JISUCONPH2024

ABSTRACT BOOK

ANUSANDHAN NATIONAL RESEARCH FOUNDATION (DST-SERB)
SPONSORED 2ND INTERNATIONAL CONFERENCE
on

Modern Tools and Approaches in the Emerging Field of Pharmaceutical and Biomedical Research

NOV 20-22, 2024

JISU DOPT JISUCONPH 2024

DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY

JIS UNIVERSITY

ABOUT THE UNIVERSITY

JIS University was established through the JIS University Act, 2014 enacted by the Legislative Act of the Government of West Bengal that came into force in February, 2015. The university's objective is to rank among the best institutions of higher learning in India and to be a top choice for teachers, researchers, and students. All courses at JIS University have been properly accredited and affiliated by the University Grants Commission (UGC), New Delhi, the All India Council for Technical Education (AICTE), the Bar Council of India (BCI), the Pharmacy Council of India (PCI), the National Council for Teacher Education (NCTE), and the United Nations Academic Impact. This guarantees prospective students a high-quality education (UNAI). Since 2017, JIS University has also belonged to the Association of Indian Universities.

ABOUT THE DEPARTMENT

The Department of Pharmaceutical Technology of JIS University has started its journey in the year 2016 with the inception of B.Pharm. course, gradually other courses such as D. Pharm., M. Pharm. in four different disciplines like Pharmaceutics, Pharmaceutical Chemistry Pharmacology, & Quality Assurance, Bachelor of medical laboratory technology (BMLT), Ph.D. in Pharmacy were introduced. The Department is recently recognized by the National Institutional Ranking Framework (NIRF), Govt. of India in 2023 in the Rank band 100-125; The department has well equipped ICT-enabled classrooms, well equipped modern laboratories, with the latest different analytical instruments, and highly qualified and dedicated faculty members.

ABOUT THE CONFERENCE

Innovation and advancement through modernization of tools & techniques isa key concept throughout the pharmaceutical industry and the healthcare community, its pursuit in pharma business is imperative. Advancement in health care technology have led to significant improvements in the quality of healthcare, in population health and, in parallel, have contributed to increases in real health expenditure in most industrialized countries over the recent decades. The pharmaceutical sector constitutes a market characterized by rapid technological change and high expenditure growth rates. To produce the next generation of innovative pharmaceutical products and medical therapies, the pharma world urgently needs better, faster, and cheaper drug discovery and development processes.

Chief Patron

Sardar Taranjit Singh,
Chancellor, JIS University, India

Patron

Sardar Simarpreet Singh, Director, JIS Group, India

Prof. Neeraj Saxena, Pro Chancellor, JISU, Kolkata, India.

Prof. Bhabes Bhattacharya, Vice Chancellor, JISU, Kolkata, India.

Padmashree Prof. Ajoy Kumar Roy, Director, JISIASR, Kolkata, India.

Organizing Chairpersons

Prof. Tapan Kumar Chatterjee,
Dean, DOPT,
JISU, Kolkata, India

Prof. Himangshu Sekhar Maji,
Dean Academics and HoD,
DOPT, JISU, Kolkata, India

Organizing Secretary

Dr. Pintu Kumar De,
Professor, DOPT, JISU, Kolkata,
India

Dr. Tapan Kumar Shaw,
Professor, DOPT, JISU, Kolkata,
India

Convenors

Dr. Kamalakanta Ray,
Professor, DOPT, JISU,
Kolkata, India

Dr. Arindam Maity,
Professor, DOPT, JISU,
Kolkata, India

Co-Conveners

Dr. Agniswar Sarkar,
Assistant Professor, Department of Biosciences, JISU, Kolkata, India

Dr. Sandip Roy,
Professor-in-charge, Research Cell ,JISU, Kolkata, India

Organizing Committee Members

Dr. Atanu Kotal,
Deputy Registrar (Academics), JISU, Kolkata, India

Dr. Ritu Khanra,
Associate Professor, DOPT, JISU, Kolkata, India

Dr. Moumita Ray,
Assistant Professor, DOPT, JISU, Kolkata, India

Organizing Committee Members

Dr. Preeta Bose,
Assistant Professor, DOPT,
JISU, Kolkata, India

Dr. Debjani Sarkar,
Assistant Professor, DOPT,
JISU, Kolkata, India

Mr. Abhidipta Ganguly,
TPO, JISU, Kolkata,
India

Dr. Sarmistha Pal,
Assistant Professor, DOPT,
JISU, Kolkata, India

Dr. Dibya Das,
Assistant Professor, DOPT,
JISU, Kolkata, India

Dr. Dilip Kumar Roy,
Associate Professor, DOPT,
JISU, Kolkata, India

Dr. Easha Biswas,
Assistant Professor, DOPT,
JISU, Kolkata, India

Dr. Sk Abdul Amin,
Assistant Professor, DOPT,
JISU, Kolkata, India

Mr. Sakshar Saha,
Assistant Professor, DOPT,
JISU, Kolkata, India

Mr. Shubham Paul,
Assistant Professor, DOPT,
JISU, Kolkata, India

Ms. Anuva Samanta,
Assistant Professor, DOPT,
JISU, Kolkata, India

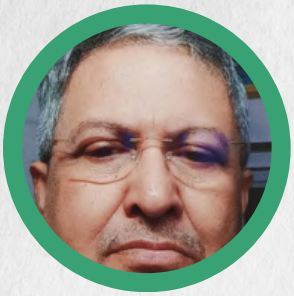
Dr. Devlina Paul,
Assistant Professor, DOPT,
JISU, Kolkata, India

Organizing Committee Members

Ms. Sharmila Mondal,
Assistant Professor, DOPT,
JISU, Kolkata, India

Ms. Ankita Acharya,
Assistant Professor, DOPT,
JISU, Kolkata, India

Dr, Indranil Banerjee,
Associate Professor, DOPT,
JISU, Kolkata, India



Dr. Jayanta Chatterjee
Professor, DOPT, JISU,
Kolkata, India

Dr. Jayanta Kumar Chowdhury,
Professor, DOPT, JISU,
Kolkata, India

Mr. Shounak Sarkhel,
Assistant Professor, DOPT,
JISU, Kolkata, India

Dr. Sanchita Das;
Associate Professor, DOPT,
JISU, Kolkata, India

Mr. Gourav Samajdar,
Assistant Professor, DOPT,
JISU, Kolkata, India

Mr. Victor Roychowdhury,
Assistant Professor, DOPT,
JISU, Kolkata.

Dr. Rania Indu,
Assistant Professor, DOPT,
JISU, Kolkata, India

Mr. Kali Kinkar De,
Assistant Professor, DOPT,
JISU, Kolkata, India

Mr. Rajat Kumar Bardhan,
Assistant Professor, DOPT,
JISU, Kolkata, India

Ms. Moulima Das,
Assistant Professor, DOPT,
JISU, Kolkata, India

ABSTRACT FROM THE DISTINGUISHED SPEAKERS

PROF. (DR) WONG TIN WUI,
Non-Destructive Biomedical and Pharmaceutical Research Centre
Smart Manufacturing Research Institute
Universiti Teknologi MARA Selangor, Malaysia.

Cancer nanotherapeutic development and recent approaches

The personalised perspective of precision medicine involves patient's health/omics analysis and therapy customized to the individual health requirements. More than one drug may be delivered in variable doses, in specific delivery kinetics, and to different intended target sites of action. An ideal dosage form is preferably can be dispensed flexibly with the required drug delivery characteristics. The dosage form should ideally be characterized by 100 % drug bioavailability. This presentation highlights the recent nano drug delivery innovations for skin, pulmonary and oral applications from the perspectives of material design, processing technology, dosage form development, and active device invention to realize the true meaning of personalized therapy. Excipient selection for precision cancer nanomedicine development against the profiles of cancer cell target and metabolizing enzyme will be discussed from the perspective of cancer omics/healthcare analysis.

JISU DOPT 2024
JISUCONPH

KAMPANART HUANBUTTA, PHD.
Department of Manufacturing Pharmacy, College of Pharmacy, Rangsit University, Thailand Secretary-General, Pharmaceutical Association of Thailand under Royal Patronage

Accelerating Pharma Innovation: The Impact of 3D Printing on Drug Formulation and Manufacturing Efficiency

The exploration of 3D printing technology in pharmaceuticals provides an in-depth view of its transformative impact on drug formulation and manufacturing, emphasizing its potential to revolutionize personalized medicine. This technology enables the creation of highly customized dosage forms, tailored precisely to individual patient needs, significantly enhancing therapeutic efficacy and minimizing adverse effects. Key 3D printing methods, including Fused Deposition Modeling (FDM) and Stereolithography (SLA), are examined for their role in producing complex drug delivery systems, such as multi-functional polypills, implants, and orodispersible tablets, which can release medication in controlled, sustained, or immediate fashion based on treatment requirements. The presentation highlights 3D printing's advantages in pharmaceutical practice, particularly its ability to support on-demand drug manufacturing in clinical settings, enhancing the feasibility of telemedicine and decentralized healthcare. The regulatory landscape is evolving in tandem, with notable milestones such as the FDA approval of the 3D-printed drug Spritam®, marking the technology's transition from experimental to viable industrial applications. Future developments are expected to expand 3D printing's role in healthcare, including bioprinting for complex tissue and organ structures and in-situ printing of implants and living tissues during surgery. This presentation underscores the growing synergy between cutting-edge technology and patient-centered healthcare, suggesting that 3D printing could be a cornerstone of next-generation pharmaceutical manufacturing.

PROF. (DR.) SITESH CHANDRA BACHAR
Pro-Vice Chancellor (Academic))
Department of Pharmacy
Dhaka University, Bangladesh.

Clinical evaluation revealed the biosimilarity of recombinant Erythropoietin GBPD002 with Eprex® in adult Bangladeshi

The biosimilarity between the laboratory-developed test candidate GBPD002 and the comparator Eprex® for erythropoietin (EPO) functioning has been assessed by contrasting their pharmacokinetic (PK) and pharmacodynamic (PD) characteristics after subcutaneous injection. This was a two-sequence, crossover clinical trial that was double-blinded and randomized. After a 4-week washout period, the subjects were randomly randomized to receive either the alternative formulations or a dose (4,000 IU) of the test or comparator EPO. The serum EPO concentrations from blood samples were used to determine the PK parameters, which were shown to be comparable for both formulations. These parameters are the maximum observed concentration (Cmax) and the area under the curve extrapolated to infinity (AUC0-inf). Within the regulatory range of 0.80 – 1.25, the geometric mean ratios (at 90% CI) of the Cmax and AUCinf were 0.89 and 1.16, respectively. The PD indicators (reticulocyte, haematocrit, haemoglobin, and red blood cell) and time-matched serum EPO concentrations showed an anticlockwise hysteresis, indicating a lag between the observed concentration and the reaction. The effectors' ANOVA-derived P-values (>0.05) amply demonstrated how similarly the test and comparator medicines' effects on PD indicators differed from one another. Anti-drug antibodies were not detected, and both formulations were reported to be well tolerated. It is anticipated that the two formulations will be utilized interchangeably in clinical setting

JISU UNIVERSITY JISU DOPT 2024 JISUCONPH

PROF. (DR.)PANNA THAPA
Department of Pharmacy,
School of Science
Kathmandu University, Nepal.

Current Trends in Herbal Research Towards Commercialization: A Nepalese Perspectives

Nepal has unique biogeographic location covering two-thirds of the Himalayan range and houses eight highest mountains in the world which has resulted in a high biodiversity with 2,331 medicinal plants. Herbal medicine research is undoubtedly an increasing area throughout the world to develop economical, accessible, and officious methods of health care management. There are 17 Universities, a dozen degree awarding academies, some research centers and more than 150 herbal industries working on R&D of Nepalese herbs. Herbal extracts formulations are being used as medicine, nutrient supplements and cosmetics. Many traditional herbs have exhibited strong medicinal, cosmetic and nutritional values. The prospect of herbal product development in Nepal is quite challenging however these challenges may open opportunities for future directions for the product development of international standard in Nepal. This lecture thus attempts to overview and analyze the research in Nepalese herb, ethnobotanical knowledge for treatment by tribal and folklore practices in Nepal, their scientific validation, current research particularly focusing on pharmacology and pharmaceutics of herbs. The lecture would also cover Nepal's policy for medicinal plants to support local livelihood as herbs have long been collected, consumed, and managed through local customs including Universities and other researchers attempts to influence government policymakers to prioritize for the promotion of local herbs using new technologies.The lecture would also cover prominent biological activities of some medicinal plants including various herbal dosage forms ranging from solid, semisolid and transdermal patches and traditional knowledge of herbal usage for the clinical management of a variety of diseases in indigenous cultures in Nepal. It would further discuss on the major pharmacological strategies such as phytochemical and antimicrobial screenings, antioxidant, wound healing, analgesic, antidiabetic, anti-inflammatory properties of plants including recently commercialized herbs for cosmetic, medicinal, and supplementary products. The importance of scientific and clinical validation of Nepalese Himalayan herbs for further research and development of herbal medicine for uses outside their traditional practice and contexts will also be highlighted.

PROF. (DR.) BALARAM GHOSH
Department of Pharmacy,
BITS-Pilani Hyderabad Campus
Hyderabad 500078, India

Graduation of Bitsinostat: A Breakthrough in Anti Cancer Immuno-chemotherapy

Cancer is a significant global public health concern and the second leading cause of death worldwide. According to the International Agency for Research on Cancer (IARC) 2022 report, there were 20 million new cancer cases and 9.7 million cancer-related deaths globally. Projections suggest that cancer incidence could rise to 35 million cases by 2050. Drug resistance resulting from prolonged chemotherapy, combined with the challenges of metastasis, creates substantial obstacles in cancer treatment, hindering efforts to achieve durable remission and improve survival outcomes. Cancer is often described as a multitarget disease due to its complex biology, involving numerous signaling pathways, genetic mutations, and cellular mechanisms. Drug combination strategies for cancer treatment use multiple therapeutic agents concurrently to enhance efficacy and counteract resistance. However, despite their promise, combination therapies face limitations related to drug metabolism, pharmacokinetics, and pharmacodynamics, complicating their application and development. To address these challenges, conjugating two drugs with closely related sites of action can enhance the specificity and efficacy of therapies, help overcome drug resistance, improve pharmacokinetics, and target multiple pathways effectively. Recently, the approach of linking chemotherapeutic agents like gemcitabine to small molecules, such as histone-modulating epigenetic drugs, has gained considerable attention, particularly for targeting proteins or enzymes often overexpressed in cancer cells. In this work, we developed highly effective therapeutics for solid tumors by designing and synthesizing 13 conjugates that combine gemcitabine, via a biodegradable linker, with various HDAC inhibitors. Among these, some inhibitors were isoform-specific, while others were pan-HDAC inhibitors.

JISU UNIVERSITY JISU DOPT 2024 JISUCONPH

PROF. (DR.) BALARAM GHOSH
Department of Pharmacy,
BITS-Pilani Hyderabad Campus
Hyderabad 500078, India

The synthesized molecules were screened for their potency against various HDAC isoforms and a small panel of cancer cell lines.. Among the 13 conjugates, a lead molecule that we named as "Bitsinostat" has been emerged as a potent inhibitor, exhibiting nanomolar IC50 values against HDAC isoforms and similar nanomolar IC50 values against cancer cell lines such as PC3 and 4T1 cells, while maintaining a minimum 1000-fold selectivity over normal human cells. Mechanistic studies on Bitsinostat, including apoptosis and cell cycle analysis in PC3 cells, revealed significant apoptotic activity and cell cycle arrest in the G2/M phase. Bitsinostat also demonstrated enhanced plasma metabolic stability and an improved pharmacokinetic profile compared to gemcitabine alone. In preclinical studies, Bitsinostat displayed excellent therapeutic potential, achieving complete tumor eradication within 12 days with just four doses at 23.51 µmol/kg (15 mg/kg) in mouse models of prostate, breast, and oral tumors. Furthermore, Bitsinostat showed impressive therapeutic potency in the gemcitabine-resistant PC3 tumor model, retaining its cytotoxic profile in gemcitabine-resistant PC3 cells compared to wild-type PC3 cells. Additionally, Bitsinostat exhibited a strong metastatic reversion effect in both 4T1-Luc and MOC2 mouse tumor models, achieving complete tumor regression within 9 and 15 days, respectively. In cardiotoxicity studies, Bitsinostat demonstrated no significant cardiotoxicity in both in vitro and in vivo models, maintaining an excellent biosafety profile throughout treatment. The tumor rejection was observed in mice re-challenged with the same number of 4T1-Luc cells following primary treatment with Bitsinostat. Bitsinostat possesses immune-boosting properties, as shown by FACS studies for various immunity biomarkers. Collectively, the accumulated data provide strong confidence that Bitsinostat has been graduated to be considered as a practical, potent, safe, and effective immune-chemotherapeutic anti-cancer drug and is now a viable candidate for clinical translation by pharmaceutical industries.

JISU DOPT 2024
JISUCONPH

PROF. (DR.) BISWAJIT MUKHERJEE,
Department of Pharmaceutical Technology,
Jadavpur University,
Kolkata, India.

Drug Targeting Through Nanocarriers

The advancement of nanotechnology has revolutionized drug delivery systems by precisely targeting therapeutics to specific tissues and cells. Nanocarriers, such as nanoliposomes, polymeric nanoparticles, dendrimers, etc., significantly enhance bioavailability, reduce systemic toxicity, and thus improve therapeutic efficacy. Nanocarriers can be engineered to achieve targeted drug delivery through various strategies, including passive targeting, which exploits the enhanced permeability and retention (EPR) effect observed in tumor tissues, and active targeting, which utilizes ligands or antibodies that bind specifically to receptors overexpressed on target cells. Here, some of such findings will be shared.

PROF. (DR.) INDERBIR SINGH,
Department of Pharmacy,
Chitkara University, India

Microneedles as Drug Delivery Platforms for Wound Healing Applications

The present research explores the preparation and evaluation of a novel drug delivery system amalgamating herbal bioactive loaded Eudragit S100 nanoparticles into microneedles for enhanced wound healing. The primary aim of this study was to combine the advantages of both nanoparticles and microneedles to achieve controlled and efficient drug delivery to the wound site. The nanoparticles demonstrated a balanced profile with a particle size of 218.8 nm, a PDI of 0.296, and a zeta potential of -30.3 mV. Optical microscopy and SEM testing were performed to examine their structural integrity and surface morphology. The in-vitro release profile of the nanoparticles and microneedle patch loaded with nanoparticles demonstrated a controlled release of the herbal bioactive. Permeation studies confirmed that the microneedles significantly enhanced the drug permeation compared to nanoparticles alone, leveraging the physical disruption of the skin barrier to achieve higher permeation rates. In-vivo wound healing studies also demonstrated the efficacy of the nanoparticle-loaded microneedles in promoting faster and more efficient wound closure. This innovative drug delivery system holds great promise for wound healing applications, offering a minimally invasive, controlled, and efficient approach to drug delivery. The findings from this study provide a strong foundation for further research and development of nanoparticle-loaded microneedles for various therapeutic applications, emphasizing their potential to revolutionize wound care and enhance patient outcomes.

PROF. (DR.) GURU PRASAD MOHANTA
Former WHO officer
Department of Pharmacy
Annamalai University, Tamilnadu, India.

Legal and Ethical Issues in Clinical Trial

Clinical Trials are necessary to ensure safety and efficacy of drug and drug products. As the drug and drug products need to meet the criteria of safe and efficacious, the clinical trials become the part of drug development process. The clinical trials industry is growing very fast and the gaps between the need and treatment options too widening. It is necessary to develop our own molecule / interventional products in order to make India self-reliant on drug discovery. India becomes the favourite destination for clinical trials because it has several advantages over other countries. There have been several legal and ethical concerns raised over the years because illegal and unethical clinical trials. The new rule 'New Drugs and Clinical Trials Rules 2019' with more clarity on various issues repealing Schedule Y of Drugs and Cosmetics Rules is framed. The academic researchers often do not have clarity on the various issues leading to put them on controversy. Persons involving on clinical trials need to comply with the law of our country. Regulating clinical trials began with introduction of definition of new drug in 1952 in our statute and the latest is New Drugs and Clinical Trial Rule 2019 that governs the clinical trials. It specifies the conditions under which clinical trials are permitted. The DCGI is the authority for issuing licence. The rule too prescribes the formation ethics committee who would approve the proposal and supervise to ensure there is no violation of human ethics in clinical trials.

The presentation basically aims to educate and sensitize academic researchers so that they can avoid controversy and complete their research which may lead to discovery of new drug / intervention. The presentation would have lot of examples that happened in our country so that the audience would appreciate the need of compliance.

JISU DOPT 2024
JISUCONPH

PROF. (DR.) MAHITOSH MANDAL
School of Medical Science and Technology,
Indian Institute of Technology, Kharagpur, India.

Where Nature Meets Medicine: Redefining Cancer Treatment with Natural Compounds

The integration of bioactive natural compounds into oncologic treatment frameworks represents a paradigm shift, providing novel mechanistic insights and enhanced tolerability compared to conventional therapies. Our study systematically examines the efficacy of several phytochemicals and plant-derived compounds in modulating complex cancer biology, with specific emphasis on breast cancer, colorectal cancer, and glioma. Notably, Campesterol, a plant sterol, has been identified as a potent estrogen receptor-alpha (ER-α) inhibitor, effectively disrupting proliferative signalling pathways in hormone-dependent breast cancer models. Further, Riboflavin has demonstrated DNA intercalation properties, destabilizing the DNA structure and impeding the replication fidelity of malignant cells. A significant finding of our research is the role of the flavone apigenin, which induces oxidative stress within human colorectal cancer cells, promoting cellular senescence and exhibiting chemotherapeutic potential by arresting cell cycle progression through oxidative mechanisms. Additionally, thymoquinone shows therapeutic promise in mitigating radiation-induced TGF-β expression and inhibiting epithelial-mesenchymal transition (EMT) in breast cancer cells during chemoradiotherapy, thus enhancing the efficacy and response of standard treatments. Furthermore, the isoflavone daidzin has been shown to modulate macrophage polarization, shifting the tumor-associated macrophage phenotype from a pro-tumorigenic M2 to an anti-tumorigenic M1 phenotype. This shift enhances immune surveillance and fosters a pro-inflammatory tumor microenvironment that is detrimental to tumor growth, thus contributing to improved therapeutic outcomes. Importantly, these natural compounds display a favorable safety profile with minimal adverse effects relative to conventional chemotherapeutics. This is attributed to their targeted molecular interactions and synergistic potential with existing therapies, which collectively support a model for more personalized and sustainable treatment approaches. Overall, those studies provide a foundation for the development of integrative treatment regimens that enhance patient outcomes and quality of life through targeted, mechanism-based interventions.

JISU UNIVERSITY JISU DOPT 2024 JISUCONPH

Dr. Chinmoy Patra,
PhD Scientist E
DBT/Wellcome Trust India Alliance
Intermediate fellow, Department of Developmental Biology
Agharkar Research Institute, Pune, India

Zebrafish: an In vitro In vivo Model in Biomedical Research

Model animals are a critical part of biomedical research. The remarkable genetic, physiological, and anatomical similarities between humans and animals, mainly vertebrates, allow us to investigate cellular and molecular mechanisms in organ development, disease, and regeneration, leading to the establishment of novel therapies for human diseases. In recent decades, zebrafish (Danio rerio) have gained prominence as a model organism for investigating vertebrate development and conducting small molecule screenings for drug discovery. This preference is attributed to several advantageous traits, including rapid ex-utero development, optical transparency, a high fecundity rate, and susceptibility to genetic manipulation. Interestingly, zebrafish have tremendous regeneration capacity. It can regenerate almost every organ, including the heart, brain, spinal cord, eye, kidney, etc.

Moreover, the zebrafish genome carries at least one orthologue of 70% protein-coding and 80% disease-causing human genes. Thus, it is possible to explore the involvement of conserved genes in human diseases and organ regeneration using zebrafish. Due to its large clutch size, faster growth, availability of a handful of reporter lines, and disease models allow large-scale small molecule screening to identify effective molecules that modulate a particular biological process and thus can be used in biomedical research or drugs to treat a specific pathological condition. In conclusion, zebrafish is a model that preserves the advantages of in vitro and in vivo studies to explore the involved cellular processes and genetic regulation in morphogenesis, disease conditions, and regeneration.

JISU DOPT 2024
JISUCONPH

Dr. Partha Chakrabarti
Sr. Principal Scientist, Indian Institute of Chemical Biology, Kolkata (A CSIR Institute)

Therapeutic Opportunities in Steatotic Liver Disease

Metabolic dysfunction-associated steatotic liver disease (MASLD) has become the most common cause of chronic liver disease and covers a spectrum from simple steatosis to metabolic dysfunction-associated steatohepatitis (MASH), and cirrhosis, the most severe form of MASLD. Although the mainstay therapy remains symptomatic, diet and lifestyle modifications, no definitive drug is available. At present, treatment strategies are mainly directed toward hepatocyte dysregulation, inflammation, apoptosis, and oxidative stress. Certain drugs are in clinical trials at various phases. Notably, elafibranor (PPAR-α/δ ligand), selonsertib (ASK-1 inhibitor), obeticholic acid, tropifexor, nidufexor (FXR agonist), cenicriviroc (CCR 2/5 inhibitor), saroglitazar (PPAR-α/γ ligand) are in Phase III clinical trial. All these drugs aim at a much-advanced stage of fibrosis in NASH. In this presentation, I will discuss our efforts in collaborations with the medicinal chemists. We have specifically targeted pathways discovered from our basic biology works. Two such examples are targeting a E3 ubiquitin ligase COP1 and Ask1-PPARγ pathway. I will emphasize how basic science biology research could lead to identification of new druggable targets which can be modulated by rational design and synthesis of new chemical entities.