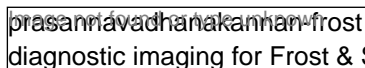


Innovation in drug delivery system is in a constant state of evolution'

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One of the notable advances transforming the field of pharmacotherapy is biopharmaceuticals, which comprise therapies derived from biological sources such as living cells or animal tissues. As the large and complex molecules (mainly sugars, proteins, and nucleic acids) are easily denatured, or altered, with harsh handling and processing, in most cases, oral drug delivery fails to be an adoptable option. Further, the physical properties of many biologics, such as high viscosity and the necessity of injection of volumes up to 1 milliliter, are driving the market for improved drug delivery devices.

Innovation in drug delivery systems design is in a constant state of evolution as manufacturers strive to meet the ever-changing demand for safe, functional and user-friendly devices.

Drug delivery devices enable the treatment and prevention of a wide variety of diseases that include diabetes, cancer, autoimmune disorders and infectious diseases. Targeted delivery of the drug to the intended site is a key factor that is necessitating the development of various forms of drug delivery in order to reduce the systemic exposure of certain drugs, thereby, minimizing the side effects.

The current drug delivery device portfolio is filled with numerous non-invasive product candidates targeting a wide spectrum

of disease indications. Devices targeting infectious diseases and cancer top the list, followed closely by autoimmune disorders, such as rheumatoid arthritis and multiple sclerosis, along with cardiovascular and hematology indications like heart failure, thrombosis, and anemia.

Numerous corporate developments and research initiatives are being undertaken globally to improve targeted drug delivery, which involves delivery of drug to specific sites on disease infected cells, thereby controlling the dosage and improving the pharmacological properties.

Targeted drug delivery aims at achieving high, local concentrations of drugs, and the possibility to track the drug's action at a target site. Since the drug is delivered to the target site, this method of drug delivery does not cause damage to normal tissues and helps prevent drug resistance and metastasis, which is quite common in disease indications.

The market for new targeted delivery technologies is growing at a rapid pace as pharmaceutical companies are realizing the importance of effective formulation and delivery strategies to reduce the side effects of drugs, lower the dosage, and work on cost effectiveness and safety reasons.

Generic products that face commoditization and increasing competition can create a niche in the market by differentiating themselves based on the delivery mode and can help create a unique patenting strategy. Some of the main advantages of using targeted delivery systems are improvement of drug solubility, reduced systemic toxicity, better bioavailability, and ability to target specific receptors and act on specific pathways, simultaneous imaging, and targeting.