferences, discussions with leading Russian cardiologists, search for information in the literature.

Results: Numerous studies show that cancer and obesity are linked. This relationship was established in the course of a large-scale study that lasted ten years, from 2005 to 2014. The medical indicators of more than 630,000 people were studied. "Obesity and overweight affect cancers, and this can surprise many," said Anne Schuchat, Deputy Director of Centers for Disease Control and Prevention (CDC). In her words, the 13-dependent obesity types of cancer include brain cancer, multiple myeloma, esophageal cancer, postmenopausal breast cancer, cancer of the thyroid gland, cancer of the gallbladder, stomach, liver, pancreas, kidneys, ovaries, uterus, colon.

Studies do not yet make it clear exactly how excessive fat affects cancer, but scientists offer several explanations for this relationship. Some believe that obesity leads to hormonal disruptions and metabolic problems. This helps to increase the levels of estrogen and insulin, and further to the growth of inflammatory processes, which affects the processes of cell division.

In my opinion, the "New theory of CVD and cancer" can explain more plausibly the relationship between obesity and cancer. This theory proves the macro MECHANISM of many diseases in modern people.

Conclusions: The new theory of CVD and cancer is finding more and more positive arguments and facts. It is very likely that abdominal obesity and ascites are the results of the "invisible" work of the AV anastomoses.

Speaker Biography

Ermoshkin Vladimir Ivanovich completed his Graduation in Physics department at Moscow State University in 1978. He has worked at Russian New University (RosNOU) as Physicist. He took part in 5 International Conferences on Cardiology. He has published about 20 articles on Cardiology in Prominent magazines.

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Myle Akshay Kiran, Chemistry and Biomedicine 2018, Volume 8
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Investigations and computation of chemicals used in advanced technological research for the prevention of diseases in present scenario

Myle Akshay Kiran
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Investigations of Chemicals - computational investigations of hydrogen bonding, with regard to the most common red shift in the vibrational frequency, as well as the less common blue shift in several hydrogen bonded systems. thereby generating new insight into both types of the frequency shifts. Thus, the frequency shifts in X—H—Y hydrogen bonded systems at different H—Y distances are shown to correlate well with the Mulliken charges on H and Y, with the positive and negative charges on Y correlating with the blue and red shift of the frequency of X—H vibration, respectively. The role played by charge transfers at other parts of the interacting system is also discussed.

Advanced computation - advances in computing have facilitated major progress in computational chemistry and biochemistry, computational materials design, computational fluid dynamics, process synthesis, planning and scheduling, model-based process control, fault diagnosis, and real-time process optimization. Investigations by involving indicators - investigations have revealed something of more significance By examining lower-consequence, higher-frequency occurrences, companies may avoid those rare incidents that cause major consequences. The two most significant roles incident investigations can play in comprehensive process.

Computation of electrons - electronic structure is the state of motion of electrons in an electrostatic field created by stationary nuclei. The term encompass both the wave functions of the electrons and the energies associated with them. Electronic structure is obtained by solving quantum mechanical equations for the aforementioned clamped-nuclei problem. Electronic structure problems arise from the Born–Oppenheimer approximation. Along with nuclear dynamics problem, electronic structure problem is one of the two steps to study quantum mechanical motion of a molecular system, we design the molecule with protein structure, lead optimization is multi optimization, the rate at which drug action undergoes in solubility and Computational methods and techniques differently we can predict it, it can help by the structure based drug discovery and Computational analysis, Designing chemicals - Designing approaches for particular fragments site for screening and available solids, Pharmacophores, fragment-based properties, profile similarity and structural similarity, and theoretical conditions when working with protein structures, ligands conformation energies are the important as protein ligands interactions energies, ligands based modeling methods, are very active and effinity when having protein structures.

Speaker Biography

Myle Akshay Kiran is an International Research Scholar and Doctor of Pharmacy at the Jawaharlal Nehru Technological University at India. His area of research is in immunization vaccine. He has been the Editor of many Journal publications and presented his research work at various conferences.

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Accepted Abstracts

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Integrating mobile applications into biomedical innovations

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With global smartphone numbers predicted to exceed 6.1 billion by the year 2020, smartphones have quickly revolutionized the world we currently live in. In addition to this, the nature of modern biomedical research is also galvanizing--resulting in increasingly high costs. From expensive specialized equipment and consumables, there are other considerations involving rental, safety, and specialized infrastructure, for example: tissue culture. Alongside the actual equipment, computers are required to both control these devices and facilitate data analysis, e.g. flow cytometry. This necessary pairing of computer and equipment further constraints the researcher to a specific location within a laboratory. In this aspect, mobile applications (APPS) and peripheral devices that displace computers or other equipment can aid to mobilize research processes, contributing to significant savings not only in terms of equipment costs, but also reducing the rental space and equipment setup as well as delivery costs. Such connectivity can be fulfilled utilizing the built-in wireless connectivity (WIFI, Bluetooth, NFC, Infrared, ect.) of the average modern smartphone. Such technological advances, if you will, have already allowed add-on peripheral devices and sensors to further expand the reach of capabilities, such as, thermostat sensors connected wirelessly, which can and has further opened up proficiencies of the smartphone. The prospect of wirelessly connected peripheral devices most certainly open up great potential in the displacement of lab equipment and improving the mobility of biomedical research. Given that smartphones are generally under-exploited in its processing power and range of available sensors for research purposes, there is great promise for the future development in this area. It is only a matter of time before everyone owns core lab equipment in their individual smartphones allowing research to take place—anytime, anywhere.

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Diseases due to accumulation of macromolecular proteins caused to the human body and their removal

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Our biology and organ systems are designed to remove toxins but in certain diseases and in aging there is an accumulation of macromolecular proteins and pathological molecules in abnormally high concentrations. It is believed also that misfolding of proteins naturally occur during the aging process as they are damaged and can cause diseases associated with aging, such as certain cancers, Alzheimer's and Parkinson's. In part protein accumulation results from impaired protein degradation. Over 100 diseases of varying types affecting our major organ systems are known to be associated with abnormal or high concentrations of macromolecular proteins and other chemistries. Various medical interventions, including pharmacological agents, have failed to adequately "clear" our bodies from these solutes and can be associated with serious side effects. New approaches are needed but simply put, can the removal alone of these pathological molecules be supportive of healthier lives? Investigations in various diseases with therapeutic apheresis as by plasma exchange and plasma treatment with membranes and sorbents have shown beneficial effects. In Alzheimer's patients in two clinical trials where plasma from young donors was administered (to test the hypothesis that young molecules are important) or replace plasma with albumin (to test the hypothesis that toxic molecules are present) the results have not been definitive to date. In the group of disease associated with cryoprecipitable proteins investigations have shown that these proteins are suppressive to the immunological system and that there removal, such as by cryofiltration, improves cellular functions as well as patient conditions. The apheresis procedure can serve as "artificial senescent cells", by removing abnormal and damaged proteins. By removing the "biological smoke", those abnormally high concentration and toxic macromolecules, the biological system can be activated to return to normalcy and allow pharmacological agents to work more effectively.

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Metallized and nanostructured metal polymer coatings obtained by *in situ* photo-induced approach

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Metal nanoparticles show potential applications in various fields including but not limited to medicine, catalysis, optics or electronics. Combining the intrinsic characteristics of metal nanoparticles with those of polymers opens up new vistas in the quest for materials with very innovative properties. In this context, metal/polymer nanocomposite materials were developed through a simple, rapid and green approach based on the photoreduction of a metal precursor and polymerization of a blend of monomers. Silver nanofilms were directly generated on a variety of substrates through this environmentally friendly approach, which uses a simple UV source does not involve any reducing or stabilizing agent and does not require any thermal activation. Top-coated films of unprotected silver nanoparticles were generated from a hydroalcoholic $AgNO_3$ solution or an acrylate monomer formulation, directly on glass substrates or food packaging plastic wraps. The metal nanoparticles and metal/polymer nanocomposites film obtained in this way were characterized and the influence of several parameters (fluence, exposure, silver ions concentration and nature of the free radicals generator) on their formation was evaluated. This photoinduced synthesis offers substantial advantages since it combines the characteristic features of light activation i.e. versatility and convenience of the process, high spatial resolution and reaction controllability (intensity and wavelength), with the simplicity of the colloidal approach. Moreover, the use of amplitude masks or interferometric devices to shape up the light beam used to induce the photoreduction of silver cations provides a very powerful and versatile means to spatially manipulate metal nanoparticles.

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Land and aquatic biomass derived monomers for polymers and fine chemicals

Aresta Michele
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The depletion of fossil resources and the environmental impact of their extended use are pushing the scientific community to look-for alternative feedstock. The transition from petroleum and natural gas feedstock to bio-based supplies is essential for the sustainability of the chemical industry. New energy-efficient processes, for converting bio based feedstock, will allow industry to produce goods from domestic resources with a substantially lower carbon emission. In this context, biomass represents an abundant low-carbon renewable resource for the production of bioenergy, chemicals and biomaterials, and its enhanced use would address several societal needs. In order to avoid any conflict with food, non-edible biomass should be used such as wood or waste from agro-forest industry or algae. Currently the global yield of agricultural crop residues, excluding grass, varies from ~8 dry Mt ha-1y-1 to ~22 dry Mt ha-1y-1. The main component of such agricultural residues is cellulose, which represents the most abundant form of biomass, and holds impressive potential as alternative to fossil carbon for sustainable production of fuels and chemicals. Cellulose can be hydrolysed into glucose using chemistry or biotechnologies. The isomerization of D-Glucose provides D-Fructose, the platform molecule for making 5-hydroxymethylfurfural (5-HMF), a most promising platform molecule. It is an intermediate in the synthesis of furan derivatives that can replace chemicals sourced from fossil carbon. Developing selective catalysts that may use oxygen as oxidant in water for the synthesis of fine chemicals and monomers for biopolymers is an important issue that targets sustainability in the chemical industry. 5-HMF and its precursors (fructose and glucose) can even undergo ring cleavage to afford di-acids such as succinic acid and oxalic acid. Another important source of monomers for polymers and fine chemicals are monounsaturated fatty acids. Non eatable oleic acid (restaurant oils, oil from algae or from tobacco and other non-eatable plants) can be converted into mono- and di-carboxylic acids that are useful monomers for polymers (the latter) or additives for the cosmetic industry or can be directly used in agrochemistry (the former). This talk will discuss a few options for sustainable conversion of biomass derived compounds into chemicals that may have an industrial utilization.

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Virtual screening platform on structure based pharmacophore hypothesis to design potential human LDH-A inhibitors against cancer

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Human Lactate dehydrogenase A (LDH-A) has been identified as a potential therapeutic target in cancer cell metabolism as it catalyzes conversion of pyruvate to lactate in presence of cofactor NADH. Based on latest medicinal chemistry research on LDH-A inhibitors, we have developed a pharmacophore model using consisting of four pharmacophore features: two H-bond acceptors and two hydrophobic aromatic rings (keeping one H-bond acceptor mandatory for activity). The presence of co factors such as Zn^{2+} and NADH on crystal structure of LDH-A was also taken into consideration. The pharmacophore model was subjected to Phase Virtual Screening on 1,500,000 commercially available compounds of Enamine database. Selected compounds were filtered out from structure-based pharmacophore search method. Crystal structure of LDH-A (PDB ID: 5W8K) with cofactor NADH was taken for further docking studies. In order to find the most accurate docking pose, self docking analysis on selected protein with 13 docking programs was performed, followed by the selection of 10 docking programs for further post-docking studies that showed docking pose within an average RMSD of 1.5 Å. The successful docked compounds were subjected to consensus docking platfrom in order to search the common docking pose amongst all docking procedures and compounds were selected from consensus level 6, 7 and 8 which showed similar binding mode as of co-crystallized ligand. Ligand-protein complexes of filtered compounds were then analyzed through a final post-docking filter Molecular Dynamics (MD) Simulations with AMBER 16 software in order to confirm the stability of the predicted binding modes. The final compounds from overall study are currently under biochemical studies for LDH-A inhibitory activity.

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Gd_2O_3 nanoparticles as a MRI contrast agents

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Magnetic resonance imaging (MRI) is widely used in modern clinical medicine as a diagnostic tool, and provides noninvasive and three-dimensional visualization of biological phenomena in living organisms with high spatial and temporal resolution. Therefore, considerable attention has been paid to magnetic nanoparticles as MRI contrast agents.

We report a facile method to synthesize high quality and bio-functionalized Gd2O3 nanoparticles (BFNPs) for use as contrast agents in MRI. The bonding status of BFNPs were confirmed by FT-IR and TGA analysis. The surface coating amount was estimated to be from 40% to 60% in weight percent from a TGA analysis. High voltage electron microscope (HVEM) shows that the BFNPs were spherical in shape with an average diameter 3M. In addition, the bio-compatibility of the nanoparticles were measured by cytotoxicity tests by using human prostate cancer (DU145) and normal mouse hepatocyte (NCTC1469) cell lines which indicated that BFNPs are not toxic up to 250M. BFNPs are paramagnetic but have an appreciable magnetic moment at room temperature. This is because Gd(III) has seven unpaired 4f-electrons (S = 7/2). Therefore, appreciable r1 and r2 values are expected from sample solutions, which were in fact observed in this study. The r1 and r2 values of BFNPs were estimated to be 13.77 to 64.14 s -1 mM -1 respectively. The high relaxivities provide an opportunity to conduct perfusion MRI experiments with significantly lower concentrations than those needed for current commercial agents. A pronounced positive and negative contrast enhancement was clearly observed in 3 tesla T1 MR images of a rat with a liver tumor after injection of an aqueous sample solution into a rat tail vein.

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Effect of rubidium in human cells

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Rubidium is found in igneous rocks at 90 ppm. Rubidium is a soft, silvery-white metal. It is an element of the alkali metal group. This metal is easily vaporized. It has a convenient spectral absorption range, making it a frequent target for laser manipulation of atoms. Rubidium metal reacts violently with water. It readily reacts with skin moisture to form rubidium hydroxide, which causes chemical burns of eyes and skin. The metal is used in the manufacture of photocells and in the removal of residual gases from vacuum tubes. Rubidium is considered to be the 16th most abundant element in the earth's crust. This rubidium is like potassium. Rubidium and potassium show a similar purple color in the flame test.

Rubidium is very similar to potassium. Normal human adults contain about 300 mg in all tissues, more than most of the other ultra trace elements. It also acts as nutritional substitute for potassium. The metabolisms of rubidium are closely related to that of potassium, and they show interchangeability with potassium in a variety of biological systems. The tissue with high potassium content accumulates with the radioactive rubidium. The main use of radioactive rubidium is perfusion imaging in myocardium.

The changes occur in the blood–brain barrier. This effects the tumors cells in the brain. Rubidium collects more in brain tumors than normal brain tissue, allowing the use of radioisotope rubidium in nuclear medicine to locate and image brain tumors. Rubidium also tested for the influence on manic depression. Dialysis patients suffering from depression show depletion in rubidium and therefore a supplementation may help during depression. Rubidium is rapidly and highly absorbed and excreted by the digestive tracts of mammals. This talk reveals about the brain cells and the reduction of tumor cells in the brain due to rubidium.

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Non enzymatic glucose sensor based on au-ru nanoparticles with high resistance against chloride poisoning

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Diabetes is the 6th most common cause of death and can lead to serious and costly complications. To avoid them, the patient must be able to manage his blood glucose level. Great efforts have been devoted to improving glucose biosensor to determine the glucose level. As enzymatic glucose biosensors suffer from many problems, non-enzymatic glucose sensor based on nanoparticles was utilized to solve these problems, because it shows good performances through increasing the surface area and enhancing the mass transport and catalysis. Bimetallic Au-Ru nanoparticles (NPs) with novel core-shell morphology were prepared through a single-step microemulsion synthesis for the decoration of multi-walled carbon nanotubes (fMWCNTs). The presence of Ru leads to particles with smaller diameters, improved distribution and adhesion on fMWCNTs, affording very good accessibility to the catalytic sites. To validate this elaborated structure, the effect of Ru on the activity and effectiveness of the catalyst were studied to detect glucose in alkaline solutions. Au-RuNPs/fMWCNTs exhibits a high sensitivity of 28.7 μAmM−1 cm−2 toward glucose and provides a linear range for physiological concentrations (1 mM – 10 mM). Contrary to Au, the Au-RuNPs/fMWCNTs electrode is highly resistant against poisoning by chloride ions, and the interference from the oxidation of common interfering species is effectively suppressed. Additionally, the presence of interfering species (fructose, galactose, ascorbic acid…) affects only marginally the response toward glucose. The role of Ru and the special core-shell morphology are discussed. The Au-RuNPs/fMWCNTs electrode exhibits good selectivity, high sensitivity toward glucose oxidation and applicability for glucose detection in real human serum samples, this is promising for the future development of non-enzymatic glucose sensors.

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Catalytic oxidative cracking of light alkanes to alkenes: A review

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Catalytic oxidative cracking is as an alternative route to steam cracking for the production of light alkenes. It is combination of heterogeneous and homogeneous reactions; where reaction is initiated on the catalyst surface via alky radical generation followed by thermal gas phase cracking. Various catalyst systems have been attempted in literature for the catalytic generation of alkyl radicals at moderate temperatures (550–650 ^{O}C). These include; Li/MgO, Li/Y_2O_3, Au/La_2O_3, Au-SCZ (gold supported on sulfated zirconia), BiOCl, B_2O_3/Al_2O_3, Co-N/Al_2O_3 and Pt/Al_2O_3 monoliths. In addition to catalytic initiation of radicals, alkyl generation using non-equilibrium plasma is studied. Plasma-catalysis in oxidative cracking induces synergy effects and introduces significant improvement in yields of alkenes, however further understanding of plasma chemistry needs to be elaborated. Minimizing CO_2 production and maximizing yields of valuable C_2-C_4 alkenes remains the bottleneck for the commercialization of oxidative cracking process. Future research should focus on reactor design and on developing optimized reactor catalyst systems. A review on various catalyst systems attempted for oxidative cracking of light alkanes to alkenes will be presented.

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Recent advances in automatic assessment of the cardiac function in zebrafish larvae

Ramesh R Galigekere
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Studying model organisms with cardiovascular system bearing similarities to that of the human, has been a part of research in medicine and biology. Accordingly, zebrafish is considered very useful for study in developmental biology, toxicology and pharmacological testing – due to the similarity in the response to various drugs, easiness of breeding, transparency (up to a week after hatching), high throughput, lesser cost involved, in vivo testing, and reduced bioethical concerns. Heart-rate (HR), its variability and arrhythmia are three non-invasive measures of cardiovascular health. Although the heart- beats, of a larva kept under a microscope, may be counted manually, the process is tedious. Therefore, there is a significant interest in automating the process, by using a video-recorder fixed to a microscope. Although many methods to address the indicated purpose have been published, they have their own respective limitations.

This talk summarizes the findings of recent research performed by our group – including Mr. Syam Krishna (PhD student at the Dept. of BME, MIT, Manipal, currently supported by a CSIR Senior Research Fellowship, Govt. of India), Dept. of Biomedical Engg., MIT, Manipal, and Dr. Kiranam Chatti, Dept. of Biology, Principal Research Scientist, Dr. Reddy's Institute of Life Sciences, Hyderabad – on the development of a completely automatic and robust HR-estimation algorithm to on non-transgenic larvae. The method works automatically to estimate an adaptive ROI (irrespective of location and size of the larva, camera zoom, and image resolution) based on the concept of "quantity of motion", followed by independent component analysis. It works even in the presence of minor motion of the larvae/platform, including drift. The method has worked on all the videos we have acquired so far. The ability of the method to detect certain type of arrhythmia is also demonstrated.

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Gas phase selective oxidation of chlorotoluene's on vanadium oxide-based catalysts

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Ecofriendly disposal and conversion of persistent chloro-organic pollutants is one of the important issues which pushed the chloro-hydrocarbon chemistry into the focus of considerable debate and research topic. It's known, modified oxovanadium catalysts are widely used in the heterogeneous catalytic oxidation reactions. Moreover, maleic anhydride and its chloro-substituted analogues have wide apply in many industries, such as paints, pharmacy additives etc. The common feature of having one or more covalent bound chlorine atoms, these compounds show a complex diversity of behavior that is primarily characterized by their aromatic character and the presence of other functional groups. Nevertheless, the introduction of chlorine atom(s) into desired products significantly influences its physicochemical and biochemical properties. From this point of view, the present paper is devoted to find a better performing catalyst for the selective oxidation of chloroaromatic hydrocarbons. Catalytic systems based on salt sand oxides of V, Mo, Sb, P were prepared by co-precipitation, impregnation and mechanical-chemical shifting and characterized via Scanning electron microscope, X-ray diffraction, Thermal analysis, N_2 adsorption-desorption methods. Elemental analysis is used to determine quantitative elemental content of catalysts. An analysis of reagent and product composition was carried out using Agilent 7820A GC equipped a flame ionization detector (FID) and Hp5 column. Selective oxidation processes of chlorotoluene's investigated both on a fixed bed and fluid-bed layer of catalyst. Although the process of heterogeneous catalytic oxidation of chlorotoluene's took place with a higher conversion in a fixed bed but it showed higher selectivity fluid-bed layer of catalyst was found.

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Preparation of MOF materials in water at room temperature

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Metal-Organic Frameworks (MOFs) are a new class of hybrid inorganic – organic porous materials. Porous materials are very useful in gas storage, adsorption based gas/vapor separation, shape/size-selective catalysis, drug storage and delivery etc. Chemistry of Metal-Organic Frameworks is extraordinarily rich. However, this richness has been scarcely exploited in their syntheses, which are still widely dominated by environmentally not benign procedures including solvothermal treatments, harmful solvents etc. This work focuses on changing the solvent and practically the only parameter that has not been altered in the synthesis of MOFs, i.e. the protonated nature of the linker source. Instead alkaline salts of organic linkers have been used. The approach resulted in affording MOF materials in a rapid, cheap and environmentally friendly way, allowing the preparation of high-quality carboxylate based MOFs under particularly sustainable conditions; room temperature and water as the only solvent in particular for MIL-53(Al). Amongst some other advantages, the preparation of MIL-53(Al) is free of any linker molecules, avoiding the subsequent calcinations step, which is compulsory in the conventional MIL-53 (Al) materials. The method has been successfully applied to some other emblematical MOF materials. Furthermore, the method circumvents the harsh condition in the synthesis of MOFs; high temperature and the use hazardous solvents. It does not only imply the prevention of the undesirable corrosive synthesis medium, but it also introduces substantial differences in terms of solubility of the linker and pH of the medium. Furthermore, it is relevant in the generation of MOFs with important textural properties. The method can be applied as a general strategy consisting in the use of salts as an alternative to the exclusively tested acidic protonated linkers.

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Assessing the quality of antimalarial drugs from India using MINILAB: A field study

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Substandard and counterfeit antimalarial medicines poses a serious threat to public health. These counterfeit/ substandard medicines increases the mortality by decreasing efficacy; it also increases the threat of emergence of drug resistance, adverse effect from incorrect excipients/ active ingredients which may be potentially dangerous to the patients. Owing to this, a pilot study was conducted to survey quality of drugs collected from different malaria endemic areas of India. The survey was conducted in different geographical regions on the basis of malaria endemicity i.e. Uttar Pradesh (U.P.), Mizoram, Meghalaya, Gujarat, Madhya Pradesh. Antimalarial samples of ACT (Artesunate+Sulphadoxine-pyremethamine), (Artesunate+Lumefantrine), Chloroquine, Primaquine were collected for qualitative analysis. A mystery shopper approach was used for collection of samples. The quality of antimalarial drugs from these areas were assessed by using Global Pharma Health Fund Minilab test kit. This includes physical/visual inspection and disintegration test, thin-layer chromatography. High performance liquid chromatography was carried out for quantitative assessment of active pharmaceutical ingredient. A total of 150 antimalarial samples were collected. These samples includes 55 (Chloroqunie), 50 (Artemether Lumefantrine), 14 (Artesunate Sulphadoxine-Pyrimethamine), 31 (Primaquine). These samples were assessed by quality using GPHF minilab lab kit. In this study 98% of the tablets passed minilab disintegration, 2% consisting did not passed disintegration test. 99% of samples passed preliminary Qualitative TLC test when compared with 100% and 80% of the standards. 96% of samples passed quantitative HPLC test, 4% of samples (contained low active pharmaceutical ingredient) did not passed this test. The substandard drugs circulating in the market causes drug resistance, treatment failure and finally leads to death. Additional analysis such as post-marketing surveillance should be done so that good quality antimalarials reached to the population.

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