EDITORIAL

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TRANSFORMING MODERN PHARMACEUTICS: EMERGING INNOVATIONS IN DRUG DELIVERY AND FORMULATION SCIENCE

Pharmaceutics has undergone a remarkable transformation over the past few decades, evolving from traditional dosage form design into a multidisciplinary field that integrates materials science, biotechnology, and nanotechnology. The expanding pharmaceutical landscape now relies on advanced drug delivery systems to achieve better treatment results through improved effectiveness and better patient adherence. Modern pharmaceutics therefore focuses not only on drug formulation but also on optimizing drug targeting, controlled release, and patient-specific therapy. The field has reached a major milestone through the introduction of nanotechnology-based drug delivery systems. Pharmaceutical research has focused on nanocarriers because they enhance drug solubility and stability and bioavailability through their polymeric nanoparticles and liposomes and dendrimers and nanogels. The nanoscale systems enable engineers to design systems which achieve controlled drug release and targeted delivery and enhanced pharmacokinetic profiles. The new intelligent delivery platforms enable medical professionals to provide individualized treatment by responding to changes in pH levels and temperature and enzymatic activity. Pharmaceutical research advances through the creation of new drug delivery systems which improve treatment effectiveness and patient treatment compliance. The use of mini-tablets and orally disintegrating tablets and transdermal patches and sustained-release implants enables medical professionals to solve the problems which conventional medication delivery systems create. The modern drug delivery systems enhance drug stability and absorption while enabling medical staff to provide suitable dosage options for different patient groups, especially children and elderly people. Research in drug delivery has advanced because of improvements in polymer science and biomaterials research. Scientists currently study biodegradable polymers and hydrogels and stimuli-responsive materials to develop intelligent drug delivery systems which control how drugs are released while enhancing the effectiveness of powerful drugs. The development of targeted drug delivery systems constitutes an important scientific advancement which enables doctors to deliver medications directly to particular body areas while reducing harmful effects on the entire body. The Indian Research Journal of Pharmacy and Science has published a new issue which invites researchers to submit their work on current developments in drug delivery and pharmaceutics. Pharmaceutical science will advance because researchers study nanocarrier systems and develop new dosage forms and create polymer-based therapeutics and develop targeted drug delivery systems and advanced pharmaceutical manufacturing methods. The development of safer and more effective and patient-focused treatments will depend on ongoing innovations in the field of pharmaceutics.

Mr. Saptarshi Dutta
Associate Professor
Mata Gujri College of Pharmacy
Kishanganj, Bihar, 855107, India
E-mail: saptorshidutta@gmail.com

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