

Ranbaxy Science Scholars-2007

The Ranbaxy Science Scholarships-2007 were presented on January 14, 2008 by Prof. David Baltimore (Nobel Laureate) President â€“ Emeritus, Robert Andrews Millikan Professor of Biology, California Institute of Technology, USA at a special function organized at National Institute of Immunology, New Delhi.

Medical Sciences



Dr. Karishma S Kaushik
Post graduate student
Department of Microbiology
Armed forces Medical College
Pune - 411 040
INDIA

Dr. Karishma S Kaushik has been selected as Ranbaxy Science Scholar in the field of Medical Sciences. Her award winning research work involved â€œMolecular characterization of clinical varicella-zoster strains in India and differentiation from the vaccine Oka strainâ€ . The study led to the conclusion that circulating varicella-zoster strains in India are genotypically different from the vaccine Oka strain licensed for use. This diversification of the clinical strains from the vaccine strain challenges the potential use of the current vaccine for universal varicella-zoster immunization. This research work has implications in terms of development of a strain-specific vaccine for India for protection against varicella-zoster virus infections.



Mr.Tanweer Hussain
Research Scholar
Dr. Rajan Sankaranarayananâ€™s Group
Centre for Cellular and Molecular Biology
Uppal Road
Hyderabad - 500 007
India.

Mr. Tanweer Hussain has been selected as Ranbaxy Science Scholar in the field of Medical Sciences for his work on the structural basis of high fidelity during translation of the genetic code. The work provides mechanistic insights into the removal of noncognate L-serine from tRNA^{Thr} by a D-aminoacyl-tRNA deacylase-like editing module of an archaeal threonyl-tRNA synthetase. The study identifies a single residue filter for enantioselectivity in these modules and presents a fascinating example of how nature has subtly engineered this domain for ensuring a high fidelity as well as enforcing homochirality during translation of the genetic code.



Mr. Aseem Mishra
Graduate Student,
International Centre for Genetic
Engineering & Biotechnology (ICGEB)
Aruna Asaf Ali Marg, New Delhi-110067

Mr. Aseem Mishra has been selected as Ranbaxy Science Scholar in the field of Medical Sciences for his research work "Design of nanostructured biological materials through self-assembly of peptides". The study focused on deciphering the design rules for self-assembling short peptides. The research work demonstrated that peptides as small as two residues efficiently assemble in aqueous medium into distinct nano-tubular or nano-vesicular structures. The studies suggested the important role of stackable moieties for self-assembly in the designed scaffold. It was also observed that chiral inversion of the constituent amino-acids along with the incorporation of conformational constraint proved to be effective strategies for modulation of morphology of the nanostructures. It was also found that amphiphilic dipeptides self-assembled into nano-vesicles that could potentially encapsulate bioactive molecules. The research was aimed at design of novel biocompatible polymer systems for their potential use in intelligent delivery systems.

Pharmaceutical Sciences



Mr. Prem N. Gupta
National Doctoral Fellow
Drug Delivery Research Laboratory
Department of Pharmaceutical Sciences
Dr. H. S. Gour University,
Sagar- 470003 (M.P.) INDIA

Mr. Gupta has been selected as Ranbaxy Science Scholar in the field of Pharmaceutical Sciences for his research work involving M-cell targeted novel delivery systems for the mucosal immunization. Development of M-cell targeted carrier construct(s) is an emerging concept in the oral vaccine delivery with enormous potential. Initial research work of Mr. Gupta in association with Prof. Suresh P. Vyas was focused on the topical, non-invasive delivery of vaccine antigen, DNA etc. Further, his research interest extends to mucosal vaccine delivery particularly by oral route. Various versions of novel drug delivery systems have been exploited for the effective delivery of bioactive agent(s).

Ranbaxy Science Scholars-2008



Ms. Mridula Nambiar

Senior Research Fellow
Department of Biochemistry
Indian Institute of Science
Bangalore-560012
INDIA

Ms. Mridula Nambiar has been selected for the Ranbaxy Science Scholarship â€“ 2008 for Young Scientists in the field of Medical Sciences. Her award winning research work involved â€œCharacterization of the Molecular Mechanism of Chromosomal Translocations in Lymphoma and Leukemiaâ€. The study identifies the possible causes of double-strand breaks in two of the genes (BCL2 and HOX11) involved in chromosomal translocations leading to follicular lymphoma and T-cell leukemia. In this study, the prevalence of the t(14;18) translocation in the healthy Indian population was also determined. It was found to be low as compared to the western population and could explain the lower prevalence of the follicular lymphoma in India as compared to the western countries. This research work has implications in terms of understanding the mechanism of generation of chromosomal translocations, development and therapeutics of lymphoma and leukemia.



Ms. Sagarika Haldar

PhD Student
TB Molecular Biology Laboratory
Department of Biotechnology
All India Institute of Medical Sciences
New Delhi -110029
India.

Sagarika Haldar has been selected for the Ranbaxy Science Scholarship â€“ 2008 for Young Scientists in the field of Medical Sciences. Her award winning research work involved â€œDevelopment and validation of improved assays for the rapid diagnosis of tuberculosisâ€. This study established the use of molecular beacons in the easy and visual detection of *M. tuberculosis* in smear negative pulmonary tuberculosis. It also involved the development of a quantitative real-time PCR assay to efficiently diagnose tuberculous meningitis in CSF samples. The utility of post-lysis smear examination in improving the reliability of PCR based diagnosis was also shown during the study. This research work has important implications towards improving the diagnosis of pulmonary and extra pulmonary tuberculosis.



Dr. Tulika Prasad

Assistant Professor,
Advanced Instrumentation Facility
Jawaharlal Nehru University,
New Delhi-110067, INDIA

Dr. Tulika Prasad has been selected for the Ranbaxy Science Scholarship â€“ 2008 for Young Scientists in the field of Medical Sciences. Her award winning research work involving â€œFinding Novel Strategies to combat drug resistance in Candida - 2 new approachesâ€ was carried out at School of Life Sciences, JNU. Investigating the extensive role of membrane lipids, she found interactions between ergosterol and sphingolipids are important determinants of multidrug resistance (MDR) and morphogenesis in *Candida* (an opportunistic dimorphic fungal pathogen). She established sphingolipid biosynthetic pathway as a novel attractive antifungal drug target. Working in collaboration at JNU, she could successfully demonstrate iron as a novel modulator of drug resistance and morphogenesis. Her work established MDR reversal by iron modulation, independent of the already known drug efflux pumps. Reversal of MDR by controlling cellular iron could represent a new target for infection and drug resistance. The work opens the possibility of

combination of iron chelators and azoles as novel therapeutic strategy for MDR reversal.

**Mr. Umesh Gupta**

Senior Research Fellow (ICMR)
Department of Pharmaceutical Sciences
Dr. Hari Singh Gour University, Sagar (M. P.)
470003, INDIA

Mr. Gupta has been selected for the Ranbaxy Science Scholarship â€“ 2008 for Young Scientists in the field of Pharmaceutical Sciences. He is currently continuing his doctoral studies under the supervision of Prof. N. K. Jain. His award winning research work involved â€œPolypropylene imine dendrimer mediated solubility enhancement: effect of pH and functional groups of hydrophobesâ€ . The study led to the conclusion that PPI dendrimers can be better choice in the solubility enhancement of the insoluble drugs like famotidine, Amphotericin B etc. This research work has opened the possibility of the transdermal drug delivery through polymeric nanocarriers. The further research work of Mr. Gupta includes the possibility of these carriers in the ligand mediated dendrimer based targeted drug delivery of certain diseases like cancer and malaria etc.

Ranbaxy Science Scholars-2009

**Ms. Ruthrotha Selvi B**

Ph.D. student
Transcription and Disease Laboratory,
Molecular Biology and Genetics Unit,
Jawaharlal Nehru Centre for Advanced Scientific Research
Bangalore 560 064, INDIA

Ms. Ruthrotha Selvi B has been selected for the Ranbaxy Science Scholarship â€“ 2009 for Young Scientists in the field of Medical Sciences. Her award winning research work is in the area of â€œHistone arginine methylation and acetylation in global gene regulation, probed by small molecule modulatorsâ€ , wherein she has shown the link between gene expression (transcription) and disease with the help of small molecules. This includes the identification of a dual mode of action of DNA intercalating anticancer compound Sanguinarine as well as a novel scaffold (plumbagin-based) for histone acetylation inhibition. Furthermore, she has also identified a specific histone arginine methylation inhibitor leading to the elucidation of a new mechanism of enzyme inhibition. Finally, she has used nanomaterial conjugated histone acetylation activator to induce hyperacetylation in mice brain. Her research work will not only help in understanding the epigenetic basis of pathophysiological conditions but also in designing new generation therapeutics for cancer, diabetes and neurodegenerative diseases.

**Ms. Teena Mohan**

PhD Student
Department of Biochemistry
All India Institute of Medical Sciences
(A.I.I.M.S.)
Ansari Nagar.
New Delhi -110029

Teena Mohan has been selected for Ranbaxy Science Scholar Award 2009 for young scientists in the stream of Medical Sciences. She is working on the topic â€œDeveloping defensins as a mucosal adjuvant/microbicide with peptide antigens of HIVâ€ . She has studied these natural antibiotic peptides and their corresponding analogues with the very well known epitopes of HIV. This study elucidates that these defensin peptide analogues markedly enhance HIV peptide antigen specific antibody immune response even at very low concentration, when administered in the form of different formulations. These findings have explored these defensin peptide analogues as a mucosal adjuvant for some of the conserved peptide antigens of HIV-1 subtype â€“ Câ€™TM. The main aim of the work is to develop Defensin as a mucosal adjuvant or microbicide on the skin or vaginal cream. The present study may have implications in the development of new antiviral agent for AIDS therapy.

Ms. Hardeep Kaur

Senior research fellow ,
Microbial Physiology and Genetics
Institute of Microbial Technology ,



Chandigarh 160036, INDIA

Ms. Hardeep Kaur has been selected for Ranbaxy Science Scholar Award-2009 for her work on glutathione degradation pathway and identifying a novel Cys-Gly specific dipeptidase in *S.cerevisiae*- Dug1p. Glutathione (GSH) is considered as a major cellular redox buffer and is present in almost all eukaryotic systems. The protein belongs to the M20A family of metallopeptidases. Homologues of Dug1p in *S.pombe* (*Spdug1*) and humans (*CNDP2*) were also shown to function as Cys-Gly specific dipeptidases. The human orthologue of Dug1p, *CNDP2* (carnosinase like dipeptidase 2) that was earlier described as a non specific peptidase is ubiquitously expressed in all human tissues. The demonstration that *CNDP2* is in fact a Cys-Gly peptidase sheds new insights into the $\text{L}\text{-glutamyl}$ cycle of glutathione metabolism in humans.



Mr. Gaurav Vadnerkar

National Doctoral Fellow of AICTE
Department of Pharmaceutical Chemistry
Poona College of Pharmacy
Bharati Vidyapeeth University
Erandwane, Pune - 411 038, INDIA

Mr. Gaurav Vadnerkar has been selected for the Ranbaxy Science Scholarship â€“ 2009 for Young Scientists in the field of Pharmaceutical Sciences. His award winning research work involved â€œSynthesis, Kinetic studies and Pharmacological Screening of Prodrugs for Colon-specific Drug Delivery in Inflammatory Bowel Diseaseâ€. This work focused on aminosalicylates as potential drug candidates and essential amino acids/amino sugars as carriers to explore concept-based mutual prodrug design for their colon-specific delivery. The study led to the conclusion that the synthesized novel prodrugs have significant ameliorating effect on the inflamed colonic mucosa as that of sulfasalazine (SLZ), which is a front line therapeutic option for the treatment of inflammatory bowel disease (IBD). These derivatives have noticeably improved safety profile than SLZ by virtue of their non-toxic amino acid/amino sugar carriers and for the same reason they are devoid of reported sulfapyridine-related side effects of SLZ. The synergistic ameliorating effect of the carriers on disrupted colonic architecture strengthened the hypothesis of concept-based mutual prodrug design. These novel prodrugs have potential implications for the safer management of IBD.



Mr. Alok Nahata

National Doctoral Fellow- AICTE
Department of Pharmaceutical Sciences
Doctor Hari Singh Gour Vishwavidyalaya
Sagar â€“ 470 003 (M.P.), INDIA

Mr. Alok Nahata has been selected for the Ranbaxy Science Scholarship Awardâ€“2009 for Young Scientists in the field of Pharmaceutical Sciences. His award winning research work involved â€œMemory boosting effects of *Canscora decussata* Schult. in albino ratsâ€ completed under the supervision of Prof. V.K. Dixit. The study led to the conclusion that *Canscora decussata* which is used as Shankpushpi by Ayurvedic practitioners in certain parts of India has a memory boosting and cognition enhancing effect on the brain of albino rats. The ethanolic extract of *Canscora decussata* as well as one of the isolated compounds i.e. mangiferin showed potent memory enhancing effects in various laboratory models employed. The studies justified the traditional claims for the use of *Canscora decussata* as Shankpushpi although it is not recognized as shankpushpi in official texts viz. the Ayurvedic Pharmacopoeia of India. The studies make a case for development of this herb as neutraceutical for geriatric people.

Ranbaxy Science Scholars-2010

Medical Sciences



Ms. Abitha Sukumaran
Senior Research Fellow
Department of Biochemistry
Christian Medical College
Vellore-632002, India

Ms. Abitha Sukumaran has been selected for the Ranbaxy Science Scholarship Award â€“ 2010 for Young Scientists in the field of Medical Sciences. Her award winning research work involved studying the effects of inflammation on proteins involved in iron homeostasis in the body, in an attempt to understand better the pathogenesis of anaemia of inflammation (AI), a condition commonly encountered in clinical practice. Her work in a mouse model has shown that inflammation caused significant changes in many of the proteins involved in the handling of iron in the body. The net effect of these changes was to decrease the release of iron from enterocytes and macrophages, leading to hypoferremia and subsequent anemia. Sustained and high levels of inflammation were associated with more marked effects on the proteins studied, with effects attenuating on resolution of inflammation. She is also involved in similar studies in patients with chronic inflammatory diseases. Her work has implications for a better understanding of the pathogenesis and, hence, management of AI .



Ms. Pragyan Acharya
Department of Biochemistry
Indian Institute of Science
Bangalore-12, Karnataka, India

Ms. Pragyan Acharyaâ€™s research work focuses on the clinical proteomics of the major human malaria parasites *Plasmodium falciparum* and *Plasmodium vivax*. The protein profile of the malaria parasites as present within the host have been analyzed for the first time ever. This is an important study because all proteomics analyses available have been carried out with either laboratory strains of malaria or with culture-adapted parasites. This does not accurately reflect the physiology of the parasites *in vivo*. This study, for the first time , peeps into the life cycle of the malaria parasite within the infected individual and identifies several unique proteins expressed only in the patient derived parasites but not expressed in laboratory cultures. In addition, the study has revealed several drug targets in malaria. This is a significant step towards understanding the biology of the malaria parasite in the wild

Pharmaceutical Sciences



Mr. Lokesh Kumar
PhD Scholar
Department of Pharmaceutics
National Institute of Pharmaceutical Education and Research (NIPER)
Sector â€“ 67, S.A.S. Nagar, Mohali, Punjab, India

Mr. Lokesh Kumar has been selected for the Ranbaxy Science Scholarship Award - 2010 for Young Scientists in the field of Pharmaceutical Sciences. His award winning research work involved â€œOptimization of biopharmaceutical properties of drug substances by salt formationâ€ . This study involves preparation and characterization of salt forms of model drug, followed by evaluation of their biopharmaceutical properties, including crystallinity, hygroscopicity, solubility, stability, polymorphism and processability. A well designed methodology has been developed for preparation, characterization and tiered screening of salt forms. A highlight of his work has been the assessment of effect of salt forms on the critical process parameter during lyophilization. Density Functional Theory parameters including hardness, electrophilicity index and chemical potential suggested that ionic interaction between the drug and counterion affects the critical process parameter for lyophilization. This research work has implications for the optimization of bio-pharmaceutical properties of drug candidate during pre-clinical stage of drug development.



Mr. Abhinav Agarwal
Senior Research Fellow
Pharmaceutics Research Lab.
Department of Pharmaceutical Sciences
Dr. H.S. Gour University
Sagar-470003, India

Mr. Abhinav Agarwal has been selected for the Ranbaxy Science Scholarship Award â€“ 2010 for Young Scientists in the field of Pharmaceutical Sciences. His award winning research work involved â€œCarbohydrate Complexed Polymeric Nanoconstructs for Delivery of an Anti-Cancer Drugâ€ . The study explores the prospective of dextran conjugated PAMAM dendrimers as a proficient vehicle for selective localization of anti-cancer bioactives in tumors increasing the therapeutic margin of safety while reducing the side effects associated with anti-cancer agents. In this study, 4.0G PAMAM dendrimers have been synthesized, characterized and further conjugated with dextran. In vitro a higher release rate was observed under low pH conditions (~6.4) which simulates acidic microenvironment of the tumor vasculature thus implicating pH specific delivery. These dextran conjugated PAMAM dendrimers were evaluated for their toxicity and cellular uptake profiles against MCF7 cancer cell lines. The dextran conjugated dendrimer formulation was found to be least haemolytic but more cytotoxic as compared to free drug. Cell uptake studies depicted that the formulation was preferably taken up by the tumor cells when compared to free drug. In vivo studies were conducted for evaluation of various pharmacokinetic parameters and tissue distribution pattern. The conjugation of oxidized polyaldehyde dextran imparts macromolecular nature to the dendritic carrier, consequently the formulation was found to selectively enter highly porous mass of tumor cells at the same time precluding normal tissues.

Ranbaxy Science Scholars-2011

Medical Sciences



Mr. Arijit Kumar Das
Senior Research Fellow
Protein Science and Engineering Department
Institute of Microbial Technology
Chandigarh 160036, India

Mr. Arijit Kumar Das has been selected for the Ranbaxy Science Scholar Award â€“ 2011 for Young Scientists in the field of Bio-Medical Sciences. His award winning research work involved â€œDeciphering the mechanism of sequence-specific DNA-protein interaction(s) of virulence associated response regulator PhoP from Mycobacterium tuberculosisâ€ . This study tries to understand the methods employed by PhoP, a virulence associated transcription factor in Mycobacterium tuberculosis to recognize specific DNA targets which have role in pathogenesis of the bacteria in the host. The work identifies a base-specific interaction by a non-conserved amino acid at the 215th position of the protein to be the major contributor of specificity to PhoP-DNA interactions. This study has implications in understanding the global regulatory role that PhoP is indicated to play in Mycobacterium tuberculosis physiology with special emphasis on the virulence network.



Mr. Kadam Meghraj S.
Senior Research Fellow
School of Life Sciences
North Maharashtra University
Jalgaon 425001, MS, India

Mr. Meghraj has been selected for the Ranbaxy Science Scholar Award â€“ 2011 for Young Scientists in the field of Medical Sciences. His award winning research work involved â€œBacterial iron chelating metabolite and its bioelectrical aspect in biomedical studiesâ€ . The study encompasses the development of a simple biosensor for detection of iron from environmental and biological sample. In this study, the prevalence of iron deficiency anemia and iron over load diseases due to lack of iron quantitation measures was addressed through development of bioinstrument. For this, fluorescent iron chelating ligand from microbial system was utilized to develop optical iron biosensor. The biosensing element in the instrument is robust; highly specific to detect ferric iron, up to nano gram quantity and effective even in presence of metal ions, proteins,

electrolytes and non “ electrolytes. The bio - sensing reactors showed better performance compared to expensive standard iron assay kit and hence, paved a novel way to develop a handy instrument.

Pharmaceutical Sciences



Mr. Deepak Chitkara

PhD Scholar

Department of Pharmaceutics

National Institute of Pharmaceutical Education and Research (NIPER)

Sector “ 67, S.A.S. Nagar, Mohali,

Punjab, India

Mr. Deepak Chitkara has been selected for the Ranbaxy Science Scholar Award-2011 for young scientists in the field of Pharmaceutical Sciences. His award winning research work entitled “Novel BSA-PLGA based core-shell type nanoparticles for delivery of highly water soluble drug-Gemcitabine” is his current PhD thesis work. In this work, core-shell nanoparticles comprising of a hydrophilic core of albumin surrounded by a hydrophobic shell of PLGA were prepared to deliver highly water-soluble anticancer drug, gemcitabine. CLSM and TEM studies confirmed the core-shell structure of the particles. In vitro evaluation of these nanoparticles showed a sustained release of gemcitabine for 12 h. Additionally, the nanoparticles were efficiently taken up by MCF-7 and MG63 cells within 2 h while TEM analysis showed that the nanoparticles were located in the cytoplasm region of the cells. Nanoparticles were then assessed for in vitro cytotoxicity assay in cancer cell lines and in vivo efficacy in DMBA induced breast cancer tumor model in Sprague Dawley rats wherein developed formulation showed an enhanced efficacy as compared to the marketed formulation of gemcitabine (Gemcite®®, Eli Lilly).



Mr. Vijay Kumar Prajapati

Senior Research Fellow (ICMR)

Department of Medicine

Institute of Medical Sciences

Banaras Hindu University

Varanasi 221005, UP, India

Mr. Vijay Kumar Prajapati has been selected for the Ranbaxy Science Scholar Award “ 2011 for Young Scientists in the field of Pharmaceutical Sciences. His award winning research work involved “Nanotherapy for Visceral Leishmaniasis”. The study describes the antileishmanial efficacy of the novel drug formulation of amphotericin B attached to functionalized carbon nanotubes. Ambiosme is an excellent drug for the treatment of Visceral Leishmaniasis patient in the endemic region of Bihar, a state of India, but in other formulations this drug is nephrotoxic and expensive to the patients. He has conjugated this drug with nanovector carbon nanotubes and checked toxicity as well as antileishmanial efficacy of this new formulation in macrophage cell line and animal hamster model. In this effort he has shown the reduced toxicity and more efficacious than conventional amphotericin B. This research work has implications in development of therapeutics for Leishmaniasis diseases.



Ms. Anupama Mittal

PhD Sholar (CSIR Research Associate)

Department of Pharmaceutics

NIPER, Sec-67, SAS Nagar, Mohali

Punjab 160062, India

Ms. Anupama Mittal has been selected for the Ranbaxy Science Scholar Award-2011 for young scientists in the field of Pharmaceutical Sciences. She is working under Dr. Neeraj Kumar (Assistant Professor, Department of Pharmaceutics, NIPER, SAS Nagar) and her award winning research work entitled “Cytomodulin functionalized porous PLGA particulate scaffolds exhibit better and faster wound healing in rodent model” is her current PhD thesis work and is based on the development of cytomodulin (a heptapeptide and a TGF- β mimic) coupled scaffolds (PMS_CM) for better and faster healing of wounds and their evaluation in in vivo full thickness rodent wound model. In this study, PMS_CM exhibited uniform cell distribution and cell spreading, actin production and migration in in vitro cell culture studies using human dermal fibroblasts while in in vivo response in full thickness wound mice model, PMS_CM showed a faster wound closure alongwith reduced inflammatory cell count. Additionally, it also exhibited abundant fibroblast

proliferation, early formation of the scar tissue and inward movement of the wound margins (Zipper-like movement) towards the deeper layers of the skin suggesting advanced wound healing.

Ranbaxy Science Scholars - 2012

Bio-Medical Sciences



Mr. Manish Goyal

Senior Research Fellow

Division of Infectious Diseases and Immunology

Indian Institute of Chemical Biology

Kolkata-700032, India

Mr. Manish Goyal has been selected for the Ranbaxy Science Scholarship Award-2012 for Young Scientists in the field of Biomedical Sciences. His award winning research work involved **Identification of Antimalarial Drug Target and Lead Antimalarial Molecules**. He has identified and validated the antimalarial activity of a new series of aryl-aryl-methyl-thio-arenes against multidrug resistant parasite. These compounds interact with free heme, inhibit hemozoin formation and prevent parasite growth through generation of oxidative stress. Thus, establish that the development of oxidative stress in malaria parasite is a novel way to develop new antimalarial by designing new redox active molecule. He has also identified and functionally characterized a DNA binding protein-(PfAlba3) from *P. falciparum* and provides evidences regarding its role in protection against oxidative stress mediated DNA damage and regulation of var gene expression. This protein is unique to malaria parasite and not present in the host, therefore offer a new antimalarial drug target. Collectively, his studies provide a new dimension in the field of antimalarial drug target identification and drug discovery.



Ms Seema C Parte

(PhD Candidate)

Senior Research Fellow

Stem Cell Biology Department

National Institute for Research in Reproductive Health

Mumbai-400012, India

Ms. Seema C Parte has been selected for the Ranbaxy Science Scholar Award-2012 for Young Scientists in the field of Bio-Medical Sciences. Her award winning research work entitled **Dynamics of Follicle Growth and Putative Stem-like Cells in Adult Mammalian Ovary** investigated presence of ovarian stem cells in rabbits, sheep, monkey and humans and resulted in proposing a model for oogenesis and primordial follicle (PF) assembly in adult life similar to spermatogenesis. This is in contradiction to existing paradigm that adult ovary is endowed with fixed number of PF. Organotypic culture of ovarian cortex revealed an interesting stem cell activity regulated by follicle stimulating hormone and basic fibroblast growth factor documented for the first time, besides PF activation, although these cultures have been reported since early nineties. Postnatal oogenesis appears to be evolutionarily conserved and has opened up new avenues for research related to female infertility, oncofertility and menopause.

Pharmaceutical Sciences



Mr. Pawar Yogesh Bapurao

PhD Scholar

Department of Pharmaceutics

National Institute of Pharmaceutical Education and Research

S.A.S. Nagar-160062, India

Mr. Pawar Yogesh Bapurao has been selected for the Ranbaxy Science Scholar Award 2012 in the field of Pharmaceutical Sciences. His award winning research work involved **Nanocrystalline solid dispersions of curcumin**. The project involved generation of nanocrystalline solid dispersions of curcumin using novel spray drying based process. This bottom-up process involves controlled nucleation and crystal growth to achieve drug nanocrystals embeded in excipient matrix. The probable solid forms of curcumin that emerge during spray drying viz- amorphous, form I and form II were characterized for physical and biopharmaceutical properties. Design of experiments approach was followed for process optimization. The oral bioavailability improvement and antitumour efficacy was demonstrated in female Sprague-Dawley rats. Nanocrystalline solid dispersions of curcumin can be tested further in clinical set up for various human ailments for which curcumin is undergoing clinical trials across the globe.

Ms. Aakanchha Jain

Pharmaceutics Research Laboratory

Department of Pharmaceutical Sciences



Dr. H. S. Gour University, Sagar, 470 003, India.

Ms. Aakanchha Jain has been selected for the Ranbaxy Science Scholar Award â€“ 2012 in the field of Pharmaceutical Sciences. Her research work involved â€œTransdermal Delivery Of Ethosomes Encapsulating Enoxaparin.â€ The study involves preparation of ethosomes encapsulating ENX. The average particle size was found to be $121\text{ }\text{\AA}\pm 2.5\text{ nm}$ with polydispersity index of $0.064\text{ }\text{\AA}\pm 0.004$ and percentage entrapment efficiency of $65.3\text{ }\text{\AA}\pm 1.2\%$. The Transmission Electron Microscopy of ENX loaded vesicles revealed their spherical structure and unilamellarity. The in vitro release studies showed that there was no burst effect and the percentage drug release increased linearly up to 24h. The transdermal flux across the rat skin was found to be $20.4\text{ }\text{\AA}\pm 1.1\text{ }\mu\text{g}/\text{cm}^2/\text{h}$. The stability profile of the prepared, optimized system was determined upto 120 days, which revealed low drug leakage on storage at $4\text{ }\text{\AA}\pm 10\text{C}$. Overall in vitro and in vivo suggested that ENX loaded ethosomes are capable of crossing the stratum corneum, thus ensuring their potential to deliver an anticoagulant in case of superficial burns and bruises.

Ranbaxy Science Scholars - 2013

Bio-Medical Sciences



Mr. Kumar Somyajit

Senior Research Fellow

Dr. Ganesh Nagaraju's laboratory
Department of Biochemistry
Indian Institute of Science
Bangalore

Mr. Kumar Somyajit has been selected for the award, for his research work on â€œUnderstanding the maintenance of genome stability by RAD51 paralogs: Implications for Fanconi anemia and Breast and Ovarian cancer susceptibilityâ€ . His study established that RAD51C is a new gene in the FA pathway of DNA repair and as a tumor suppressor. His study clearly showed for the first time that RAD51C distinctly regulates DNA damage signaling and repair which has implications for FA and breast and ovarian cancer susceptibility. Notably, He also identified that XRCC3 which is a binding partner of RAD51C as a novel phosphorylation target of ATM and ATR kinase and clinical functions of RAD51C are regulated through XRCC3 phosphorylation. The pathological RAD51C mutants that were identified in cancer patients are hypomorphic with partial repair function. However, targeting those cancer cells are highly challenging. His work shows that RAD51C deficient cells can be targeted by a â€œsynthetic lethalâ€ approach by using PARP inhibitors and this sensitivity was attributed to enhanced non-homologous end joining (NHEJ) leading to genome instability and cell death. Strikingly, stimulation of NHEJ by low dose of ionizing radiation (IR) in the PARP inhibited RAD51C pathological mutant cells induced enhanced toxicity â€œsynergisticallyâ€ . These results demonstrate that cancer cells arising due to hypomorphic mutations in RAD51C can be specifically targeted by a â€œsynergistic approachâ€ , and imply that this strategy can be potentially applied to breast and ovarian cancers with hypomorphic mutations in other homologous recombination (HR) pathway genes including BRCA1 and BRCA2.



Ms. Priyanka Shreekrishna Gokhale

PhD Student

Department of Infectious Diseases Biology
National Institute for Research in Reproductive Health
Parel, Mumbai

Ms. Priyanka Shreekrishna Gokhale has been selected for the award, for her research work on â€œVariation in host immunogenetic factors in HPV infection and predisposition to cervical cancerâ€ . This is the first study from India that highlights the use of +49 A/G SNP of CTLA-4 gene as a risk marker for cervical cancer. Her work has confirmed and proposed the use of HLA-DRB1*13 as a protective factor associated with cervical cancer. Her study provides information on HPV types in Indian population, which adds to the existing knowledge on HPV type prevalence. Three novel SNPs of E6 gene of HPV16 have been identified. Data on variants of this gene differ from the available Indian reports. The results emphasize confirmation of these findings, which may help in designing new vaccination strategies as well as in successful HPV based immunization programmes against cervical cancer.



Ms. Pushpa Mishra

Senior Research Fellow

Department of Chemistry
Tata Institute of Fundamental Research
Mumbai

Ms. Pushpa Mishra has been selected for the award, for her research work on â€œP proteins as new and

effective targets for malariaâ€ . It is known that ribosomal P proteins are also involved in extra ribosomal functions. Self-association of Plasmodium falciparum P2 (PfP2) has been seen to regulate parasite cell division during development. Her study demonstrates that the N terminal domain of the protein is responsible for its self-association while its C terminal domain remains free and flexible and is available for interactions. The N terminal stretch, Met1-Leu14, nucleates association which is initiated by hydrophobic collapse. This research work has implications for understanding mechanism of aggregation of P2, which seems to be one of the potent targets for Malaria. Therapeutics can be developed which specifically target N terminal domain of P2 of Plasmodium falciparum.

Pharmaceutical Sciences



Ms. Priyanka P. Trivedi

Ph.D. Scholar
Facility for Risk Assessment & Intervention Studies
Department of Pharmacology and Toxicology
National Institute of Pharmaceutical Education and Research (NIPER)
Mohali

Ms. Priyanka P. Trivedi has been selected for the award, for her research work on â€œElucidation of the possible molecular mechanisms involved in colitis-associated local and global damage, viz., hepatic damage and systemic genotoxicity in miceâ€ . The study investigates the role of intestinal microbiota in colitis-associated extra-intestinal manifestation. The study further deciphers the molecular mechanisms involved in melatonin-mediated protection against colitis-associated local and systemic damage. The protective effect of melatonin was mediated by its ability to counteract inflammation (by decreasing nuclear factor-kappa B, cyclooxygenase-2 and signal transducer and activator of transcription3 expression), oxidative stress (by increasing nuclear erythroid 2-related factor2 expression), fibrosis (by decreasing matrix metalloproteinase-9 and connective tissue growth factor expression) and DNA damage (by decreasing 8-oxo-dG expression). The study suggests clinical implication of melatonin for the management of colitis and the associated systemic damage.



Mr. Chetan Prakash Yewale

Senior Research Fellow
Pharmacy Department
Faculty of Technology and Engineering
The Maharaja Sayajirao University of Baroda
Kalabkhavan, Vadodara

Mr. CMr. Chetan Prakash Yewale has been selected for the award, for his research work on â€œProtein Conjugated Drug Delivery System for Breast Cancer Targetingâ€ . In this study, single chain anti-epidermal growth factor receptor antibody (scFv-EGFR) was isolated and conjugated to protein nanoparticles for targeting. The optimized targeted protein nanoparticulate formulation showed better tumor cell uptake and cytotoxicity compared to marketed formulations. This is pioneering work to be carried out by conjugating single chain anti-EGFR antibody with protein nanoparticles for breast cancer targeting and can be classified as SMART drug delivery. Protein conjugated nanoparticles help improve the therapeutic benefits in treatment of breast cancer by reducing toxicities.

Ranbaxy Science Scholars - 2014

Bio-Medical Sciences



Mr. Anuj Kumar

PhD student
Department of Microbiology and Cell Biology, Indian Institute of Science, Bangalore

Mr. Anuj Kumar has been selected for the Ranbaxy Science Scholar Award-2014 in the field of Bio-Medical Sciences. His award winning research work involved â€œUnderstanding mechanism of replication of hepatitis C virus: Exploring prophylactic and therapeutic approachesâ€ . The study revealed La protein mediated regulation of HCV replication by interaction with cis-acting element GCAC near the initiator AUG in HCV-5'UTR. It was also demonstrated by his research work that specific sequence of a beta turn in La protein may contribute in determining HCV host tropism. Further, anti-HCV potential of a cyclic peptide (derived from La) and bioactive compounds (isolated from a plant Phyllanthus amarus) was shown. Moreover, findings in this study delineated the immune responses against genotype 3a based HCV virus-like particles. Taken together, results obtained in this research work would further help in understanding the biology of HCV and designing newer anti-HCV agents in near future.

Mr. Bidyut Purkait



Senior Research Fellow
Department of Molecular Biology
Rajendra Memorial Research Institute of
Medical Sciences (RMRIMS) (ICMR) Agamkuan, Patna

Mr. Bidyut Purkait has been selected for the Ranbaxy Science Scholar Awardâ€“2014 in the field of Bio-Medical Sciences. His award winning research work involved â€œMechanism of Amphotericin B resistance in clinical isolates of Leishmania donovaniâ€ . This study explores for the first time the AmB resistance mechanism in Leishmania parasites isolated from the AmB unresponsive kala-azar patients and showed the involvement of membrane composition (ergosterol), ABC transporter (MDR1) and thiol metabolic pathway in conferring AmB resistance. It was found that the membrane ergosterol of the resistant parasites was replaced by another modified sterol, cholesta-5,7,24-trien-3¹²-ol (due to loss of function of the SCMT gene) and thus AmB binding with the membrane was impaired. A small amount of AmB was taken up into the resistant parasite, but was also effluxed out by the membrane-bound MDR1 and the remaining intracellular AmB auto-oxidizes and produces ROS. The toxic effect of this intracellular ROS is detoxified by the evolved tryparedoxin cascade of the thiol metabolic pathway. These cumulative effects of an altered membrane profile, evolved MDR1, and the tryparedoxin cascade are responsible for making the L. donovani parasite resistant to AmB. This study can help in identifying a key factor or molecule or pathway that can be used for designing better chemotherapeutic options for kala-azar.

Pharmaceutical Sciences



Ms. Preshita P. Desai
INSPIRE- Senior Research Fellow
Department of Pharmaceutical Sciences and Technology
Institute of Chemical Technology, Mumbai

Ms. Preshita P. Desai has been selected for the Ranbaxy Science Scholar Award-2014 in the field of Pharmaceutical Sciences. Her award winning research work entitled, â€œHot Melt Extrusion: A Green Scalable Approach towards Bioenhanced Curcuminâ€ was aimed at development and scale up optimization of curcumin solid solution using hydrophilic excipient matrix. An Indian Patent has been filed for this invention. In this study, PAT analysis was employed as an efficient tool to understand mechanistic formation of amorphous solid solution and to optimize critical parameters of hot melt extrusion process. The developed formulation indicated almost 13 fold improvement in in vitro drug dissolution at the end of 1 hour and in vivo pharmacokinetic studies demonstrated 7 fold enhancement in oral bioavailability as compared to the plain drug. Further, successful scale up was achieved enabling industrial use of developed technology towards pharmaceutical, nutraceutical and cosmeceutical applications.



Ms. Jasmine Kaur
PhD Scholar
C/O Professor Kulbhushan Tikoo
Laboratory of Epigenetics and Diseases
Department of Pharmacology and Toxicology
National Institute of Pharmaceutical Education and Research, SAS Nagar (Mohali), Punjab

Ms. Jasmine Kaur has been selected for the Ranbaxy Science Scholar Awardâ€“2014 in the field of Pharmaceutical Sciences for her research work on â€œDevelopment of Aptamers for Targeted Drug Delivery and Elucidating the Underlying Molecular Mechanisms for Cancer Therapeuticsâ€ . This study involved the selection of cell specific RNA aptamer which has high specificity and binding affinity towards only drug resistant and metastatic cancer cells. Aptamer selection was performed through Cell-SELEX process against gefitinib resistant H1975 lung cancer cells which possess T790M mutation in their EGFR domain. The selected aptamer could distinguish between normal and metastatic cancer cells through the oncogenic transcription factor Ets- 1, which is exclusively present in highly progressive cancer cells. The selected aptamer, on conjugation with gefitinib loaded nanoparticles, exhibited enhanced anti-cancer activity in xenograft model of lung cancer. In clinics, this aptamer can be used both as a diagnostic agent for detecting metastasis and as a vehicle for delivering pharmaceutical substances specifically to metastatic cells.



Mr. Bhushan Munjal
PhD Scholar
Prof. Arvind K. Bansal's lab,
Department of Pharmaceutics
National Institute of Pharmaceutical Education & Research (NIPER)
SAS Nagar (Mohali), Sector-67, Punjab

Mr. Bhushan Munjal has been selected for the Ranbaxy Science Scholar Awardâ€“2014 in the field of

Pharmaceutical Sciences. His award winning research work involved influence of formulation and process parameters on phase behaviour of gemcitabine hydrochloride (GHCl) during lyophilization. This work utilized advanced tools for material characterization in sub-ambient temperatures, including sub-ambient DSC, lowtemperature XRD and cold-stage microscopy. It was revealed that - (i) slowing the cooling-rate, (ii) incorporation of an annealing step, or (iii) addition of tert-butyl alcohol, facilitated GHCl crystallization during freezing, thereby reducing lyophilization time and yielding a crystalline product. Further, inhibitory effect of non-crystallizing sugars (fructose, sucrose, trehalose and raffinose) on GHCl crystallization was revealed, and found to be governed by increased unfrozen-water content in freeze-concentrated matrix. Furthermore, crystallizing sugar, mannitol was found to form ternary eutectic in the frozen system, thereby exerting concentration-dependent effect on GHCl crystallization. Additionally, cold-stage microscopy was explored for the first time for monitoring solute crystallization kinetics in frozen systems. Overall, this work provided mechanistic understanding of factors governing solute crystallization in freeze-concentrated systems which can contribute to rational development of lyophilization cycles.

Sun Pharma Science Scholars - 2015

Bio-Medical Sciences



Mr. Kirtimaan Syal

PhD Scholar

Molecular Biophysics Unit

Indian Institute of Science, Bangalore-560012 India

Mr. Kirtimaan Syal has been selected for the Sun Pharma Science Scholar Awardâ€“2015 in the field of Bio-medical Sciences for his research work on secondary messenger (p)ppGpp-the master regulator of stress response and persistence in bacteria. He deciphered the molecular basis of regulation of transcription by secondary messenger (p)ppGpp. He showed the different mode of binding of ppGpp and pppGpp to E. coli RNA polymerase which results in the differential regulation of transcription by both of the molecules. Earlier, ppGpp and pppGpp were considered as the same molecule, candidateâ€™s work proved that they are not the same molecule and can have different biological functions. He has also demonstrated the classical feedback loop of (p)ppGpp synthesis. Further, he synthesized analogue molecules of (p)ppGpp which can target (p)ppGpp synthesis thereby inhibiting the stress response/persistence in bacteria. He developed many potential cell wall inhibitors against Mycobacteria which are now in the process of being tested in vivo systems



Ms. Deepali Joon

PhD Student (SPM Fellow)

c/o Prof Daman Saluja

Dr BR Ambedkar Center for Biomedical Research

University of Delhi, Delhi-110007 India

Ms. Deepali Joon has been selected for the Sun Pharma Science Scholar Awardâ€“2015 in the field of Biomedical Sciences for her research work on â€œDevelopment and evaluation of rapid and sensitive in-house isothermal nucleic acid amplification assay for detection of M. tuberculosis for the diagnosis of pulmonary and extrapulmonary tuberculosisâ€ . The study has led to development of a novel loop mediated isothermal amplification (LAMP) assay targeting a region of sdaA gene of M. tuberculosis which was evaluated with clinical specimens for the diagnosis of pulmonary and extrapulmonary tuberculosis. sdaA LAMP assay generates a visual result rapidly in 45 minutes and is robust to carryover contamination. The assay has shown high sensitivity and specificity in comparison to culture as gold standard as well as composite reference standard. This research has implications in control of tuberculosis by providing potential point of care diagnostic test.

Pharmaceutical Sciences



Mr. Sumit Arora

PhD Scholar

Department of Pharmaceutics

National Institute of Pharmaceutical

Education and Research (NIPER), SAS Nagar, Mohali-160062 India

Mr. Sumit Arora has been selected for the Sun Pharma Science Scholar Awardâ€“2015 in the field of Pharmaceutical Sciences for his research work on â€œAerosolized Delivery of Voriconazole for the Treatment of Invasive Pulmonary Aspergillosisâ€ . The study involved development of dry powder inhalable formulations of voriconazole using the spray drying technique. The developed formulations were extensively characterized for their suitability for pulmonary administration. Inhaled voriconazole dry powder was found to enhance the lung exposure of the drug whilst simultaneously reducing its systemic exposure

and hence associated toxicities. The present research work can address the unmet medical needs in patients suffering from invasive pulmonary aspergillosis

Mr. Sarwar Beg

UGC Meritorious Research Fellow in Science
University Institute of Pharmaceutical Sciences
Punjab University, Sector-14, Chandigarh-160014 India



Mr. Sarwar Beg has been selected for the Sun Pharma Science Scholar Awardâ€“2015 in the field of Pharmaceutical Sciences on his research work entitled, â€œSystematic Development of Optimized Oral Nanostructured Drug Delivery Systems of Cardiovascular Drugs employing Quality by Design (QbD) Paradigmsâ€ . His work encompasses development of diverse lipid-based nanostructured systems like self-nanoemulsifying systems (i.e., liquid, solid, cationic and supersaturable), surface-engineered solid lipid nanoparticles and nanostructured lipid carriers for olmesartan medoxomil and rosuvastatin calcium, and their extensive evaluation through in vitro cell line and molecular biology studies, ex vivo permeation and in situ perfusion, in vivo pharmacokinetic, pharmacodynamic and biodistribution studies, and eventually, IVIVC. Distinct improvement (5 to 8-folds) in biopharmaceutical performance of these cardiovascular drugs vouches superlative outcomes of the work. All the formulations developed during the work have been systematically optimized using QbD paradigms including QRM, DoE and chemometric techniques, furnishing enhanced product and process understanding to accomplish the desired objectives.

Sun Pharma Science Scholars - 2016

Bio-Medical Sciences



Mr. Venkateswara Rao Amara

PhD Scholar
Dept. of Pharmacology & Toxicology,
National Institute of Pharmaceutical Education
and Research S.A.S. Nagar, Punjab-160062 India.

Mr. Venkateswara Rao Amara, student of Prof. Kulbhushan Tikoo, has been selected for the Sun Pharma Science Scholar Awards-2016 in the field of Bio-Medical Sciences. His research work, â€œStudy of the effect of High Salt Diet on Cardiovascular and Renal systems in Uninephrectomized ratsâ€ investigated dysregulation of renin angiotensin system-both local and systemic, L-type calcium channel signaling in cardiac dysfunction and remodeling of high salt diet-fed uninephrectomized rats. Epigenetic and molecular players altered were increased cardiac miRNA-25, -451, -155 and decreased miR-99b and alteration in their corresponding target proteins â€“ decreased SERCA, p-AMPK and increased p-AKT. Uninephrectomized rats fed with high salt diet (UNX+HSD) exhibited vascular and renal dysfunction and remodeling worse than the normal rats fed with high salt diet (HSD). In contrast to prevailing notion, high salt diet feeding did not induce hypertension but induced pressure-independent end organ damage. These epigenetic marks can have potential diagnostic and therapeutic significance for early detection and treatment of cardiac dysfunction.



Ms. Rashi Arora

(PhD student c/o Prof Daman Saluja)
Senior Research Fellow,
Dr. B. R. Ambedkar Center for Biomedical Research
University of Delhi, Delhi-110007 India

Ms. Rashi Arora is a final year Ph.D. student working on improving cancer diagnostic and therapeutic approaches. She has been selected for the Sun Pharma Science Scholar Award-2016 in the field of Bio-Medical Sciences. In her award winning research work entitled â€œEsculetin induces antiproliferative and apoptotic response in pancreatic cancer cells by directly binding to KEAP1â€ , she has explored the anticancer potential of a naturally occurring coumarin derivative, esculetin in pancreatic cancer cells. The study involved elucidation of mechanism of action and direct binding target of esculetin. Her work reported a loss of interaction between Nrf2 and KEAP1 on exposure to esculetin apparently due to direct binding between esculetin and KEAP1, that ultimately depletes ROS and abrogate NF-â€B activity (Arora et al., Mol Cancer, 2016 Oct 18;15(1):64).

Pharmaceutical Sciences

Ms. Supriya V. Vartak

Graduate student
Department of Biochemistry
Indian Institute of Science



Bangalore 560012 India

Ms. Supriya V. Vartak has been selected for the Sun Pharma Science Scholar Award-2016 in the field of Pharmaceutical Sciences. Her award winning research work entitled "Antiapoptotic protein BCL2 and DNA Repair protein LIGASE IV: Novel strategies for Targeted Cancer Therapy" investigated two aspects for improved chemotherapeutic modalities. The first part of the study identified a novel BCL2 inhibitor, specifically targeting BCL2 'high' cancer cells, sparing normal ones. Disarib activated the intrinsic pathway of apoptosis, by disrupting BCL2-BAK interaction. It exhibited an excellent tumor regression property in three mouse models, without side effects, and showed promising potential for clinical trials. The second aspect described encapsulation of SCR7 (previously identified DNA Ligase IV inhibitor) using nanopolymers, making it water soluble and rendering it 5 times potent in comparison with the parental molecule. Studies demonstrated that SCR7 brought down the effective dose of radiation, aiding radiotherapy for cancer treatment.

Sun Pharma Science Scholars - 2017

Bio-Medical Sciences



Ms. Punita Kumari

PhD student

Biological Sciences & Bioengineering department
Indian Institute of Technology, Kanpur-208016, India

Ms. Punita Kumari has been selected for the Sun Pharma Science Scholar Award 2017 in the field of Bio-Medical Sciences. Her research work has developed a better understanding of the signaling and regulation of G protein-coupled receptors (GPCRs), the largest class of drug targets in the human body. Her research has revealed a novel paradigm in GPCR biology where distinct conformations of GPCR signaling complexes mediate different downstream functional outcomes. Her findings have elucidated a key aspect of spatio-temporal regulation of GPCR signaling and they have direct implications for designing novel GPCR therapeutics with minimized side-effects.



Ms Aditi Jain

PhD Candidate

Senior Research Fellow
Centre for BioSystems Science and Engineering
Indian Institute of Science
Bangalore-560012, India

Ms. Aditi Jain has been selected for the Sun Pharma Science Scholar Award-2017 for Young Scientists in the field of Bio-Medical Sciences. Her award winning research work entitled ' Understanding cardiac failure using engineered materials' provides a suitable laboratory substitute to conduct research on cardiac cells for developing better therapies to treat heart diseases. This research work highlights the biocompatibility, suitability and ease of using keratin coated surfaces for supporting spontaneously contracting cardiomyocytes. Keratin can be easily extracted from discarded human hair which is available in abundance. Moreover, an organotypic cardiac model was designed using engineered micro-ridges to investigate the importance of topography in assessing cardiac function. These engineered cardiomyocytes show strikingly directional flow of calcium currents similar to what is seen in native heart. This system was validated to serve as model for studying cardiac hypertrophy at transcriptional as well as translational level. These engineered biomaterials are a promising in vitro platform for research related to understanding pathophysiology of the heart.

Pharmaceutical Sciences



Mr. Gaurav Joshi

PhD Candidate

Junior Research Fellow

Laboratory for Drug Design and Synthesis
Department of Pharmaceutical Sciences and Natural Products
Central University of Punjab
Bathinda-151001, India

Mr. Gaurav Joshi has been selected for the Sun Pharma Science Scholar Award-2017 for Young Scientists in the field of Pharmaceutical Sciences. Mr. Gaurav is pursuing his Ph.D. under the supervision of Dr. Raj Kumar and co-supervision of Dr. Sandeep Singh. His award-winning research work entitled "Targeting chromatin coupled enzymes by small molecules in cancer cells" explored the design strategies, synthesis and biological evaluation of the novel heterocycles as the multifunctional inhibitors of Epidermal Growth

Factor Receptors (EGFR), Histone Deacetylases(HDAC) and Human Topoisomerases (hTopo) as anticancer agents. The overall aim of the work was to understand the epigenetic mechanism as well as design novel compound(s) to either (a) inhibit kinase-chromatin mediated cross-talks, and or (b) develop safe and efficacious drugs for cancer. The present work seeks exchange and imparts the knowledge to applied medical sciences for the treatment of cancer which requires multidisciplinary research skills needed to carry out bench to bedside research.



Mr. Shasank Sekhar Swain

PhD Research Scholar
Central Research Laboratory
Institute of Medical Sciences & SUM Hospital
Siksha 'O' Anusandhan (Deemed to be University)
Bhubaneswar-751003, Odisha, India

Mr. Shasank Sekhar Swain has been selected for the 'Sun Pharma Science Scholar Award-2017 for Young Scientists', in the field of Pharmaceutical Sciences for his innovative research work, "Conjugation of a phytochemical with an obsolete drug as a novel strategy towards antimicrobial drug discovery: a case study with sulfonamide-monoterpene phenols against MRSA". The chemical conjugation of a phytochemical with a sulfa drug through azo-dye coupling reaction is a novel idea for reuse of sulfa drugs against methicillin resistant Staphylococcus aureus (MRSA). Moreover, bioinformatic tools for the validation of drug likeness properties before synthesis was an ideal approach during the development of effective antibacterials with minimum time and resources. The conjugation process is not tedious; eventually the mass production of the conjugated chemicals could be possible. The used conjugation method could be extended for the reuse of other obsolete drugs with a suitable phytochemical against any disease.

Sun Pharma Science Scholars - 2018

Bio-Medical Sciences



Mr. Parijat Sarkar

(Ph.D. Student)
Shyama Prasad Mukherjee Fellow
CSIR-Centre for Cellular and Molecular Biology
Hyderabad - 500 007, India

Mr. Parijat Sarkar has been selected for the Sun Pharma Science Scholar Award-2018 for Young Scientists in the field of Bio-Medical Sciences. His award winning research work entitled "Actin Cytoskeleton and Cholesterol: A Dual Mechanism of Regulation" investigated the reorganization of actin cytoskeleton and its implications in membrane protein dynamics and function, upon modulation of membrane cholesterol by statins. His work showed that F-actin content significantly increases in response to membrane cholesterol depletion, which could be due to a synergistic effect of multiple pathways. In this context, he explored the role of actin cytoskeleton in regulating the dynamics of the serotonin1A receptor, a crucial neurotransmitter G protein-couple receptor (GPCR) that plays a crucial role in the generation and modulation of cognitive and behavioral functions. On a broader perspective, these results assume significance in understanding the modulatory role of the membrane environment on the organization and function of GPCRs.



Mr. Sanjeev Kumar

(PhD Scholar)
Senior Research Fellow
Department of Biochemistry
All India Institute of Medical Sciences (AIIMS)
Ansari Nagar, New Delhi-110029, India

Mr. Sanjeev Kumar has been selected for the Sun Pharma Science Scholar Award-2018 for Young Scientists in the field of Bio-Medical Sciences. His award winning research work entitled "CD4-Binding Site Directed Cross-Neutralizing scFv Monoclonals from HIV-1 Subtype C Infected Indian Children". The CD4 binding site (CD4bs) is an important epitope and is one of the current HIV-1 vaccine targets. Disease progression is faster in children infected at birth by mother-to-child transmission than adults. Further, infected children in the absence of antiretroviral therapy mostly progress to AIDS within two years of age. Characterization of the cross-neutralizing scFvs isolated herein and future identification of scFvs from the anti-HIV-1 recombinant phage library constructed using the PBMCs of antiretroviral chronically HIV-1 infected children, targeting diverse epitopes on viruses of pediatric origin, will help in understanding the co-evolution of virus and the protective antibody response in the infected children who are non-progressors even in the absence of antiretroviral therapy.

Pharmaceutical Sciences



Mr. Pronay Das
(Ph.D. Scholar)
Senior Research Fellow
Division of Organic Chemistry
CSIR-National Chemical Laboratory
Pune 411008, India

Mr Pronay Das has been selected for the prestigious “Sun Pharma Science Scholar Award 2018” under the category of Pharmaceutical sciences. His research entitled “Specific Stereoisomeric Conformations Determine the Drug Potency of Cladosporin Scaffold against Malarial Parasite” has elegantly demonstrated in a molecular level, the role of absolute stereochemical conformation in bio-potency. This project is a collaborative work between three research groups from NCL Pune and ICGEB New Delhi. In this work he has synthesized all the possible stereoisomers of a potent anti-malarial natural product Cladosporin and classified the stereoisomeric set in the order of their anti-malarial potency through in-depth biological screening. Besides co-crystals of the isomers with the target enzyme was also obtained and thoroughly scrutinized to decipher the structural bases of enzymatic binding. The research work conducted by Mr Das also paves the way towards the development of new promising anti-malarial drugs which could be of societal importance in the upcoming times.



Mr. Himesh Venkata Subba Rao Makala
(PhD Candidate)
Senior Research Fellow - ICMR
#203, Molecular Motors Lab, ASK-2
SAASTRA Deemed University
Thanjavur-613401, Tamil Nadu, India

Mr. Himesh Makala has been selected for the Sun Pharma Science Scholar Award-2018 for Young Scientists in the field of Pharmaceutical Sciences. In his award-winning research work entitled “Biophysical & biochemical characterization of inhibitors against human mitotic kinesin Eg5”, he has screened diverse databases for inhibitors using in-silico methods that target the second allosteric binding site of Eg5. The top hits were validated using different in vitro experiments like ATPase assay, ITC, DSF, MST and in HeLa, A549, K562 cell lines. He investigated their binding mode and specific interactions that causes the conformational changes using extensive molecular dynamic simulations. Of the two best compounds, one binds selectively to the second allosteric binding site while the other binds to both the allosteric sites of Eg5. This will be validated by structural studies and the outcome will be useful in designing more potent inhibitors that could act as anticancer agents.

Sun Pharma Science Scholars - 2019

Bio-Medical Sciences



Mr. Santosh Kumar Kuncha
(Ph.D. Student)
DST-INSPIRE Fellow
CSIR-Centre for Cellular and Molecular Biology
Hyderabad-500 007, India

Mr. Santosh Kumar Kuncha has been selected for the Sun Pharma Science Scholar Award-2019 for Young Scientists in the field of Bio-Medical Sciences. His award winning research work entitled “DTD-like fold for Translation Quality Control” has unraveled a hidden tRNA code essential for proofreading and also discovered an Animalia-specific variant of D-aminoacyl-tRNA deacylase (DTD). His work showed that the chiral proofreading module, DTD, operates via an important base (N73) in the tRNA called discriminator base. The Discriminator-code based surveillance of DTD is crucial to avoid Ala-to-Gly mistranslation and also depletion of Gly-tRNA(Gly). He has also discovered a new variant of DTD named as Animalia-specific tRNA deacylase (ATD), which is essential to avert the cellular proteome imbalance caused due to confluence of tRNA expansion and oxidative stress in kingdom Animalia. Overall the work assumes significance in understanding the basic quality control mechanisms to maintain the fidelity during protein biosynthesis.



Mr. Vipul Bhatia
Ph.D. Student
Indian Institute of Technology
Kanpur-208016, India

Mr. Vipul Bhatia has been selected for the Sun Pharma Science Scholar Award-2019 for Young Scientists in

the field of Bio-Medical Sciences. His award winning research work entitled "Exploration of genetic drivers regulating the etiology of ETS-fusion negative prostate cancer" investigated the regulatory model involving the functional interplay between SPINK1, miRNA-338-5p/miRNA-421, and EZH2, thereby revealing hitherto unknown mechanism of SPINK1 upregulation in prostate cancer. Wherein, miRNA-338-5p/421 posttranscriptionally down-regulate SPINK1 expression in SPINK1-positive malignancies. EZH2 along with repressive H3K27me3 and DNA-methylation marks epigenetically suppresses miR-338-5p/-421 in SPINK1- positive subtype. Further, the use of epigenetic inhibitors downregulate SPINK1 expression. Owing to the pleiotropic anti-cancer effects exhibited by miRNA-338-5p/-421, we show miRNA-replacement therapy as one of the potential therapeutic approaches for SPINK1-positive cancers. Alternatively, the study potentiates the use of epigenetic inhibitors for SPINK1+ PCa subtype. Therefore, stratification of patients based on SPINK1-positive and miRNA-338-5p/-421 low criteria could further improve therapeutic modalities and overall management-strategies for SPINK1-positive malignancies.

Pharmaceutical Sciences



Mr. Salman Sadullah Usmani
(Ph.D. Student)
CSIR- Institute of Microbial Technology
Chandigarh, India

Mr. Salman Sadullah Usmani has been selected for the Sun Pharma Science Scholar Award 2019 for Young Scientists in the field of Pharmaceutical Sciences for his research work entitled "Computer-aided designing of antitubercular peptides". He has developed a knowledgebase, AntiTbPdb and an in silico tool, AntiTbPred, to predict and design antitubercular peptides. Implementing these tools, predicted the antitubercular activity of a peptide named as IMT-P8 and then validated it's *in vitro* as well as intracellular antimycobacterial activity. He also demonstrated its synergy with several anti-TB drugs as well as repositioning of an antimalarial drug, a quite significant approach in combating drug resistance. On a broader prospective, the project demonstrated the significance of peptide based therapy.



Ms. Ankita Desai
(PhD. Student)
Department of Pharmaceutics
Maliba Pharmacy College
Uka Tarsadia University
Bardoli-394 350, India

Ms. Ankita Desai has been selected for the Sun Pharma Science Scholar Award-2019 for Young Scientists in the field of Pharmaceutical Sciences. Her award-winning research work entitled "Multiple drug delivery from the drug-implants-laden silicone contact lens" investigated the potential of contact lenses as a multiple drug delivery tool. Her work emphasized the development of drug-implants which were sandwiched inside a contact lens and showed a sustained release of the drugs over a period of time. In this arena, she also explored the possibility of adding a comfort enhancer and make a single contact lens wearable for more than a week giving varied treatment options for diseases like glaucoma, dry eye, conjunctivitis, and other anterior eye diseases. On a larger perspective, these results assume significance in unleashing the hidden potential of contact lenses for drug delivery to the eyes.

Sun Pharma Science Scholars - 2020

Bio-Medical Sciences



Ms. Madhu Chaturvedi
(Ph.D. Student)
CSIR Fellow
Department of Biological Sciences and Bioengineering
Indian Institute of Technology
Kanpur - 208016, India

Ms. Madhu Chaturvedi has been selected for the Sun Pharma Science Scholar Award-2020 for Young Scientists in the field of Bio-Medical Sciences. Her award winning research work is focused on understanding the functional and conformational dynamics of G-protein coupled receptors. GPCRs regulate almost every aspect of behavior and physiology and this makes them the most pursued drug targets the most pursued drug targets. Signaling through GPCRs is regulated by $\beta\gamma$ -arrestin proteins. Madhu's work unravels that the spatial positioning of phosphorylation sites in GPCRs is crucial in governing the recruitment, trafficking and signaling outcomes mediated by $\beta\gamma$ -arrestins. The findings of her work also contribute to and extend the current framework of biased signaling for development of novel therapeutics with minimized side-effects.



Ms. Parej Nath
(Ph.D. Student)
Institute Of Life Sciences
Bhubanswar - 751023, India

Title: Understanding the role IRGM in innate immunity

This study uncovers that under homeostatic conditions, IRGM is a master suppressor of type I IFN response. The mRNA sequencing whole transcriptome analysis in human cells and mice shows that IRGM controls the expression of almost all major Interferon Stimulated Gene's. Mechanistically, it has been shown that IRGM suppresses IFN signaling by mediating p62-dependent autophagic degradation of cGAS, RIG-I, and TLR3. Further, it is shown that IRGM is critical for the removal of damaged mitochondria by macroautophagy. Thus, IRGM deficiency results in defective mitophagy, accumulation of dysfunctional mitochondria, and enhanced mitochondrial DAMPs that stimulate cGAS-STING and RIG-IMAVS axis to drive robust activation of type I IFN response leading to autoimmunity. This study also defines IRGM as a strong potential target for new therapeutic interventions against autoimmune diseases and viral diseases.



Mr. Nitesh Mishra
(Ph.D. Student)
Department of Biochemistry
All India Institute of Medical Sciences
New Delhi, India - 110029

Mr. Nitesh Mishra has been selected for the Sun Pharma Science Scholar Award - 2020 for Young Scientists in the field of Biological Sciences. His award-winning work is in the field of HIV vaccine design. Nitesh's work is focused on identifying HIV-1 infected infants with potent anti-HIV-1 plasma broadly neutralizing antibodies (plasma bnAbs) and understand the viral features that are responsible for generation of such potent plasma bnAbs. In that direction, using several complementary approaches, he has shown that plasma bnAbs targeting the top of the viral spike (V2-apex region) are common in infants of Indian origin. Furthermore, he showed that infants that generated these potent antibodies were infected with more than one strain of HIV-1. His work has the potential to be an important step in the field of HIV-1 vaccine for assessing polyvalent vaccine candidates targeting this region of the virus.

Pharmaceutical Sciences



Ms. Dhanashree Hemant Surve
(Ph.D. research scholar)
Department of Pharmacy,
Birla Institute of Technology and Science, Pilani Campus,
Pilani, Jhunjhunu, Rajasthan-333031

Ms. Dhanashree Hemant Surve has been selected for the Sun Pharma Science Scholar Award 2020 for young Indian researcher in the field of Pharmaceutical Sciences for her research work entitled "Long-Acting Nanoformulations for Targeted Delivery of Anti-Infective Agents". Her research work encompassed development, optimization, characterization, in vivo pharmacokinetic and biodistribution studies of long-acting (LA) nanoformulations to deliver the drugs exhibiting varied physicochemical properties including Efavirenz (poorly soluble small molecule)+Enfuvirtide (highly soluble peptide) and Isometamidium chloride (cationic hydrophilic small molecule). The LA nanoformulations can be utilized for the treatment and prophylaxis of chronic/acute infectious diseases including HIV and trypanosomiasis. The developed LA nanoformulations elicited enhanced cellular uptake in T-cells and macrophage (secondary depots) and biodistributed to the desired RES organs via lymphatic-circulatory conjoint. It was observed that subcutaneous route significantly enhanced the LA potential of developed nanoformulations. Briefly, the developed LA nanoformulations embodies wider pre-clinical and clinical application due to their scalability, increased safety, decreased toxicity and protracted drug delivery.



Ms. Praachi Tiwari
(Ph.D. Student)
Tata Institute of Fundamental Research
Mumbai, India

Ms. Praachi Tiwari has been selected for the Sun Pharma Science Scholar Award-2020 for Young Scientists in the field of Pharmaceutical Sciences for her research work entitled "Chemogenetic excitation and inhibition of forebrain excitatory neurons: Impact on mood behaviors across life span". Praachi's work shows that increased Gi-coupled signaling in forebrain excitatory neurons in different developmental epochs does not affect mood-related behavioral responses in adulthood. In contrast, as previously seen, enhanced Gq-coupled signaling in early life programs persistent schizo-affective behavioral response. Given that the G-

protein coupled monoamine neurotransmitters are harnessed for potential therapeutics against mood-related disorders, this study helps in understanding the broad role of Gq/Gi signaling in programming mood states. Her work raises a possibility for a potential therapeutic target against such disorders, especially for pregnant and lactating mothers suffering from mood-related disorders, without having long term behavioral consequences on the child.

Sun Pharma Science Scholars - 2021

Bio-Medical Sciences



Mr. Shubham Singh

Ph.D. Student

Department of Biology

IISER-Pune, MH

India - 411008

Mr. Shubham Singh has been selected for The Sun Pharma Science Foundation Science Scholar Award - 2021 for Young Scientists in the field of Biological Sciences. His award-winning work is in the field of lipid metabolism and neurodegeneration. His research was focused on broadly on two aspects: 1) to map lysophosphatidylserine (lyso-PS) lipid metabolism and signaling in the mammalian central nervous system 2) identify molecular mechanisms through which deregulated lyso-PS levels cause neuro-immune diseases like PHARC Syndrome and Hereditary Spastic Paraplegia. His work expanded our understanding about the physiological relevance of lyso-PS lipids in mammals, and identified crucial druggable targets that can alleviate lyso-PS lipid associated neuro pathological conditions.



Mr. Sundaram Acharya

Ph.D. Student

Genomics and Molecular Medicine Unit

Council of Scientific and Industrial Research

Institute of Genomics & Integrative Biology (CSIR-IGIB)

New Delhi, India - 110025

Mr. Sundaram Acharya has been selected Sun Pharma Science Foundation Science Scholar Award - 2021 for the Young Scientists in the field of Biomedical Sciences. His award-winning work is entitled as "Rational design of an enhanced genome editing protein for therapeutic gene correction and diagnostics". His research work focuses on the characterization of an intrinsically-specific Cas9 protein from *Francisella novicida* (FnCas9) which has been used for proof-of-concept therapeutic gene correction and diagnostics. Moreover, he has used protein engineering approach for rational design of FnCas9 which has resulted into enhanced FnCas9 variants (enFnCas9s) with superior cellular editing efficiency and specificity coupled with broad genomic targeting range. This development has paved the way to preclinical studies for correcting sickle cell anemia mutation with a goal to translate it to a therapeutic platform. Broadly, his work has the potential to be the game changer in the field of gene therapy and diagnostics.

Pharmaceutical Sciences



Mr. Arihant Kumar Singh

(Ph.D. Research Scholar)

Nanomedicine & Gene Delivery Lab

Department of Pharmacy,

Birla Institute of Technology & Science Pilani, Pilani campus,

Pilani, Rajasthan- 333031

Mr. Arihant Kumar Singh has been selected for Sun Pharma Science Foundation Science Scholar Award - 2021 for young scientist in field of pharmaceutical science. His award-winning work is entitled by "Drug-fatty acids conjugates in diabetes treatment: Role of chain length and degree of unsaturation of fatty acids". His research work comprised synthesis of different hydrophobic prodrugs by conjugating fatty acids of various chain length and degree of unsaturation with an anti-diabetic drug- Lisofylline & study of their self-assembling nature. Prodrugs has proven their anti-inflammatory effect in MIN6 cells in the presence of cytokines and shown sustained release in rat plasma. The enhancement of chain length significantly increases prodrugs' t_{1/2} and steady fasting glucose level with increased insulin level after 35 days of treatment in type 1 diabetic animal model & maintains the beta cells intactness in IHC study. Further, nanoparticulate polymeric tablet dosage form of prodrug makes it better candidate for the treatment of type 1 diabetes.



