



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

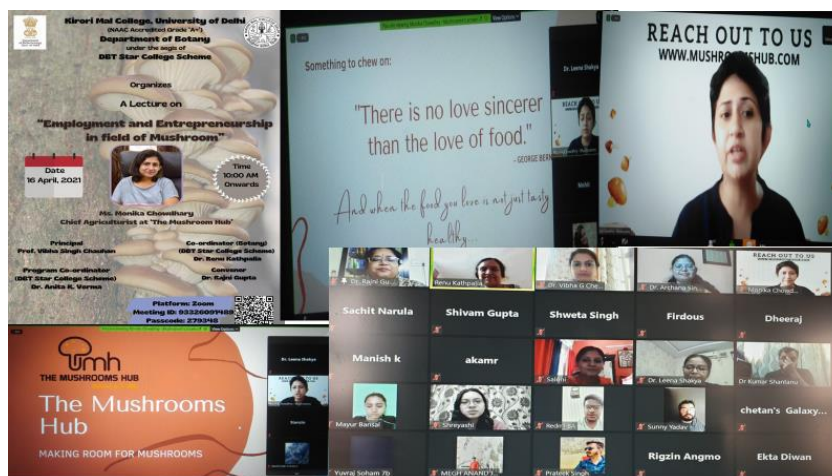
Website: kmc.du.ac.in



Report of activities under the aegis of DBT Star College Scheme 2021-2022

A webinar on “Employment and Entrepreneurship in Field of Mushroom” was organised by Department of Botany, Kirori Mal College on 16th April 2021 under the aegis of DBT Star College Scheme.

Ms. Monika Chowdhary, Chief Agriculturist at ‘The Mushroom Hub’ gave lecture on “Employment and Entrepreneurship in the Field of Mushroom”. The lecture was organised on Zoom platform.



<https://zoom.us/j/93326091489?pwd=VS8ycDhMM3RNdDFLVGRtMGNpeGk1UT09>

(Meeting Id: 93326091489; Passcode: 279348). It was attended by more than 85 participants including students and faculty.

Detail Report

The session began with encouraging words of Dr. Anita Kamra Verma, Program Coordinator, DBT Star College Scheme, Kirori Mal College. The speaker was formally introduced by Dr. Rajni Gupta convenor of the event. The lecture provided visual virtual treat and detailed many aspects of the mushroom cultivation, healing capacities and properties in traditional medicine. The speaker enriched our knowledge about Entrepreneurship in field of mushroom and discussed about marketing management and strategies. The session was appreciated by all the attendees and ignited queries in enthusiastic minds. All the queries were answered by Ms. Monika Chowdhary. The session ended with vote of thanks by Dr. Renu Kathpalia, Botany Coordinator.



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

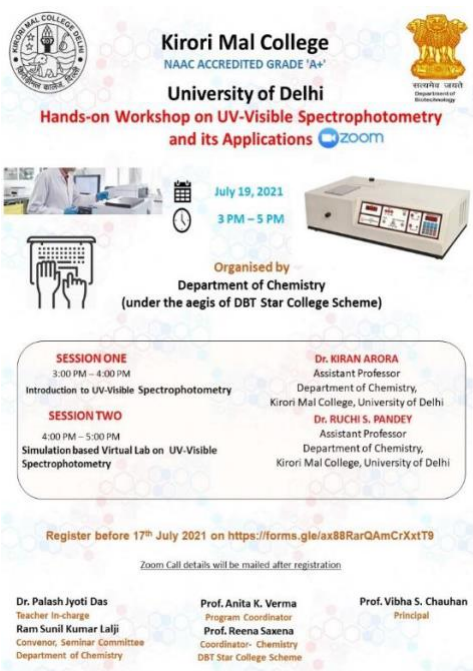
Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Hands-on Workshop on UV Visible Spectrophotometry and its Applications” held in Department of Chemistry, University of Delhi, under the aegis on DBT Star College Scheme on 19th July 2021.



Kirori Mal College
NAAC ACCREDITED GRADE 'A+'
University of Delhi

Hands-on Workshop on UV-Visible Spectrophotometry and its Applications

July 19, 2021
3 PM – 5 PM

Organised by
Department of Chemistry
(under the aegis of DBT Star College Scheme)

SESSION ONE
3:00 PM – 4:00 PM
Introduction to UV-Visible Spectrophotometry

Dr. KIRAN ARORA
Assistant Professor
Department of Chemistry,
Kirori Mal College, University of Delhi

SESSION TWO
4:00 PM – 5:00 PM
Simulation based Virtual Lab on UV-Visible Spectrophotometry

Dr. RUCHI S. PANDEY
Assistant Professor
Department of Chemistry,
Kirori Mal College, University of Delhi

Register before 17th July 2021 on <https://forms.gle/ax8BRarQAmCrXxtT9>

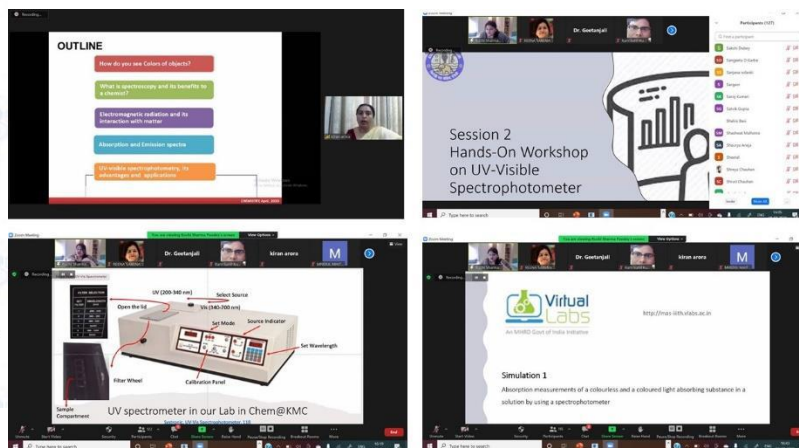
Zoom Call details will be mailed after registration

Dr. Palash Jyoti Das
Teacher In-charge
Ram Sunil Kumar Lalji
Convener, Seminar Committee
Department of Chemistry

Prof. Anita K. Verma
Program Coordinator
Prof. Reena Saxena
Coordinator- Chemistry
DBT Star College Scheme

Prof. Vibha S. Chauhan
Principal

Department of Chemistry, Kirori Mal College conducted an online workshop on “UV Visible Spectrophotometry and its Applications” under the aegis of DBT star college scheme on 19th July 2021. The audiences comprised of undergraduate students from our college along with several faculty members .



Detail Report

Principal, Dr. Vibha Singh Chauhan inaugurated the workshop with her words of wisdom. The workshop was divided in two sessions followed by a quiz based on questions from each session. Both the speakers, Dr. Kiran Arora and Dr. Ruchi Sharma Pandey were from the Department of Chemistry, Kirori Mal College University of Delhi and delivered a very stimulating and compendious lecture followed by a hands-on session based on computer simulations based virtual laboratory platforms. Dr. Kiran Arora familiarized the students with the various aspects of Ultraviolet-Visible spectroscopy and its application in understanding the structure and properties of chemical compounds. This was followed by a hands-on session by Dr. Ruchi Sharma Pandey, where she explained the various aspects of carrying out experiments on a UV-Vis Spectrophotometer as well as a demonstration of the UV-Vis Spectrophotometer that is present in the chemistry labs of the Department of Chemistry. She also introduced the students to online lab platforms where the students did two virtual experiments



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



understanding the concept behind and the working principle of the instrument. The Seminar Committee of the Chemistry department held a quiz at the end for the student participants which was both the fun element as well as a window into their understanding. The students were enthralled and asked several interesting questions. The workshop ended with a formal vote of thanks.

International Conference Nanomedicine “Biomolecules for Human Health (NBHH-2021): Small Molecules, Big Opportunities!!” (27th-28th September, 2021) organized by Department of Botany and Zoology

The conference registered as many as 225 participants and 130 abstracts have been received. This conference also witnessed the participation from 30 different Universities including 24 National Universities (11 private, 13 Government) and 6 International Universities. The conference had a list of distinguished speakers and panelists from across the world including the National (JNU, DU-South Campus, NII, ICGEB, INMAS, Jamia, AIIMS, ICMR) as well as eminent international institutes (Mayo Clinic-USA, Shenzhen University-China, Boston, UCLan-UK, University of Liverpool-UK and Deakin University-Australia among others). The conference was held on zoom platform

<https://www.google.com/url?q=https://us02web.zoom.us/j/87903709252?pwd%3DbENoemFuU09JVUZUk81QUFDWlpRUT09&sa=D&source=calendar&ust=1643985440758043&usg=AOvVaw2oxODcO0Touixe7II011dR>

Day 1 (27th September, 2021)

Inaugural session



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

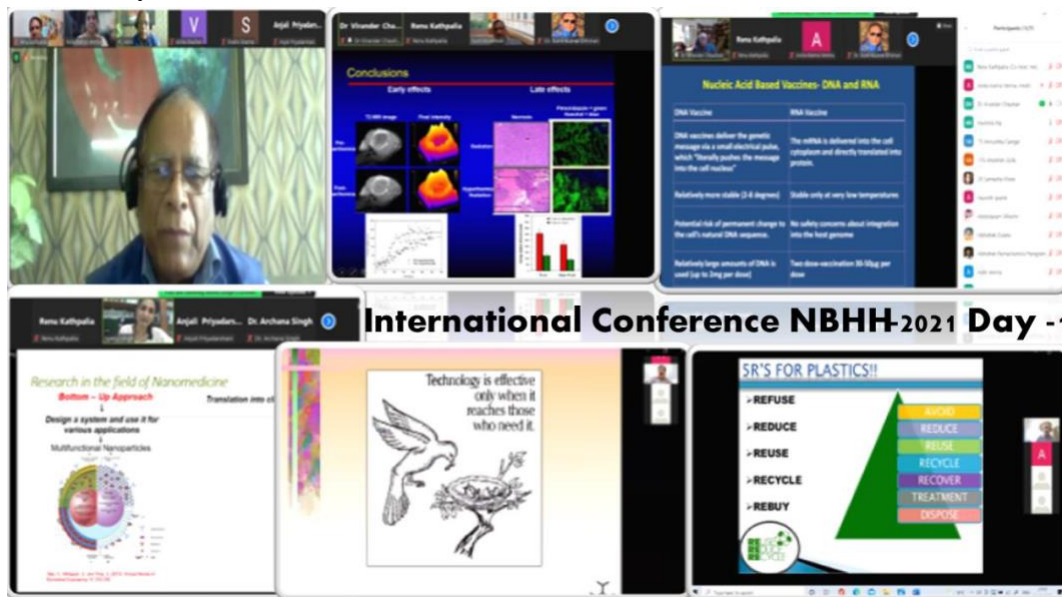
Tel. No.: 011-27667939

Website: kmc.du.ac.in



The two-Day (27th-28th September, 2021) International Conference Nanomedicine “Biomolecules for Human Health (NBHH-2021): Small Molecules, Big Opportunities!!” was organized by Kirori Mal college via virtual platform. The conference began at 8:30 am wherein the convenors of the conference Prof. Anita Kamra Verma and Dr. Renu Kathpalia joyfully welcomed the Principal Prof. Vibha S. Chauhan, and the delegates present in the conference. The convenor then enlightened the audience about the theme, objective and schedule of the conference organized by Kirori Mal College under the aegis of DBT Star College Scheme. Participants were also informed about the post conference workshop where the students could learn more about characterization and synthesis of nanoparticles & applications along with synthesis of Biosensors all under the umbrella of this workshop. Prof. Kamra was happy to share that the idea of the conference was initially conceptualized way back in March 2019. However, due to the pandemic situation the idea got delayed, nevertheless the convenors took this as an opportunity to make the conference an International one.

Prof. Vibha S. Chauhan then formally introduced and welcomed the Chief Guest Prof. P.C. Joshi, Vice Chancellor University of Delhi. Prof. Joshi congratulated the organizing committee for fruitful translation of this international conference with such eminent National and International speakers. He congratulated Prof. Kamra for creating such a wonderful facility at the



college and truly deserve the promotion as well as academic excellence award. He also congratulated the college for establishing itself as Star college and getting grade “A” NAAC Accreditation. He also acknowledged the fact that the organizing committee is making full advantages of the available resources by publishing the proceedings of the conference in a CSIR journal “Indian Journal of Biochemistry and Biophysics” with impact factor of 1.95. He also emphasized the concept of ‘Nano’ or ‘Parmanu - a tiny molecule or building block’ given by Maharshi Karnad.



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in

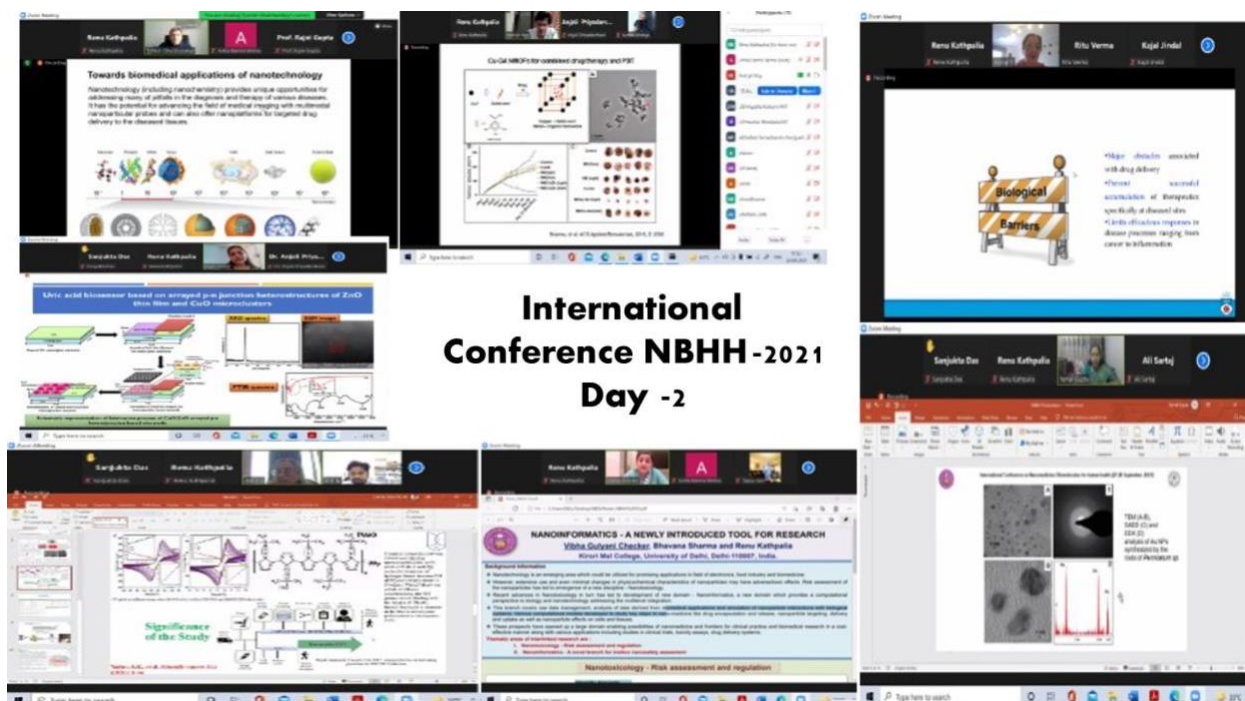


Plenary Session I: Radiation Nanomedicine

The inaugural session was followed by the Plenary Session I on “Radiation Nanomedicine” where a wonderful lecture was delivered by Prof. Sunil Krishnan, Mayo Clinic, Florida, USA on the topic “Radiation Therapy and Radio-diagnostics as Nanomedicine”. Prof. Krishnan exquisitely talked about radiation therapy and Radio-diagnostics as Nanomedicine. He elaborated that amalgamation of gold nanoparticles and irradiation therapy could be utilized to effectively treat pancreatic and hepatobiliary tumors. Talking about Gold nanoshells and its characteristic features Prof. Krishnan explained that these are very easily modulated, biocompatible with dielectric silica core robust structure of 150nm in size and form thiol bond resulting in delay of tumor regrowth. He also supported these findings with Monte-Carlo computational modelling and simulations. Prof. Krishnan appraised all about some of his ongoing work on photodynamic therapy, nanophosphor and molecular nanomachine. His talk gave insight to quality and in-depth work undergoing in his laboratory. His talk enlightened and raised many queries which was very well taken by the speaker. Prof. Inderjeet from Department of Chemistry, DU present formal vote of thanks to Prof. Sunil Krishnan.

Prof. V. S. Chauhan, Arturo Falaschi Emeritus Scientist, ICGEB was introduced by Dr. Sunil Dhiman. Prof. Chauhan delivered the talk on the topic "Vaccine Platforms: Delivery and Role of Nanotechnology". The talk started with the characteristics of the virus and a huge number of people suffering from covid is due to human interference. He explained that all viruses must enter the human cell and each virus has different mechanism of

entering into the host cell and that is amazing. Covid virus is smart virus so there is need to





किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



have different process for making vaccines and covid vaccine making process is different and should be referred as new generation vaccine. RNA is used for the first time for making vaccination although RNA being unstable but it is mainly due to nano material progress. Nanotechnology has played fundamental role in developing, delivering and stabilizing the RNA vaccines. He discussed the composition of different vaccine and advantage of using lipid nanoparticles.

Adenovirus vaccine are so friendly but still is not being used as vaccine though Russian have used these adenoviruses as vector. Prof. Chauhan enriched the participants with the nitty gritty of vaccines mainly covid vaccine and emphasized that formulation of vaccine is possible only by understanding fundamental of nanotechnology. He concluded his talk by highlighting delivery of vaccine through 3-D nanoparticle and research on using hydrogel for delivering larger peptides. Talking about the failure of development of HIV vaccines is mainly as Coat of HIV changes very fast and major challenge is that all viruses mutate very rapidly. Malaria, TB, HIV vaccine have not been developed. Presently, 20 vaccines are now being used and given to healthy people so its efficacy and safety is very important. Dr. Cherita presented formal vote of thanks to Prof. Chauhan.

The next speaker Prof. Anil K. Mishra, DG, INMAS, Delhi, was introduced by Dr. Cherita Prof Mishra delivered his talk on the topic “Radionuclides are Nano and Beyond: Application in Human Health”. He started his talk by reiterating that we must learn from nature. At the onset he said that quantum theory is central to explain artificial intelligence, clinical diagnostic etc. In nature it is evident that minimum size has maximum energy which is being exploited by nano scientists. He emphasized that it is very important to first have clear cut objective for what purpose one is using these nanoparticles. Copper, silver and gold has stable isotope, select which one is best and exploit for clinical diagnostic purposes. He explained the designing of copper, Scandium and Silicon based nanoparticles and how these have been used for diagnostic purposes. Nanoparticles for diagnostic purposes should be not metabolized by the cell at the same time should be safely released. The metal selected should be protected with ligand and taken by the receptor of the cell. A very energetic talk on revolution in clinical diagnosis using nanoparticles and was brilliantly presented. He gave example of Scandium -44 radioisotope designed nanoparticles and Si NMR used for tumor diagnosis. At the end he said it is fundamental to know the chemistry and biology behind the particle which you have synthesized. During interjection he cleared that intake of these metal can be toxic if concentration goes beyond the optimal level. Dr. Renu Kathpalia presented formal vote of thanks to Prof. Anil K Mishra.



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Plenary Session II: Nano vaccines

Dr. Amod introduced Prof. Amulya Panda, Former director of NII who delivered lecture on “Vaccine Development using Polymeric Nanoparticles”. He talked facts about vaccines, its formulation using biodegradable polymeric particles and development of novel polysaccharide-based vaccines using nanotechnology. He reiterated that vaccines are the second most important requirement after clean water, more than 300 vaccines for 80 human pathogens are already developed and vaccines are given to healthy people so it should two hundred percent safe for use. He showed major milestones in vaccines development and talked about new generation vaccines working principle. It is very important that vaccine must induce long lived plasma and memory cell ultimately leading to the formation of germinal center. The major bottleneck in vaccine development has been overcome by polymeric particulate delivery system as it enhances immunogenicity of the antigen. Nanoparticle entrapped PCP induces specific protective immunity by enhancing formation of germinal center and increasing frequency of T follicular helper cells. He categorically remarked that candidate for sixth revolution in vaccinology is immune-engineering and delivery systems and the development of covid vaccine substantiate that. In the interjection section he said that we need to develop vaccine which can boost the activity of germinal center. He also informed that immunity develops up to 12 years and that is the reason all vaccines are given only during these formative years. It is for the first time that vaccine has been injected to adults. Dr. Sanjukta Das gave the formal vote of thanks to the speaker.

Oral Presentation Session

This was followed by the Oral paper presentation which was judged by Dr. Tinku Basu, Dr Zeenat Iqbal, Dr. Durga Pal and Dr. Prasanna. After the oral presentations Dr. Amod presented vote of thanks to all the judges.

Plenary Session III: Environmental Nanotechnology/Engineered Nanomaterials Prof. Nand Gopal Sahoo was welcomed Dr. Sanjukta Das. Prof. Sahoo gave lecture on “Waste to Wealth”: A Green and Sustainable Roadmap for conversion of Solid Waste to Value Added Products and their Applications” and discussed the critical issues for disposal of plastic waste. Although 60% of plastic is recycled in India which is the highest in the world, but still there is no organization to dispose it and garbage is mixed with sub-standard plastic, even burning of plastic is also major problem in India. Plastic which is a polymer can be recycled by mechanical, chemical and thermal. In his lab the main objective is to convert plastic into graphene, which has high tensile strength rather than recycling plastic. In 2016 preliminary waste management set-up was installed in Nainital which convert waste plastic into graphene (15-20%), liquid fuel (25-30%) and gaseous fuel (35-45%). The cost



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



of 1 gm of graphene is Rs 9,500/ and graphene made in his lab around Rs 800/-. He elaborated that graphene produced in his lab has all the properties like graphene available in market. They have used graphene for the energy and biomedical applications, for making carbon nanotubes, water filters, for removal of dyes and can also be mixed cement to concrete mixture. In his lab even paper, cotton and agricultural waste is also converted into graphene. He also showed graphene paper made in his lab which is used for testing iron which already being patented. It is greener technology and has multidisciplinary application. It was indeed putting theory into practise. During interjection he informed that the centre has been able to do pyrolysis of all kind of plastic and it the catalyst concentration and temperature which is optimized in his lab that always convert plastic into graphene. Dr. Archana Singh gave formal vote of thanks to the speaker for his marvellous contribution to the environment sustainability. Dr. Archana introduced the speaker Dr. Neetu Singh from IIT, Delhi. The topic of the talk was "Engineering New Materials for Drug Delivery: A Chemist's Perspective". She appraised all about her work being carried out in her lab. The lecture also described toxicity of nanoparticles, mitigating the toxicity of nanoparticles which is the key for drug delivery. Key aspects for mitigating cytotoxicity through protein corona formation, intracellular interactions and ROS generation were discussed. The talk emphasized the use nanoparticles for drug delivery. Nanoparticle based drug delivery platform technologies offer several distinct advantages over free drug molecules. Nanoerythrocytes an alternative to pegylated liposomes were discussed. The protocol involves haemolysis of erythrocytes and ghost were prepared, incubated with nanoparticle, dye and drug. The dye is photostable and hydrophobic in nature and drug camptothecin (CPT) a potent anti-cancer drug was loaded. The size of nanoparticle was measured using DLS and zeta potential. It was observed that there was no protein adsorption and these were stable structures. The efficacy of drug delivery was checked in vitro there was increase in circulation. The technologies developed possess the highly tuneable physicochemical properties of synthetic nanomaterials as well as the complex protein composition of the nature's own delivery vehicle, the red blood cells. The talk discussed RBCs derived vesicles, characterization of these nanovesicles, their efficacy in vitro and in vivo, chemo photothermal therapy using CPT-ICG loaded nanoerythrocytes, strategy for improving drug encapsulation. The lecture concluded with future perspective showing challenges in clinical translation of nano RBCs like inadequate pre-clinical studies, factors affecting nanoparticle accumulation in tumor, sterilization and challenges in commercialization. Prof. Anita K. Verma profusely thanked Dr. Neetu Singh for accepting the invitation and present her work to the participants.

Poster Presentation Session



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Glimpses of Inaugural session and day 1 activities

Day 2: 28th September, 2021

Plenary Session-IV: Nanophotonics Prof. Tymish Y. Ochulchanskyy from Shenzhen University, China was introduced by Prof. Rajni Gupta. Prof. Tymish enlightened the participants on the topic “Merging Nanotechnology and Biophotonics for Imaging Guided Photoinduced Therapy or Cancer”. The speaker started by discussing about the applications of nanotechnology in biomedicine and how the same can be used for addressing the challenges or lacunae that exist in diagnostics and therapy of various diseases. The audience were enlightened with the concept of multimodal nanoparticulate probes.

The advantages of nanocarriers for formulation and what makes nanomedicine better than the conventional drugs such as multimodality, controlled and targeted release. The use of nanoparticles in Oncotherapy was discussed as these are able to pass the endothelial barrier and reach the cancer cell. The advantage of addition of ligands to the surface of NPs in binding and recognition of receptors in cancer cells was briefed. The speaker introduced a newly emerged term “Theranostics” for modern personalized medicine, where there is a nanotechnology enabled combination of diagnostics and therapeutics.

In a very candid manner Prof. Tymish mentioned Biophotonics as ‘marriage’ between photonics and biology and has immense scope for early detection and treatment of diseases with the help of nanoprobe for imaging and sensing, and also light activated and guided targeted Nanotherapy. Further with the help of covers of various journals he showed the evolution of terminologies such as ‘Theranotics’, ‘Nanotheranotics’ and ‘Photonanotheranotics’. The audience were told about concept and the principle behind Photodynamic therapy and interaction between light and tissue. With the help of diagrams, the penetration depth of various wavelengths of light were shown and discussed. The speaker tried to show how the different wavelengths of light such as Visible, NIR and SWIR effect the visibility and how SWIR because of low scattering useful for development of Nanoprobes.

Then the speaker discussed the core-shell polymeric nanoparticles and nanoliposomes for NIRSWIR and multimodal imaging guided photodynamic therapy of cancer. At the end, the absence of oxygen (hallmark of cancer cells) was discussed as a challenge for multimodal imaging and the ways to overcome it by generating oxygen for enhanced up conversion photodynamic therapy were discussed. It was a very enlightening and updated lecture. After interjection with participants Prof. Inderjit Roy from Department of Chemistry presented vote of thanks to Prof. Tymish for his presence in the conference.



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



The next speaker Dr. Sushma Talegonkar, DPSURU, was introduced by Dr. Ram Babu. Dr. The topic of the talk was “Functionalized dual loaded nanoliposomes effective Treatment of Resistant Metastatic Melanoma”. Dr. Sushma discussed different therapies in the cancer and factors in causing resistance in Melanoma. CD44 receptors are overexpressed in cancer and hyaluronic acid as substrate of CD44 Dacarbazine with eugenol is used in designing the drug.

Optimization of the drug delivery were studied in her lab. The protocol followed involved software using which Lipid, water, ethanol and drug concentration was optimized. After optimization surface functionalization was achieved and different size of liposomes were formed which were entrapped with the drug and drug release at the target site was studied. Cell lines were studied by MTT assay and cytotoxicity with drug can be reduced by coated nanoliposomes. In vivo studies in mice confirm that nanoliposome coated with hydrolic acid the tumour growth of mice.

Dr. Anjali introduced the next speaker of the day Dr. Zeenat Iqbal from Jamia Hamdard. The topic of her talk was “Nanomedicine therapeutics as an approach to ameliorate women reproductive diseases”. She enlightened the participants with the role of nanomedicines in women health which is ignored like cervix cancer, healthy vaginal ecosystem and bacterial vaginosis. She talked vulvovaginal candida for which lipid based nanotherapeutics was tried by her group. Solid lipid nanoparticles were tried for controlled drug release, drug targeting by formulation and design approach. Luliconazole, an antifungal drug was used for candida species to stabilize the drug lipids were screened and spherical shaped nanoparticles were designed and in vitro studies in release of the drug were analyzed. Luliconazole based lipid nanoformulations were devised and screened. Exploration of antibiofilm was also being undertaken. She also talked about treating PCOD with coated nanoparticles. She acknowledged various nano scientist for being inspiration in exploring the nanoworld.

Plenary Session-V: Regenerative Nanomedicine

Dr. Rana Samad introduced Prof. Sujata Mohanty from Stem Cell Facility at DBT-centre of excellence for stem cell research at AIIMS, New Delhi. She talked on regenerative medicine and nanotechnology for advances in healthcare. Stem cell is always in limelight and she talked her journey in the world of stem cells. Regeneration is there in nature but in complex multicellular organisms’ degree of regeneration decrease. She talked about three diseases Parkinson’ disease, diabetes and cardiovascular diseases which need organ transplantation.

Stem cells technology has been used in eye-ocular surface reconstruction transplantation from donor eye to the recipient eye. Tissue specific stem cell are used in vitiligo where skin does produce melanin. By using hair follicle



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



transplantation melanocytes were synthesized. To overcome shortcomings in using stem cells nanotechnology is used for stem cell tracking.

Magnetic nanoparticles were used along the stem cells. Nanographene is used stem cells which differentiated into neurons. The neurons formed in this manner were secreting nopolamines and interact with each other. Stem cell interaction with nano structure scaffolds leads to formation of aligned nanofibers a special coating is done which make the sheet transparent it can replace the cornea. In future they are trying stem cell movement like cardiac cells which can used in heart tissues or making artificial heart. Fabrication and characterization of these has been successfully done. Biomaterial scaffolds are also done for bone tissue engineering. Graphene incorporated 3D porous material has been tried. Natural nanoparticles which are synthesized in the form growth factors and magnetic nanoparticles and nanochips to make neurons and wound healing has been successfully done. She concluded her lecture by saying that if stem cells are shown to be safe, non-tumorigenic and efficiently differentiated then “Lead will be turned into gold” by next generation students. It was a phenomenal presentation where she discussed stem cell therapy and its vast application using nanotechnology for fast targeting the stem cell delivery where it is required. During the interjection she said that stem cell therapy can be used for genetic diseases. Because of ethical issues the stem cell therapy is not fully exploited to treat the patients. Prof. Anita K. Verma presented formal vote of thanks to the guest.

Dr. Gauri Garg Dhingra introduced the next speaker Dr. Sangram Keshari Samal, ICMR Regional Medical Research Center Bhubaneswar, Odisha. He talked about nano-biomaterial like nanofibers, nanogels, micelles, dendrimers, liposome and nanoparticles accelerate their delivery and enhance cell migration, proliferation and differentiation for regenerative medicines. NPs are biocompatible biodegradable, easy to prepare while giving the overview of drug delivery system he informed that GO nanosheets were designed and irradiated with laser resulted in photoporation which was analysed by flow cytometry. It increased visibility of delivery of si-RNA in cell. Bacterial infection need urgently to be addressed and design alternative antibacterial drug as antibiotic resistance is now global threat. Biofilm formation result resistance to antibiotic. Different nanoparticles were to coculture with biofilms in his lab.

Bacteriophage therapy is also a good alternative to treat bacterial infection. Bacteriophage is modified with gold and magnetic nanoparticles and it gave positive results Charge effect biofilm formation effect of different size pegylated polystyrene particles, D-aspartic acid carbondots, #D graphene oxide, 3D chitosan sacaffold were used for treating bacterial infection. Chitosan beads hydrogels release antimicrobial drugs in slowly and prevent



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



infection. He informed that next generation of medical implants and therapeutic modalities, interface of biotechnology and traditional engineering and nano-biomaterial market will be governed by nanobiotechnology and use of antibiotic is going to be eliminated for treatment of microbial infection. Students were delighted to hear the lecture which in depth dealt with bionanomaterials. During interjection session he reiterated that the concept of bacterial film is picking up fast all over world and antibiotics are not able to target bacterial infection. A formal vote of thanks was given by Dr. Renu Kathpalia.

Oral presentation session.

Poster presentation session

Plenary Session VI: Nanomedicines

Dr. Renu Kathpalia introduced Prof. Kamalinder K. Singh Prof. of pharmaceutical technology and drug delivery, University of Central Lancashire, Preston. Prof. Kamalinder gave lecture on the topic “Designing Functional Nanomedicine for overcoming biological barriers”. She started her lecture with introductory remarks on Nanomedicine which are very fast expanding and Asia has maximum growth in the field of Nanomedicines. Challenges in nanomedicine development are nanocarrier capability, stability shelf-life process scale-up ability, material excipient ability, regulatory concern and long-term safety measures. Covid -19 mRNA vaccine is a big milestone for nanomedicine. Nano system can be used for functional nanomedicines. Talking about various physiological barriers, skin, air-lung barrier, reproductive, circulation barrier and Blood brain barrier she said of all these barriers blood brain barrier is very challenging and screening is done using in vitro -DBBB model using various lipids were tried in her lab. Cytotoxicity and cellular uptake of hybrid nanoparticles were studied using fluorescence microscopy. One of antifungal drug aspergillosis is prevalent and spreads to blood vessels and beyond. Covid-19 patients have also shown the effect on nebulization and unable to cross the barrier.

She concluded her talk with appraising all the emergence of nanomedicines brings hope for future drug therapies, understanding principles of biological barriers becomes critical knowledge to improve nano safety and efficacy for nanomedicines. Understanding the mechanisms that govern the fate of nanomedicines against these biological barriers including the strategies that can be used to shift their fate between access and blockage, has become key information for nanoparticle design. Safe -by-design technique to precisely manipulate nanomedicines through imposing biological barriers ultimately employing transformative nanotechnology and lifesaving medicines. Future challenges include more in vitro models for biological barriers, better pre-clinical models to mimic human environment as much as possible, scale up and manufacturing and regulatory hurdles. Nanomedicine is hope for



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



target drug delivery. Participants asked their queries and appreciated the inspiring lecture. Prof. Anita presented formal vote of thanks and appreciated her gracious presence and enlightening the participants.

Dr. Yamal Gupta introduced Prof. Indrajit Roy, Department of Chemistry, University of Delhi. Prof. Roy delivered lecture on the topic “Nanotechnology for Biological Applications”. He gave an overview of nanotechnology involved in health care for diagnosis, therapy both ex-vivo and in vivo. He mentioned different types of nanomaterial like liposomal or polymeric inorganic and inorganic and organic hybrid nanoparticles and their unique properties. NPs have high surface to volume ratio, porosity and biodegradability, unique optical and magnetic properties because of which there are used as drug carriers, tissue engineer, sensing, medical imaging super capacitors, and data storage. Quantum confinement effect has been used in semiconductors and nanoparticles known as quantum dots which give better insight into imaging the human body. Noble metal nanoparticles show surface plasmon resonance, magnetic properties and show phenomenon ferromagnetism. Nanomedicine is used for targeted delivery, controlled release, externally activated therapy and multimodality using multiple agents to perform multiple functions. He compared the conventional drug therapy with externally activated drug therapy. Photodynamic therapy involves activation by light leading to fluorescence and phosphorescence converting triplet oxygen to singlet oxygen which kills the tumour cells. Gold nanoparticle PDT in PS-doped nanoparticles resulted in singlet oxygen and killing cancer cells. Talking about Nanozymes he mentioned that these are nanoparticle acting as enzymes like catalase which converts hydrogen peroxide to water and oxygen by which hypoxia can be treated in tumour cells. It was a very lucid talk giving clear concepts about the role of nanoparticles in human health. Prof. Roy was profusely thanked by Prof. Anita.

Glimpses of day 2 of the international conference

Valedictory session

Prof Anita K. Verma appraised Prof Kundu about the conference involving different lectures and publishing 15 articles in Indian Journal of Biochemistry and biophysics. There are more 125 participants on both the days. We had galaxy of speakers, each and every one was par excellent and gave their valuable times. There were 85 abstract and faculty gave oral and poster presentation and there were 8 judges and the result has been complied.

Prof Vibha Chauhan, principal thanked all the participants and congratulated the convenors and co-convenor of the conference. She welcomed Prof. Kundu and thanked him for joining and in the same vein she appreciated Dr. Tapas and Dr. Kamalinder for giving their support. It was meant to encourage students and the faculty member



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



for giving the platform to learn nanomedicine. We are having high sense of elation and we will take to higher level. Prof. Tapas Sen appreciated the participation of research scholar and he advised the students three thing viz., talent, hard work and mindset to succeed in any field. The success of large event is success and hard work of everyone. The audience, students and researchers were very active and participated actively. A conference like this creates and gives platform to students and research scholars.

Dr. Sunil Dhiman introduced Prof. Suman Kundu to all. Prof. Kundu congratulated each and every one for wonderful scientific session. Nanomedicine and nanotechnology have elated everyone so we are nano-elated. The resource person holds the key to success of any conference. Mentioning the efforts of Prof. Anita Kamra Verma congratulated her on being awarded Academic Excellence Award from university. To have conference on nanotechnology is wonderful idea and even historian learn from this technology. Carbo nanotubes have been used in cosmetics in ancient India. Physicist and chemist are involved in this material science, metal nanoparticles, semiconductor, photodynamic, protein-based nanoparticles, foodtechnology, manufacturing industry and has wide usage and is going to be used in space soon.

Nanomedicine, biosensors, diagnostics, green synthesis are the areas where students must bemotivated to do research Mr. Amit K Yadav from JNU, Ms. Kumari Bhavya and Ms. Lubna Siddiqui for Jamia Milia University won first second and third prize respectively. Dr. Manvi Singh from Dept of Pharmaceuticals won first prize, Dr. Kajal Jindal from Department of Physics, Kirori Mal College got second prize and Dr. Anjali Kumar Department of Zoology, Kirori Mal College. won third prize in oral presentation in the faculty category. In student category Ms. Monika Matiyani from Kumaon University, Ms. Rajashri from Bhuvneshwar won the prize in poster presentation. In faculty category Dr. Chansi Gupta from Amity University and Dr. Vibha Gulyani Checker from Department of Botany, Kirori Mal College, In the student category, Ms. Palak Chugh from Sri Venkateshwara college, Ms Anu from CSIR and Best interjector prize was given to Priyanka Patra, Anaya Mishra and Abhishek Dubey. Prof. Kundu said that you must keep up the spirit and be inquisitive.

The vote of thanks was given by Prof. Anita Kamra

Day 3, September 29th 2021

Workshop on Nanomedicine

Dr. Anand Tadas, Malvern, UK, delivered talk on the topic "Drug Delivery:



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

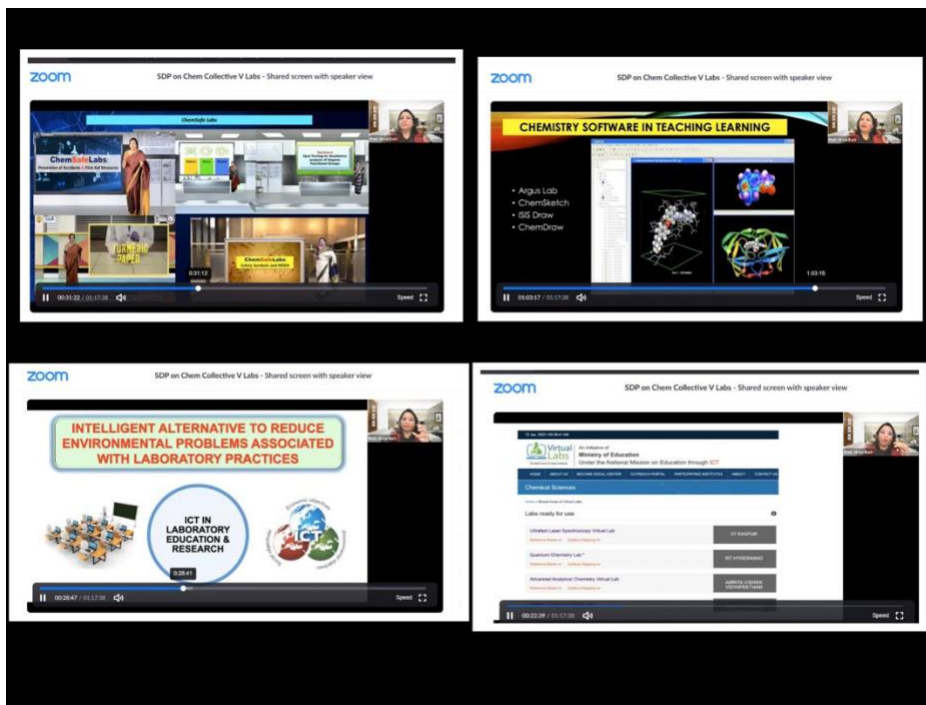
Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Characterization Perspective- DLS, Zeta & NTA”. The research on drug delivery routes of delivery, delivery vehicles, cargo and targeting strategies is important for drug formulation. It is important that manufacturing process should consistently deliver the product, quality and critical process of materials. Drug product design, drug product control and patients need is required for drug product development. The physiochemical properties are first analysed for drug designing and these properties should be fit for biological process and price of drug need to be low. Then he showed the infrastructure required for setting up a company involved in manufacturing drug. The first thing is to find what is the routes of drug delivery; if it is oral, nanodrug delivery or oral solid dose products. Based upon ways of administration drug the drug is designed. Liposomes are good delivery system and different technologies are there to find the concentration, charge and size of liposome and the route of its delivery. The regulatory give the guidelines for designing the drugs. The different equipment used for checking, size, charge, excipient structure, bilayer phase transition, lamellarity and alkyl chain order to design liposomes. He informed about different equipment used viz., Nanotracking analyzer, Dynamic and electrophoretic light scattering,



Gel Permeation / size exclusion chromatography, differential scanning calorimetry and small and wide-angle X-ray scattering to analyse liposomes and then he explained their principle and methods to use these equipment. Prof. Anita appreciated and profusely thank Dr. Anand for sparing time and enlightening the participants. This was followed by lecture on the “Nano-bio-interaction: journey of nanoparticles inside the cell” by Prof. Anita K.Verma. With wonderful illustrations she explained the cellular uptake and nanotoxicity it impacts on cellular structure, cell elasticity and the dynamic mechanism of the cell. It is of great significance to understand the microenvironment of NP simultaneously charge, size, elasticity and thickness is to be checked. She then explained



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



cell membrane interactions and NP entry into cells. There are two pathways namely phagocytosis and pinocytosis and five different mechanisms of endocytosis leads to NP entry into the cell.

There is recognition, processing before entry NP into the cell. If recognition is by the receptor it is known as receptor mediated entry. Based on the cell it may take 30-minutes to many hours to enter into the cell. The cell differentiates between different particles and can uptake NPs through Clathrin coated mediated endocytosis or caveolae mediated endocytosis. 15-18nm NP prefer caveolae mediated endocytosis. The cytoskeleton of the cell is also involved in uptake.

There can be different pathways of entry of NP and the final fate of these NP in cell and cell signalling decide whether autophagy will take place. The presentation gave insight that biocompatibility of NPs in biological systems is the crucial step to decide the efficacy of Nanomedicines.

Mr. Jake Mazur-Deakin University, Australia delivered lecture on “Nanoparticles-targeted therapy for the modern era”. He explained targeted delivery by aptamers in the brain which has lots of receptors. Different types of NPs viz, coated NP with proteins, self-peptides coated, RBC membrane coated as well organic and inorganic NPs were tried for drug delivery.

Sonication method was tried to prevent agglomeration of NPs and finally achieve entry in brain using different pathways via nasal.

Ms. Monika from nanobiotech lab, Department of Zoology, Kirori Mal College explained the fluorescence microscopy. She explained how the living cell, organic and inorganic specimens absorb and subsequently re-radiate light and exhibit the phenomenon of fluorescence and phosphorescence. The comparison of fluorescence microscopy to ordinary light microscope was also explained. The principle, method of preparation of specimen by use of fluorescent dyes and targeting of proteins and immunofluorescent were explained clearly. The application of the microscope using different dyes used in the lab were also elaborated. She showed the video to explain the method to use fluorescence microscope.

Ms. Large Biswas gave hand on experience to perform “Cytotoxicity assay by MTT”. She explained the procedure of using haemocytometer and counted the number of cells. MTT assay was explained to test the cell viability and toxicity. MTT is a yellow water-soluble dye and reduced to purple. She talked about the principle, procedure of MTT assay through video prepared by her.



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Dr. Amod, Department of Zoology, Kirori Mal College demonstrated the technique “Genotoxicity Micronucleus assay- a gold standard for genotoxic hazard identification of Nanoparticles”. The micronucleus assay: a toxic genetic approach for the risk assessment of NP. He talked the ames test and compared the other method to perform genotoxicity test. The multiple genotoxicity biomarkers used are chromosome aberration test, micronucleus induction assay, sister chromatid exchange analysis sperm toxicity test, rapid assay and comet assay. He

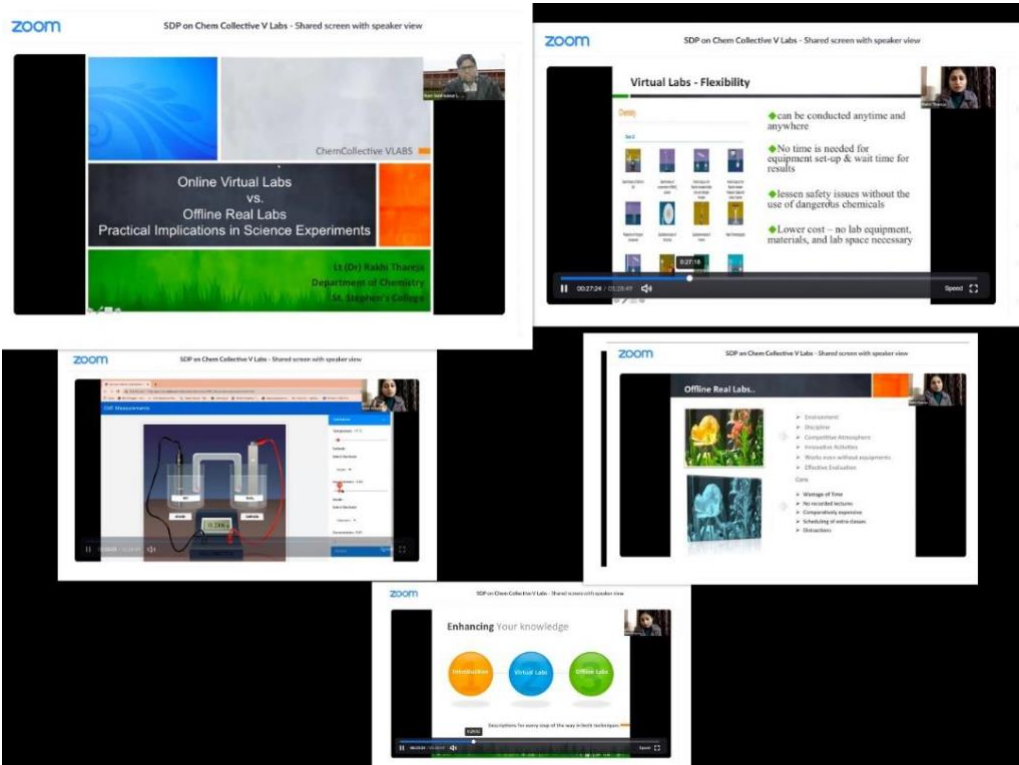
explained in detail the micronucleus test which can be performed in bone marrow and circulating erythrocytes in fish which does not require ethical permission. The micronucleus can be identified by its size and the condensation is like nucleus.

Ms. Karishma from Nano biotech lab

“RT PCR - Gene Expression” Dr. Pratima Solanki, JNU, New Delhi demonstrated “Nanoparticle-Based Sensors for Pathogen Detection: From Bench-side to Field Ready Application”. She introduced the biosensor which is an analytical device and converts a biological response into a measurable signal. Then she explained nanomaterial-based biosensors which can be easily fabricated.

While preparing nanomaterial-based biosensors a self-assembled single layered molecules were used and functional group which interact were identified by the biochemical reactions that were visualized by immobilization. Discussing the protocol, she said that first biocompatible electrode is designed and is connected to amplifier where signals are amplified.

These amplified signals are converted into digital value. Biosensor has three major components (i) A bio-recognition element such as DNA, enzyme (ii) antibody for recognition also called bioreceptor (iii) a transducer





किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



for conversion of a biochemical reaction product into an electrochemical signal. Leland C. Clarke in 1962 invented biosensor using enzyme.

Biological recognition element like enzyme, antibody, DNA organelles, microbial cells and plant and animal tissue can be recognized by biosensor like, enzyme electrode, immunosensor, DNA sensor, organelle sensor, microbial sensor and tissue sensor respectively. Different biosensors which can be fabricated, electrochemical, calorimetric, piezoelectric and optical biosensor. These biosensors have immense application in industry, military, environment monitoring, agriculture and medical. Lateral flow immunoassay with low cost, reliable and easy to operate. Different biosensors for clinical diagnosis commonly used are glucose based on glucose oxidase, urea based urease nucleic acid, cancer biomarkers Vitamin D antibiotics detection. Nanomaterials are important for biosensors as they have high specific surface area, biocompatible, high chemical stability, electrochemical activity, high adsorption capability, high electron communication and negligible swelling in both aqueous and non-aqueous solution compared to organic polymers. She also mentioned the various biosensor being successfully used in diagnosis of various disease such as, Chitosan modified Nickel oxide immunosensor for vibrio cholera detection (made in her lab), Nano structural zirconium oxide based Geno sensor for E.coli detector, SARS-CoV-2 detection, zika virus detection, covid-19 biosensors. It was an excellent presentation with detailed information about biosensors and use of nanomaterials in disease diagnosis.

This was followed by demonstration of “Electrochemical approach towards designing of nanoengineered materials” by Prof Tinku Basu, Founder, Director, Amity University. Electrochemical approaches have been used to design nanomaterials and using this it possible to enhance mechanical, optical, magnetic and biological properties of NPs. She sited various engineered nanoparticles synthesis; By using template-free nanoparticles and electrochemical method nanofibers were designed; microporous polyaniline films using foam templates were prepared by ultrasonication. Uniform porosity was an added advantage of these engineered nanoparticles. In her lab her group are able to synthesize nanostructured polyaniline, MOF steered electrosynthesis of anisotropic gold particles. Electrochemical reduced graphene oxide (ERGO) and electrochemical synthesized MOF has been synthesized and patent have been granted. She magnificently explained on a very crucial aspect of nanoparticles that how controlled engineering of NP can be used to increase the efficiency of NP and can be used for varied purposes. Challenges to nanoengineered materials the toxicity anisotropic material have less side affects the phagocytic effect of these is not much they can be used for drug delivery and cancer cell killing monoclonal antibody attached to it can delivered properly. What kind of material we should avoid during implementation?



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Silver nanoparticles are the best for . The shape of NP affects their activity triangle, cubical or rod have different efficacy in using for their application. Why anisotropic NP has more application? Rod are aligned properly and stacked and then only they can be applied shape advantage can be only exploited if they are properly made.

Prof. Tapas Sen, Uclan, UK demonstrated “Magnetic nanoparticles in bio separation:

Application for the detection of food and waterborne microorganisms and potential for Covid-19 RNA”. He elaborated application of magnetic NP in bio-separations, food and water borne microorganisms, diagnosis, therapeutic, controlling size, morphology and potential for covid-19 RNA. He discussed the synthesis and surface modification of nanomagnetic NP and nanocomposites. Surface area and pore size is measured by nitrogen gas adsorption and mercury porosimeter. NP tend to aggregate and to make them disperse is an art which was demonstrated by surface coating. He showed the video showing synthesis NP and positive charge NP attracting negative charged bacteria and for bio-separation. Using silica-magnetic nanocomposite separation of RNA from bacterial cell was also demonstrated and this was used for testing the contamination of frozen food without culturing the microbes. Magnetic NP have been used in diagnosis of Covid-19, By synthesizing NP and attaching some ligand which change the surface properties and that is used for separation of bioactive particles. Selective capturing with attaching genome sequence and that can be used for separation of complementary sequence genome. Then he showed the tri-phasic reverse emulsion which selectively make surface changes in NP and specificity to capture microbial genome without culturing. In his lab they have made commercial kit using superparamagnetic iron oxide nanoparticles for checking food contamination with covid-19.

The workshop concluded with the formal vote of thanks by Prof. Anita Kamra Verma to all the resource persons, Principal madam for her undaunting support and DBT star college scheme under the aegis this international conference was organized.



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

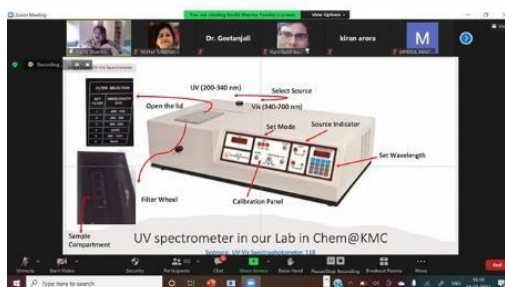
Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in





किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

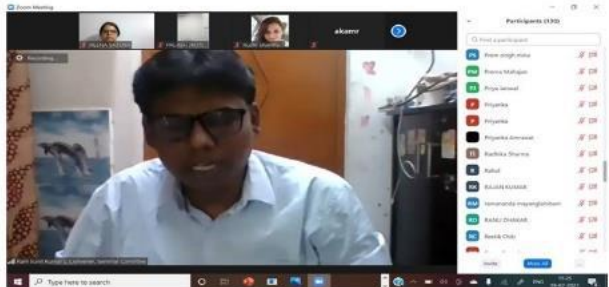
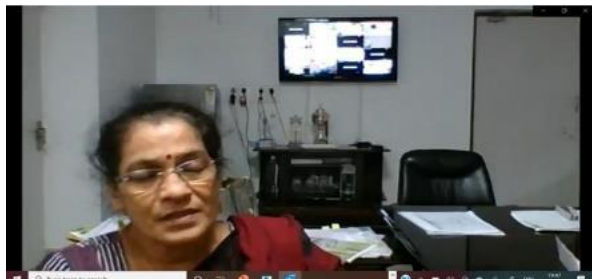
Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Two- Day Workshop on Arduino Programming: Level 01' Physics Department, Kirori Mal College, University of Delhi 28th -29th June, 2022



किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



A two-Day Workshop on Arduino Programming: Level 01', was organized under the aegis of DBT Star College Scheme on from 2:00 pm to 5:00 pm in the college. This workshop was for B.Sc.(Hons) Physics students of KMC. The registration of students for the workshop was done through a Google form (<https://forms.gle/4PaE4E8ED1LY4PFTA>). Since the equipment to provide hands on experience to students were limited so only first 35 registered students were invited to attend the workshop.

Detail Report

The workshop was held with the help of resource persons from by TI Centre for Embedded Product Design, Netaji Subhas University of Technology, Delhi: Mr. Naman Puri, Mr. Mudit Aggarwal, Mr. Rohan Deswal and Mr. Reshul. The Google Classroom was also created for the students to give relevant exercises to students to have better understanding of the concept.

The work plan of the workshop is as follows:

This workshop was based on the Arduino Nano to introduce students with basics of the Arduino Platform and how to use elementary components for physical computing like LEDs, switches, sensors, buzzers and displays. The students also learnt how to use the serial monitor to debug problems with their circuits.

Project Demonstration

Prof. Dhananjay Gadre, demonstrated various projects made at TI-CEPD, NSUT to showcase the use cases of Arduino and similar platforms (ESP32, MSP430, ATtiny etc.)

Introduction to Micro-controller

It began with introduction of Arduino and explaining the difference between a Microcontroller and a Microprocessor and the use of Arduino.

Setup and Installation





किरोड़ी मल कॉलेज

दिल्ली विश्वविद्यालय, दिल्ली - 110007

Kirori Mal College

University of Delhi, Delhi - 110007

Email: principal@kmc.du.ac.in

Tel. No.: 011-27667939

Website: kmc.du.ac.in



Showing students how to install the required software and familiarising students with the UI of the Arduino IDE and the serial monitor **Seminar on 'Formation of Structures in the Universe' organised by Department of Physics on 30th June 2022**

Physics Department, Kirori Mal College, University of Delhi has organised a seminar on 'Formation of Structures in the Universe' under the aegis of DBT Star College Scheme on 30th June, 2022 at 2:00 pm in the college.

[Detail Report](#)

The lecture was delivered by Dr Sampurn Anand, Assistant Professor, Central University of Tamil Nadu, India, for undergraduate students in chalk-talk mode. He discussed the formation of structures in the Universe starting from Big Bang Theory followed by formation of planets, expansion of the universe etc. He explained the difficult concepts like black holes, space-time equivalence, in a very simple way using minimum mathematics. It was an interactive session where students kept on pouring their queries and doubts about the topic.