

Advances in
Pharmaceutical Research
and Innovation
MCOPS
Experience
2022-2023

Approval



Pharmacy Council of India

Accreditation



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**MANIPAL COLLEGE
OF PHARMACEUTICAL SCIENCES**
MANIPAL
(A constituent unit of MAHE, Manipal)



Dear Esteemed Colleagues,

This compendium presents a curated collection of high-impact research from the Manipal College of Pharmaceutical Sciences (MCOPS), showcasing significant contributions to pharmaceutical and biomedical sciences from 2022 to 2023. Organized under five key themes-Advanced Drug Delivery Systems and Nanotechnology, Cancer Therapeutics and Bioactive Compounds, Neurological and Central Nervous System Disorders, Inflammation, Immunology and Infectious Diseases, and Pharmaceutical Sciences Formulations and Pharmacokinetics-this compilation highlights pioneering research addressing critical healthcare challenges.

Additionally, a sixth theme, Miscellaneous, covers a broad array of research that transcends traditional categories but still makes a substantial impact in areas like cardiovascular protection, cognitive enhancers, nanoparticle-based drug delivery for chronic diseases, drug repurposing, and innovations in 3D bioprinting for tissue engineering. This theme also provides insights into pharmacogenomics and the therapeutic potential of bioactive peptides, showcasing the interdisciplinary nature of modern pharmaceutical research.

The studies under this section emphasize that even unconventional research avenues can play pivotal roles in advancing healthcare, therapeutic strategies, and personalized medicine. The inclusion of diverse and emerging topics ensures that innovative approaches and solutions to global health challenges are integrated into this comprehensive compendium, underscoring MCOPS's commitment to advancing pharmaceutical knowledge and improving patient outcomes.

MCOPS faculty members listed in these publications are ready to provide further details on the research as well as to collaborate for mutual fruitful outcomes.

With regards
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Principal & Professor

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MCOPS, List of Q1 journals (2022-2023)

1. Advanced Drug Delivery Systems and Nanotechnology

Recent advancements in drug delivery from our institution have focused on the development of nanotechnology-based carriers, including lipid nanoparticles, solid lipid nanoparticles, bilosomes, and cubic liquid crystalline nanoparticles. These innovations address key challenges such as poor solubility, bioavailability, and targeted drug delivery. Researchers have also explored novel strategies like ionic liquids for enhanced skin permeation and nose-to-brain delivery systems to bypass the blood-brain barrier. These breakthroughs hold promise for improving treatments in cancer, HIV, ocular diseases, and skin conditions, contributing to more effective and personalized healthcare solutions.

Publications Under This Theme

1. Transdermal Delivery of Curcumin-Loaded Solid Lipid Nanoparticles as Microneedle Patch: An In Vitro and In Vivo Study
Prabhu, A.; Jose, J.; Kumar, L.; Salwa, S.; Vijay Kumar, M.; Nabavi, S.M.. AAPS PharmSciTech 2022, 23, 1-12, doi:10.1208/s12249-021-02186 <https://link.springer.com/article/10.1208/s12249-021-02186-5>.
2. Multifunctional Lipidic Nanocarriers for Effective Therapy of Glioblastoma: Recent Advances in Stimuli-Responsive, Receptor and Subcellular Targeted Approaches.
Hegde, M.M.; Prabhu, S.; Mutalik, S.; Chatterjee, A.; Goda, J.S.; Satish Rao, B.S. Journal of Pharmaceutical Investigation 2022, 52, 49-74, doi:10.1007/s40005-021-00548-6. <https://link.springer.com/article/10.1007/s40005-021-00548-6>
3. Lipid Nanoparticles as a Promising Drug Delivery Carrier for Topical Ocular Therapy; An Overview on Recent Advances.
Jacob, S.; Nair, A.B.; Shah, J.; Gupta, S.; Boddu, S.H.S.; Sreeharsha, N.; Joseph, A.; Shinu, P.; Morsy, M.A. Pharmaceutics 2022, 14, doi:10.3390/pharmaceutics14030533. <https://www.mdpi.com/1999-4923/14/3/533>
4. Ionic Liquids Assisted Topical Drug Delivery for Permeation Enhancement: Formulation Strategies, Biomedical Applications, and Toxicological Perspective.
Navti, P.D.; Pandey, A.; Nikam, A.N.; Padya, B.S.; Kalthur, G.; Koteswara, K.B.; Mutalik, S. AAPS PharmSciTech 2022, 23, doi:10.1208/s12249-022-02313-w. <https://link.springer.com/article/10.1208/s12249-022-02313-w>
5. Voriconazole-Cyclodextrin Supramolecular Ternary Complex-Loaded Ocular Films for Management of Fungal Keratitis.
Suvarna, P.; Chaudhari, P.; Birangal, S.; Mallela, L.S.; Roy, S.; Koteswara, A.; Aranjani, J.M.; Lewis, S.A. Molecular Pharmaceutics 2022, 19, 258-273, doi:10.1021/acs.molpharmaceut.1c00746. <https://pubs.acs.org/doi/10.1021/acs.molpharmaceut.1c00746>
6. Novel Nano Spanlastic Carrier System for Buccal Delivery of Lacidipine.
Mary DCruz, C.E.; Bhide, P.J.; Kumar, L.; Shirodkar, R.K. Journal of Drug Delivery Science and Technology 2022, 68, 103061, doi:10.1016/j.jddst.2021.103061. <https://www.sciencedirect.com/science/article/pii/S1773224721007413>
7. Anti-Oxidant Containing Nanostructured Lipid Carriers of Ritonavir: Development, Optimization, and In Vitro and In Vivo Evaluations.
Jitta, S.R.; Bhaskaran, N.A.; Salwa; Kumar, L. AAPS PharmSciTech 2022, 23, 1-15, doi:10.1208/s12249-022-02240-w. <https://link.springer.com/article/10.1208/s12249-022-02240-w>
8. Recent Advances in Nanoformulation Development of Ritonavir, a Key Protease Inhibitor Used in the Treatment of HIV-AIDS.
Jitta, S.R.; Salwa; Bhaskaran, N.A.; Marques, S.M.; Kumar, L. Expert Opinion on Drug Delivery 2022, 19, 1133-1148, doi:10.1080/17425247.2022.2121817. <https://www.tandfonline.com/doi/abs/10.1080/17425247.2022.2121817>
9. Development of Posaconazole Nanosuspension for Bioavailability Enhancement: Formulation Optimization, in Vitro Characterization, and Pharmacokinetic Study.
Kolipaka, T.; Sen, S.; Mane, S.S.; Bajad, G.D.; Dengale, S.J.; Ranjan, O.P. Journal of Drug Delivery Science and Technology 2023, 83, 104434, doi:10.1016/j.jddst.2023.104434. <https://www.sciencedirect.com/science/article/pii/S1773224723002861>

10. Engineered Nano-Carrier Systems for the Oral Targeted Delivery of Follicle Stimulating Hormone: Development, Characterization, and, Assessment of in Vitro and in Vivo Performance and Targetability.
Raut, S.Y.; Fu, K.; Taichun, H.; Gahane, A.; Chaudhari, D.; Kushwah, V.; Suresh Managuli, R.; Hegde, A.R.; Jain, S.; Kalthur, G.; et al. *International Journal of Pharmaceutics* 2023, 637, 122868, doi:10.1016/j.ijpharm.2023.122868. .
<https://pubmed.ncbi.nlm.nih.gov/36958606/>
11. Unlocking the Potential of Bilosomes and Modified Bilosomes: A Comprehensive Journey into Advanced Drug Delivery Trends.
Nayak, D.; Rathnanand, M.; Tippavajhala, V.K. *AAPS PharmSciTech* 2023, 24, 1-23, doi:10.1208/s12249-023-02696-4. <https://pubmed.ncbi.nlm.nih.gov/37989979/>
12. Self-Nanoemulsifying Drug Delivery Systems (SNEDDS) of Anti-Cancer Drugs: A Multifaceted Nanoplatfrom for the Enhancement of Oral Bioavailability.
Shukla, E.; Kara, D.D.; Katikala, T.; Rathnanand, M. *Drug Development and Industrial Pharmacy* 2023, 49, 1-16, doi:10.1080/03639045.2023.2182124. <https://www.tandfonline.com/doi/full/10.1080/03639045.2023.2182124>
13. Polymeric Solid Dispersion Vs Co-Amorphous Technology: A Critical Comparison.
Vullendula, S.K.A.; Nair, A.R.; Yarlagadda, D.L.; Navya Sree, K.S.; Bhat, K.; Dengale, S.J. *Journal of Drug Delivery Science and Technology* 2022, 78, 103980, doi:10.1016/j.jddst.2022.103980.
<https://www.sciencedirect.com/science/article/pii/S1773224722008917>
14. Drug-Carrier Miscibility in Solid Dispersions of Glibenclamide and a Novel Approach to Enhance Its Solubility Using an Effervescent Agent.
Pisay, M.; Bhaskar, K.V.; Mehta, C.H.; Nayak, U.Y.; Koteswara, K.B.; Mutalik, S. *AAPS PharmSciTech* 2022, 23, doi:10.1208/s12249-022-02437-z. <https://link.springer.com/article/10.1208/s12249-022-02437-z>
15. Hot-Melt Extruded in Situ Gelling Systems (MeltDrops Technology): Formulation Development, in Silico Modelling and in Vivo Studies.
Tambe, S.M.; Jain, D.D.; Hasmukh Mehta, C.; Ashwini, T.; Yogendra Nayak, U.; Amin, P.D. *European Journal of Pharmaceutics and Biopharmaceutics* 2023, 188, 108-124, doi:10.1016/j.ejpb.2023.05.008.
<https://pubmed.ncbi.nlm.nih.gov/37182553/>
16. Nose-to-Brain Delivery of Antiretroviral Drug Loaded Lipidic Nanocarriers to Purge HIV Reservoirs in CNS: A Safer Approach.
Mehrotra, S.; Salwa, B.G.; Bhaskaran, N.A.; Srinivas Reddy, J.; Kumar, L. *Journal of Drug Delivery Science and Technology* 2023, 87, 104833, doi:10.1016/j.jddst.2023.104833.
<https://www.sciencedirect.com/science/article/pii/S1773224723006858>
17. Targeted Delivery of 5-Fluorouracil and Sonidegib via Surface-Modified ZIF-8 MOFs for Effective Basal Cell Carcinoma Therapy.
Padya, B.S.; Fernandes, G.; Hegde, S.; Kulkarni, S.; Pandey, A.; Deshpande, P.B.; Ahmad, S.F.; Upadhya, D.; Mutalik, S. *Pharmaceutics* 2023, 15, doi:10.3390/pharmaceutics15112594. <https://www.mdpi.com/1999-4923/15/11/2594>
18. Topical Micro-Emulsion of 5-Fluorouracil by a Twin Screw Processor-Based Novel Continuous Manufacturing Process for the Treatment of Skin Cancer: Preparation and In Vitro and In Vivo Evaluations.
Nikam, A.N.; Jacob, A.; Raychaudhuri, R.; Fernandes, G.; Pandey, A.; Rao, V.; Ahmad, S.F.; Pannala, A.S.; Mutalik, S. *Pharmaceutics* 2023, 15, doi:10.3390/pharmaceutics15092175. <https://www.mdpi.com/1999-4923/15/9/2175>
19. Subconjunctival Therapy by Cubic Liquid Crystalline Nanoparticles to Deliver Triamcinolone Acetonide for the Management of Diabetic Retinopathy: In Vivo Evidences.
Sharadha, M.; Vishal Gupta, N.; Rahamathulla, M.; Muqtader Ahmed, M.; Ayesha Farhana, S.; Osmani, R.A.M.; Veeranna, B.; Koteswara, K.B. *International Journal of Pharmaceutics* 2023, 646, 123443, doi:10.1016/j.ijpharm.2023.123443.
<https://pubmed.ncbi.nlm.nih.gov/37748633/>
20. Multifunctional and Multilayer Surgical Sealant for a Better Patient Safety.
Chevala, N.T.; Kumar, L.; Veetilvalappil, V.; Mathew, A.J.; Jadhav, M.; Gandhi, M.; Rao, C.M. *International Journal of Pharmaceutics* 2022, 629, 122411, doi:10.1016/j.ijpharm.2022.122411.
<https://pubmed.ncbi.nlm.nih.gov/36402288/>
21. Organic Quantum Dots: An Ultrasmall Nanoplatfrom for Cancer Theranostics.
Dhas, N.; Pastagia, M.; Sharma, A.; Khera, A.; Kudarha, R.; Kulkarni, S.; Soman, S.; Mutalik, S.; Barnwal, R.P.; Singh, G.; et al. *Journal of Controlled Release* 2022, 348, 798-824, doi:10.1016/j.jconrel.2022.06.033.
<https://pubmed.ncbi.nlm.nih.gov/35752250/>

2. Cancer Therapeutics and Bioactive Compounds

This theme focuses on developing novel cancer therapeutics using both synthetic and natural bioactive compounds. Research includes advanced nanocarriers like cell membrane-camouflaged nanoparticles and dendrimeric peptide-modified liposomes to enhance targeted drug delivery. Studies also explore natural molecules such as resveratrol and goji berry extracts for their potential in modulating cancer-related pathways. Efforts in targeted delivery systems, including anti-CD4 antibodies and PI3K inhibitors, aim to overcome chemotherapy resistance and reduce side effects, offering promising advancements in cancer prevention, diagnosis, and treatment.

Publications Under This Theme

1. Advancements in Cell Membrane Camouflaged Nanoparticles: A Bioinspired Platform for Cancer Therapy. Dhas, N.; García, M.C.; Kudarha, R.; Pandey, A.; Nikam, A.N.; Gopalan, D.; Fernandes, G.; Soman, S.; Kulkarni, S.; Seetharam, R.N.; et al. *Journal of Controlled Release* 2022, 346, 71-97, doi:10.1016/j.jconrel.2022.04.019. <https://pubmed.ncbi.nlm.nih.gov/35439581/>
2. Combinatorial Approaches of Nanotherapeutics for Inflammatory Pathway Targeted Therapy of Prostate Cancer. Johnson, R.P.; Ratnacaram, C.K.; Kumar, L.; Jose, J. *Drug Resistance Updates* 2022, 64, 100865, doi:10.1016/j.drug.2022.100865. <https://pubmed.ncbi.nlm.nih.gov/36099796/>
3. Gold and Carbon-Based Nano-Theranostics: An Overview on the Developments and Applications for Cancer Phototherapy. Shailendrakumar, A.M.; Tippavajhala, V.K. *Advanced Pharmaceutical Bulletin* 2022, 12, 673-685, doi:10.34172/apb.2022.071. <https://pubmed.ncbi.nlm.nih.gov/36415647/>
4. (+)-Cyanidan-3-OI Inhibits Epidermoid Squamous Cell Carcinoma Growth via Inhibiting AKT/MTOR Signaling through Modulating CIP2A-PP2A Axis. Monga, J.; Suthar, S.K.; Rohila, D.; Joseph, A.; Chauhan, C.S.; Sharma, M. *Phytomedicine* 2022, 101, 1-15, doi:10.1016/j.phymed.2022.154116. <https://pubmed.ncbi.nlm.nih.gov/35525235/>
5. Ameliorative Anticancer Effect of Dendrimeric Peptide Modified Liposomes of Letrozole: In Vitro and in Vivo Performance Evaluations. Hegde, A.R.; Paul, M.; Kumbham, S.; Roy, A.A.; Ahmad, S.F.; Parekh, H.; Biswas, S.; Mutalik, S. *International Journal of Pharmaceutics* 2023, 648, 123582, doi:10.1016/j.ijpharm.2023.123582. <https://pubmed.ncbi.nlm.nih.gov/37940082/>
6. Synthesis, Biological Evaluation, and in Silico Studies of 2-Aminobenzothiazole Derivatives as Potent PI3K? Inhibitors. Haider, K.; Ahmad, K.; Najmi, A.K.; Das, S.; Joseph, A.; Shahar Yar, M. *Design, Archiv der Pharmazie* 2022, 355, doi:10.1002/ardp.202200146. <https://onlinelibrary.wiley.com/doi/full/10.1002/ardp.202200146>
7. Structure-Activity Relationship Insight of Naturally Occurring Bioactive Molecules and Their Derivatives Against Non-Small Cell Lung Cancer: A Comprehensive Review. Das, S.; Roy, S.; Rahaman, S.B.; Akbar, S.; Ahmed, B.; Halder, D.; Ramachandran, A.K.; Joseph, A. *Curr Med Chem* 2022;29(39):6030-6062. doi:10.2174/0929867329666220509112423. <https://pubmed.ncbi.nlm.nih.gov/35579166/>
8. Highlights on Cell-Penetrating Peptides and Polymer-Lipid Hybrid Nanoparticle: Overview and Therapeutic Applications for Targeted Anticancer Therapy. Bangera, P.D.; Kara, D.D.; Tanvi, K.; Tippavajhala, V.K.; Rathnanand, M. *AAPS PharmSciTech* 2023, 24, 1-24, doi:10.1208/s12249-023-02576-x. <https://pubmed.ncbi.nlm.nih.gov/37225901/>
9. Design, Development and Evaluation of Resveratrol Transdermal Patches for Breast Cancer Therapy. Gadag, S.; Narayan, R.; Nayak, Y.; Garg, S.; Nayak, U.Y. *International Journal of Pharmaceutics* 2023, 632, 122558, doi:10.1016/j.ijpharm.2022.122558. <https://pubmed.ncbi.nlm.nih.gov/36592891/>
10. Tumor-Associated Macrophages Employ Immunoediting Mechanisms in Colorectal Tumor Progression: Current Research in Macrophage Repolarization Immunotherapy. Cheruku, S.P.; Rao, V.; Pandey, R.; Rao Chamallamudi, M.; Velayutham, R.; Kumar, N. *International Immunopharmacology* 2023, 116, 109569, doi:10.1016/j.intimp.2022.109569. <https://pubmed.ncbi.nlm.nih.gov/36773572/>

11. Goji Berry (*Lycium Barbarum*) Inhibits the Proliferation, Adhesion, and Migration of Oral Cancer Cells by Inhibiting the ERK, AKT, and CyclinD Cell Signaling Pathways: An in-Vitro Study.
Sanghavi, A.; Srivatsa, A.; Adiga, D.; Chopra, A.; Lobo, R.; Kabekkodu, S.P.; Gadag, S.; Nayak, U.; Sivaraman, K.; Shah, A. *F1000Research* 2023, 11, 1-15, doi:10.12688/f1000research.129250.3. <https://pubmed.ncbi.nlm.nih.gov/36761830/>
12. Anti-CD4 Antibody and Dendrimeric Peptide Based Targeted Nano-Liposomal Dual Drug Formulation for the Treatment of HIV Infection.
Mutalik, S.P.; Gaikwad, S.Y.; Fernandes, G.; More, A.; Kulkarni, S.; Fayaz, S.M.A.; Tupally, K.; Parekh, H.S.; Kulkarni, S.; Mukherjee, A.; et al. *Life Sciences* 2023, 334, 122226, doi:10.1016/j.lfs.2023.122226. <https://pubmed.ncbi.nlm.nih.gov/37918627/>
13. Transforming Wound Management: Nanomaterials and Their Clinical Impact.
Ashwini, T.; Prabhu, A.; Baliga, V.; Bhat, S.; Thenkondar, S.T.; Nayak, Y.; Nayak, U.Y. *Pharmaceutics* 2023, 15, doi:10.3390/pharmaceutics15051560. <https://pubmed.ncbi.nlm.nih.gov/37242802/>
14. Polyphenol-Based Targeted Therapy for Oral Submucous Fibrosis.
Mehta, C.H.; Paliwal, S.; Muttigi, M.S.; Seetharam, R.N.; Prasad, A.S.B.; Nayak, Y.; Acharya, S.; Nayak, U.Y. *Inflammopharmacology* 2023, 31, 2349-2368, doi:10.1007/s10787-023-01212-1. <https://pubmed.ncbi.nlm.nih.gov/37106237/>
15. Ultrasound Assisted One-Pot Synthesis of Rosuvastatin Based Novel Azaindole Derivatives via Coupling-Cyclization Strategy under Pd/Cu-Catalysis: Their Evaluation as Potential Cytotoxic Agents.
Kumar, J.S.; Reddy, G.S.; Medishetti, R.; Amirul Hossain, K.; Thirupataiah, B.; Edelli, J.; Dilip Bele, S.; Kristina Edwin, R.; Joseph, A.; Shenoy, G.G.; et al. *Bioorganic Chemistry* 2022, 124, 105857, doi:10.1016/j.bioorg.2022.105857. <https://pubmed.ncbi.nlm.nih.gov/35594765/>
16. Emphasizing the Crosstalk Between Inflammatory and Neural Signaling in Post-Traumatic Stress Disorder (PTSD).
Govindula, A.; Ranadive, N.; Nampoothiri, M.; Rao, C.M.; Arora, D.; Mudgal, J. *Journal of Neuroimmune Pharmacology* 2023, 18, 248-266, doi:10.1007/s11481-023-10064-z. <https://pubmed.ncbi.nlm.nih.gov/37097603/>
17. 4-Methylesculetin Ameliorates LPS-Induced Depression-like Behavior through the Inhibition of NLRP3 Inflammasome.
Choudhary, K.; Prasad, S.R.; Lokhande, K.B.; Murti, K.; Singh, S.; Ravichandiran, V.; Kumar, N. *Frontiers in Pharmacology* 2023, 14, 1-14, doi:10.3389/fphar.2023.1120508. <https://pubmed.ncbi.nlm.nih.gov/36909194/>
18. Investigating the Influence of the Type of Polymer on Sustaining the Supersaturation from Amorphous Solid Dispersions of Apremilast and Its Pharmacokinetics.
Shetty, D.; Yarlagadda, D.L.; Brahmam, B.; Dengale, S.J.; Lewis, S.A. *Journal of Drug Delivery Science and Technology* 2023, 84, 104520, doi:10.1016/j.jddst.2023.104520. <https://www.sciencedirect.com/science/article/pii/S1773224723003726>
19. Inhibition of SGK1 Potentiates the Anticancer Activity of PI3K Inhibitor in NSCLC Cells through Modulation of MTORC1, p-ERK and β -Catenin Signaling.
Kale, R.; Samant, C.; Bokare, A.; Verma, M.; Nandakumar, K.; Bhonde, M. *Biomedical Reports* 2023, 19, 1-9, doi:10.3892/br.2023.1676. <https://pubmed.ncbi.nlm.nih.gov/37901878/>



3. Neurological and Central Nervous System (CNS) Disorders Therapies

This theme focuses on treating neurological and CNS disorders through innovative drug delivery systems and molecular research. Studies investigate exosomes and nose-to-brain delivery to overcome the blood-brain barrier for improved treatment of Alzheimer's, Parkinson's, and epilepsy. Research into neuroprotective agents like HDAC and GSK-3? inhibitors aims to mitigate neurodegeneration, while epigenetic and neurotrophin studies enhance understanding of CNS disorders. These advancements emphasize early intervention and targeted therapies to slow disease progression and improve patients' quality of life.

Publications Under This Theme

1. Exosomes as Cell-Derivative Carriers in the Diagnosis and Treatment of Central Nervous System Diseases
Shetgaonkar, G.G.; Marques, S.M.; DCruz, C.E.M.; Vibhavari, R.J.A.; Kumar, L.; Shirodkar, R.K.; *Drug Deliv Transl Res* 2022 May;12(5):1047-1079. doi: 10.1007/s13346-021-01026-0. <https://pubmed.ncbi.nlm.nih.gov/34365576/>
2. Role of GSK-3? Inhibitors: New Promises and Opportunities for Alzheimer's Disease
Shri, S.R.; Manandhar, S.; Nayak, Y.; Pai, K.S.R.. *Advanced Pharmaceutical Bulletin* 2023, 13, 688-700, doi:10.34172/apb.2023.071. <https://pubmed.ncbi.nlm.nih.gov/38022801/>
3. Novel HDAC Inhibitors Provide Neuroprotection in MPTP-Induced Parkinson's Disease Model of Rats.
Meka, S.T.; Bojja, S.L.; Kumar, G.; Birangal, S.R.; Rao, C.M. *European Journal of Pharmacology* 2023, 959, 176067, doi:10.1016/j.ejphar.2023.176067. <https://pubmed.ncbi.nlm.nih.gov/37751833/>
4. Epigenetic Basis for PARP Mutagenesis in Glioblastoma: A Review.
M, A.; Xavier, J.; A S, F.; Bisht, P.; Murti, K.; Ravichandiran, V.; Kumar, N. *European Journal of Pharmacology* 2023, 938, 175424, doi:10.1016/j.ejphar.2022.175424. <https://pubmed.ncbi.nlm.nih.gov/36442619/>
5. A Review on the Role of Endogenous Neurotrophins and Schwann Cells in Axonal Regeneration.
Pandey, S.; Mudgal, J. *Journal of Neuroimmune Pharmacology* 2022, 17, 398-408, doi:10.1007/s11481-021-10034-3. <https://pubmed.ncbi.nlm.nih.gov/34843075/>
6. Nose-to-Brain Delivery of Antiretroviral Drug Loaded Lipidic Nanocarriers to Purge HIV Reservoirs in CNS: A Safer Approach.
Mehrotra, S.; Salwa, BG, P.K.; Bhaskaran, N.A.; Srinivas Reddy, J.; Kumar, L. *Journal of Drug Delivery Science and Technology* 2023, 87, 104833, doi:10.1016/j.jddst.2023.104833. <https://www.sciencedirect.com/science/article/pii/S1773224723006858>
7. Sirtuins as Therapeutic Targets for Improving Delayed Wound Healing in Diabetes.
Beegum, F.; P, V, A.; George, K.T.; K, P, D.; Begum, F.; Krishnadas, N.; Shenoy, R.R. *Journal of Drug Targeting* 2022, 30, 911-926, doi:10.1080/1061186X.2022.2085729. <https://pubmed.ncbi.nlm.nih.gov/35787722/>
8. What Is the Role of Lithium in Epilepsy?
Bojja, S.L.; Singh, N.; Kolathur, K.K.; Rao, C.M. *Current neuropharmacology* 2022, 20, 1850-1864, doi:10.2174/1570159X20666220411081728. <https://pubmed.ncbi.nlm.nih.gov/35410603/>
9. Lung-on-Chip: Its Current and Future Perspective on Pharmaceutical and Biomedical Applications.
De, A.; Paul, S.; Reddy, Y.N.; Sharma, V.; Bhaumik, J.; Tippavajhala, V.K. *Journal of Drug Delivery Science and Technology* 2022, 78, 103930, doi:10.1016/j.jddst.2022.103930. <https://www.sciencedirect.com/science/article/pii/S1773224722008413>
10. In Silico Screening as a Tool to Prepare Drug-Drug Cocrystals of Ibrutinib-Ketoconazole: A Strategy to Enhance Their Solubility Profiles and Oral Bioavailability.
Kara, D.D.; Bangera, P.D.; Mehta, C.H.; Tanvi, K.; Rathnanand, M. *AAPS PharmSciTech* 2023, 24, doi:10.1208/s12249-023-02621-9. <https://pubmed.ncbi.nlm.nih.gov/37552343/>

4. Inflammation and Infectious Diseases

This theme explores the molecular and immunological mechanisms of inflammation and infectious diseases to develop innovative therapies. Research highlights anti-inflammatory compounds like β -glucan and thalidomide for conditions such as lung injury and pulmonary fibrosis. It also emphasizes immune modulation using small extracellular vesicles and nanocarriers to treat inflammatory diseases like psoriasis and diabetic retinopathy. By examining immune response pathways and natural and synthetic inhibitors, these studies contribute to more effective, personalized treatments for chronic inflammatory conditions and infections.

Publications Under This Theme:

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2. Thalidomide Interaction with Inflammation in Idiopathic Pulmonary Fibrosis.
Dsouza, N.N.; Alampady, V.; Baby, K.; Maity, S.; Byregowda, B.H.; Nayak, Y. *Inflammopharmacology* 2023, 31, 1167-1182, doi:10.1007/s10787-023-01193-1. <https://pubmed.ncbi.nlm.nih.gov/36966238/>
3. N-Acetyl Cysteine in Rodenticide Poisoning: A Systematic Review and Meta-Analysis.
Rashid, M.; Chandran, V.P.; Nair, S.; Muthu, D.S.; Pappuraj, J.; Jacob, K.A.; Sridhar, B.; Mark, K.; Hyder, S.; Khan, S.; et al. *Current Reviews in Clinical and Experimental Pharmacology* 2022, 17, 192-204, doi:10.2174/2772432816666210825102726. <https://pubmed.ncbi.nlm.nih.gov/34455951/>
4. Protective Effect of β -Glucan on Poly(I:C)-Induced Acute Lung Injury/Inflammation: Therapeutic Implications of Viral Infections in the Respiratory System.
Tirunavalli, S.K.; Pramatha, S.; Eedara, A.C.; Walvekar, K.P.; Immanuel, C.; Potdar, P.; Nayak, P.G.; Chamallamudi, M.R.; Sistla, R.; Chilaka, S.; et al. *Life Sciences* 2023, 330, 122027, doi:10.1016/j.lfs.2023.122027. <https://pubmed.ncbi.nlm.nih.gov/37597767/>
5. Treatments for Psoriasis: A Journey from Classical to Advanced Therapies. How Far Have We Reached?
Hari, G.; Kishore, A.; Karkala, S.R.P. *European Journal of Pharmacology* 2022, 929, 175147, doi:10.1016/j.ejphar.2022.175147. <https://pubmed.ncbi.nlm.nih.gov/35820531/>
6. Small Extracellular Vesicle-Loaded Bevacizumab Reduces the Frequency of Intravitreal Injection Required for Diabetic Retinopathy.
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7. Modulatory Role of Vitamins A, B3, C, D, and E on Skin Health, Immunity, Microbiome, and Diseases.
Joshi, M.; Hiremath, P.; John, J.; Ranadive, N.; Nandakumar, K.; Mudgal, J. *Pharmacological Reports* 2023, 75, 1096-1114, doi:10.1007/s43440-023-00520-1. <https://pubmed.ncbi.nlm.nih.gov/37673852/>
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Thirupataiah, B.; Bhuktar, H.; Mounika, G.; Reddy, G.S.; Kumar, J.S.; Shukla, S.; Hossain, K.A.; Medishetti, R.; Samarpita, S.; Rasool, M.; et al. *Bioorganic Chemistry* 2022, 121, 105667, doi:10.1016/j.bioorg.2022.105667. <https://pubmed.ncbi.nlm.nih.gov/35182886/>
9. Scopus Based Bibliometric and Scientometric Analysis of Occupational Therapy Publications from 2001 to 2020.
Sau, K.; Nayak, Y. *F1000Research* 2023, 11, 1-21, doi:10.12688/f1000research.108772.1. <https://f1000research.com/articles/11-155>

5. Advancements in Pharmaceutical Sciences

This theme highlights innovations in pharmaceutical sciences, focusing on formulations, pharmacokinetics, and analytical methods. Research includes improving drug solubility and bioavailability using co-amorphous systems, hot-melt extrusion, and polymeric nanoparticles. Studies on nutritional factors and pharmacokinetic interactions in HIV, cancer, and diabetes optimize therapeutic outcomes. Applying Quality-by-Design (QbD) principles to eco-friendly analytical methods reflects a commitment to sustainability, enhancing drug delivery, patient adherence, and therapeutic efficacy.

Publications Under This Theme:

1. Exploring the Utility of Co-Amorphous Materials to Concurrently Improve the Solubility and Permeability of Fexofenadine.
Uppala, S.; Vullendula, S.K.A.; Yarlagadda, D.L.; Dengale, S.J. *Journal of Drug Delivery Science and Technology* 2022, 72, 103431, doi:10.1016/j.jddst.2022.103431.
<https://www.sciencedirect.com/science/article/pii/S1773224722003410>
2. Metamorphosis of Twin Screw Extruder-Based Granulation Technology: Applications Focusing on Its Impact on Conventional Granulation Technology.
Rao, R.R.; Pandey, A.; Hegde, A.R.; Kulkarni, V.I.; Chincholi, C.; Rao, V.; Bhushan, I.; Mutalik, S. *AAPS PharmSciTech* 2022, 23, 1-23, doi:10.1208/s12249-021-02173-w. <https://pubmed.ncbi.nlm.nih.gov/34907508/>
3. Effect of Turmeric Supplementation on the Pharmacokinetics of Paclitaxel in Breast Cancer Patients: A Study with Population Pharmacokinetics Approach.
Kalluru, H.; Mallayasamy, S.R.; Kondaveeti, S.S.; Chandrasekhar, V.; Kalachaveedu, M. *Phytotherapy Research* 2022, 36, 1761-1769, doi:10.1002/ptr.7412. <https://pubmed.ncbi.nlm.nih.gov/35181963/>
4. Enhancing the Oral Bioavailability of Asenapine Maleate with Bio-Enhancer: An in-Silico Assisted in-Vivo Pharmacokinetic Study.
Suresh, A.; Narayan, R.; Tummala, H.P.; Matcha, S.; Mallayasamy, S.; Nayak, Y.; Puralae Channabasavaiah, J.; Nayak, U.Y. *Journal of Drug Delivery Science and Technology* 2022, 70, 103215, doi:10.1016/j.jddst.2022.103215.
<https://www.sciencedirect.com/science/article/pii/S1773224722001253>
5. Solvent Free Twin Screw Processed Silybin Nanophospholipid: In Silico, In Vitro and In Vivo Insights.
Fernandes, G.; Pusuluri, S.L.A.; Nikam, A.N.; Birangal, S.; Shenoy, G.G.; Mutalik, S. *Pharmaceutics* 2022, 14, doi:10.3390/pharmaceutics14122729. <https://pubmed.ncbi.nlm.nih.gov/36559222/>
6. In Vitro, in-Vivo, and in-Silico Investigation of Physicochemical Interactions between Pioglitazone and Rifampicin.
Londhe, O.; Sanjay Mane, S.; Umesh Hirlekar, B.; Subbevarapu, A.; Elsa Viju, A.; Dixit, V.A.; Dengale, S.J. *European Journal of Pharmaceutics and Biopharmaceutics* 2023, 188, 54-65, doi:10.1016/j.ejpb.2023.05.006. .
<https://pubmed.ncbi.nlm.nih.gov/37172696/>
7. Development of Curcumin Nanophytosomes Surface Functionalized with Chondroitin Sulfate-A for Treating K1 Plasmodium Falciparum Drug-Resistant Malaria.
Bhargav, E.; Koteswara, K.B.; Padmanabha Reddy, Y.; Sowmya, C.; Ramalingam, P. *Journal of Drug Delivery Science and Technology* 2023, 87, 104788, doi:10.1016/j.jddst.2023.104788.
<https://www.sciencedirect.com/science/article/pii/S1773224723006408>
8. Quality-by-Design-Based Development of an Eco-Friendly HPLC Method for the Estimation of Nisoldipine in Nanoformulations: Forced Degradation Studies and in-Vitro Release Studies.
Marques, S.M.; Salwa; Kumar, L. *Sustainable Chemistry and Pharmacy* 2023, 36, 101254, doi:10.1016/j.scp.2023.101254. <https://www.sciencedirect.com/science/article/pii/S2352554123002887>
9. Nutritional Aspects of People Living with HIV (PLHIV) Amidst COVID-19 Pandemic: An Insight.
Fathima, A.S.; Madhu, M.; Udaya Kumar, V.; Dhingra, S.; Kumar, N.; Singh, S.; Ravichandiran, V.; Murti, K. *Current Pharmacology Reports* 2022, 8, 350-364, doi:10.1007/s40495-022-00301-z.
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10. The Effect of Nutritional Status on the Pharmacokinetic Profile of Acetaminophen.

Souza, V.D.; Shetty, M.; Badanthadka, M.; Mamatha, B.S.; Vijayanarayana, K. *Toxicology and Applied Pharmacology* 2022, 438, 115888, doi:10.1016/j.taap.2022.115888. <https://pubmed.ncbi.nlm.nih.gov/35065993/>

11. Current Scenario and Strategies to Tackle Cardiovascular Disease Risk in HIV Geriatrics.

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12. Determinants of Medication Non-Adherence Among the Elderly with Co-Existing Hypertension and Type 2 Diabetes Mellitus in Rural Areas of Udipi District in Karnataka, India.

Jeyalakshmi, K.; Rao, M.; Shashidhara, Y.N.; Thunga, G.; Ravishankar, N.; Sudhakar, C.; Devi, E.S. *Patient Preference and Adherence* 2023, 17, 1641-1656, doi:10.2147/PPA.S380784. <https://pubmed.ncbi.nlm.nih.gov/37465058/>

13. Investigation of Drug-Polymer Miscibility and Design of Ternary Solid Dispersions for Oral Bioavailability Enhancement by Hot Melt Extrusion.

Pisay, M.; Navti, P.D.; Rao, V.; Koteswara, K.B.; Mutalik, S. *Journal of Drug Delivery Science and Technology* 2023, 90, 105107, doi:10.1016/j.jddst.2023.105107. <https://www.sciencedirect.com/science/article/pii/S1773224723009590>

14. Phytoestrogenic Potential of Resveratrol by Selective Activation of Estrogen Receptor- α in Osteoblast Cells.

Shah, A.A.; Shah, A.; Kumar, A.; Lakra, A.; Singh, D.; Nayak, Y. *Revista Brasileira de Farmacognosia* 2022, 32, 248-256, doi:10.1007/s43450-022-00239-9. <https://link.springer.com/article/10.1007/s43450-022-00239-9>

15. Wang Resin Catalysed Sonochemical Synthesis of Pyrazolo[4,3-d]Pyrimidinones and 2,3-Dihydroquinazolin-4(1H)-Ones: Identification of Chorismate Mutase Inhibitors Having Effects on Mycobacterium Tuberculosis Cell Viability.

Shukla, S.; Nishanth Rao, R.; Bhuktar, H.; Edwin, R.K.; Jamma, T.; Medishetti, R.; Banerjee, S.; Giliyar, V.B.; Shenoy, G.G.; Oruganti, S.; et al. *Bioorganic Chemistry* 2023, 134, 106452, doi:10.1016/j.bioorg.2023.106452. <https://pubmed.ncbi.nlm.nih.gov/36889201/>

16. A Computational-Based Approach to Fabricate Ceritinib Co-Amorphous System Using a Novel Co-Former Rutin for Bioavailability Enhancement.

Yarlagadda, D.L.; Anand, V.S.K.; Nair, A.R.; Dengale, S.J.; Pandiyan, S.; Mehta, C.H.; Manandhar, S.; Nayak, U.Y.; Bhat, K. *European Journal of Pharmaceutics and Biopharmaceutics* 2023, 190, 220-230, doi:10.1016/j.ejpb.2023.07.019. <https://pubmed.ncbi.nlm.nih.gov/37524214/>

17. Emvolio - A Battery Operated Portable Refrigerator Preserves Biochemical and Haematological Integrity of Biological Samples in Preclinical Studies.

Maity, S.; Aakriti, J.; Manandhar, S.; Anchan, S.B.; Bhat, A.; Shetty, M.U.; Nayak, Y. *F1000Research* 2023, 11, doi:10.12688/f1000research.109134.3. <https://pubmed.ncbi.nlm.nih.gov/37771720/>



6. Miscellaneous Biomedical and Pharmaceutical Research

This category encompasses diverse research topics contributing to biomedical and pharmaceutical fields. It includes systematic reviews of cardioprotective activities, cognitive enhancers like rosemary, and nanoparticle-based delivery for diabetes management. Studies on drug repurposing, bioactive peptides, 3D bioprinting for tissue engineering, and pharmacogenomics in personalized medicine highlight the interdisciplinary nature of modern research. This section captures innovative studies and emerging technologies, reflecting the evolving landscape of scientific inquiry.

Publications Under This Theme:

1. A Systematic Review and Meta-Analysis on the Cardio-Protective Activity of Naringin Based on Pre-Clinical Evidences. Viswanatha, G.L.; Shylaja, H.; Keni, R.; Nandakumar, K.; Rajesh, S. *Phytotherapy Research* 2022, 36, 1064-1092, doi:10.1002/ptr.7368. <https://pubmed.ncbi.nlm.nih.gov/35084066/>
2. Cognition Enhancing Effect of Rosemary (*Rosmarinus Officinalis* L.) in Lab Animal Studies: A Systematic Review and Meta-Analysis. Hussain, S.M.; Syeda, A.F.; Alshammari, M.; Alnasser, S.; Alenzi, N.D.; Alanazi, S.T.; Nandakumar, K. *Brazilian Journal of Medical and Biological Research* 2022, 55, 1-14, doi:10.1590/1414-431X2021e11593. <https://pubmed.ncbi.nlm.nih.gov/35170682/>
3. Medium and Large Scale Preparation of Nanostructured Lipid Carriers of Asenapine Maleate: Quality-by-Design Based Optimization, Production, Characterization and Performance Evaluation. Rao, R.R.; Pisay, M.; Kumar, S.; Kulkarni, S.; Pandey, A.; Kulkarni, V.I.; Mutalik, S. *Journal of Drug Delivery Science and Technology* 2022, 71, 103275, doi:10.1016/j.jddst.2022.103275. <https://www.sciencedirect.com/science/article/pii/S177322472200185X>
4. Thermoreversible Gel of Green Tea Extract: Formulation and Evaluation for the Management of Periodontitis. Hr, R.; Jagwani, S.; Shenoy, P.A.; Jadhav, K.; Shaikh, S.; Mutalik, S.P.; Mullick, P.; Mutalik, S.; Jalalpure, S.; Sikarwar, M.S.; et al. *Journal of Drug Delivery Science and Technology* 2022, 76, 103765, doi:10.1016/j.jddst.2022.103765. <https://www.sciencedirect.com/science/article/pii/S1773224722006761>
5. Epigenetic Basis for PARP Mutagenesis in Glioblastoma: A Review M, A.; Xavier, J.; A S, F.; Bisht, P.; Murti, K.; Ravichandiran, V.; Kumar, N.. *European Journal of Pharmacology* 2023, 938, 175424, doi:10.1016/j.ejphar.2022.175424. <https://pubmed.ncbi.nlm.nih.gov/36442619/>
6. A Bibliometric Analysis of Publication Output in Selected South American Countries. Narayan, A.; Chogtu, B.; Janodia, M.; Radhakrishnan, R.; Venkata, S.K. *F1000Research* 2023, 12, 1-14, doi:10.12688/f1000research.134574.1. <https://pubmed.ncbi.nlm.nih.gov/38059135/>
7. Review on 505(b)(2) Drug Products Approved by USFDA from 2010 to 2020 Emphasizing Intellectual Property and Regulatory Considerations for Reformulations and New Combinations. Ravula, J.D.; Nirogi, R.; Janodia, M.D. *Journal of Pharmaceutical Sciences* 2023, 112, 2146-2175, doi:10.1016/j.xphs.2023.04.004. . <https://pubmed.ncbi.nlm.nih.gov/37040834/>





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