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ASIA EDITION

FROM TRADITIONAL TO ADVANCED: Drug delivery market on the growth curve in Asia

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Advanced drug delivery technologies hold a major part of drug delivery market and will play a major role in shaping the future of drug delivery domain



The field of drug delivery is highly interdisciplinary. This science of delivering a pharmaceutical compound in the human body to achieve the therapeutic effect is complicated yet extremely important for pharma industry. With advancement in technology, practice of drug delivery has changed a lot in the past few decades and still changing.

Novel drug delivery systems like targeted delivery and drug-device combinations are now attracting more and more attention in drug development as against the traditional ways of drug delivery systems based on the route of administration like oral, injectable, transdermal, inhalation, implant, ophthalmic and optic dosage forms.

“Targeted and controlled drug delivery is one of the most innovative mechanisms to deliver uniform dose of medicines with reduced administration frequency and lesser side effects” said Dr Mradul Kaushik, Director Operations and Planning, BLK Super Speciality Hospital. He further said that though at a higher cost, these modes have primarily been used in cancer therapy, diabetes management, cardiovascular conditions and some infective diseases.

Asian markets specifically South East Asia have been slow to adopt these modalities primarily for cost reasons. “However the prices have come down significantly in last few years making these within reach of many if not all patients,” said Dr Mradul Kaushik.

Commenting on the same Zarine Khety, headclinical pharmacy and scientific officer, clinical research, Saifee Hospital said, “Evolution of drug delivery and with it medication management has been the mainstay of medical therapy globally since times immemorial. Mankind has seen the evolution and use of medical treatments in the form of raw herbs crushed on stones and just applied topically to the modern day very targeted, nanospecific drug deliveries in the form of formulations.”

Market Watch

APAC Injectable drug delivery market is estimated at $ 154.0 billion in 2016 and is projected to reach $ 143.1 billion by 2024 at a CAGR of 12.4 % during the forecast period from 2017 to 2024, according to Data Bridge market research report.

In another report by Market Monitor, “The Asian Injectable Drug Delivery Devices Market, mainly driven by a growing prevalence of target disease segments such as diabetes, multiple sclerosis, Crohn’s disease, rheumatoid arthritis, psoriasis, reproductive diseases and cancer was valued at $2.1 billion in 2013 and expected to be $4.1 billion by 2018, growing at a CAGR of 14.4%.”

Commenting on the same Dr Daryl Tan, Specialist in Haematology and Consultant, Raffles Cancer Centre, Singapore said, “This is not surprising to me considering the population and market size of Asia. With increasing affluence, many novel drugs that were previously unaffordable are now commonly prescribed in Asia.”

“The advanced drug delivery market is expected to increase from about $178.8 billion in 2015 to nearly $227.3 billion in 2020, reflecting a five-year compound annual growth rate (CAGR) of 4.9%, according to a March 2016 analysis by BCC Research. North America leads the global advanced drug-delivery market, followed by Europe. Asia-Pacific is projected to grow the fastest during the forecast period with a five-year CAGR of 6.4%”, according to a March 2016 analysis by BCC Research.

Dr Rajeev Bhoudhankar, CEO Bhatia Hospital said, “The pharmaceutical markets in China are growing rapidly, owing to low costs and favourable regulatory environment. The Chinese pharmaceutical market was ranked third-largest (by value) with $64 billion, and is expected to become the second-largest by 2015, projected to grow at a CAGR of 20 %.”

Drug delivery systems used in current medical practice

Number of new drug delivery systems have been designed and developed by pharmaceutical companies with improved therapeutic effectiveness of the drug, safety and improved patient compliance with reduced toxicity. Some of the popular drug delivery systems like oral controlled delivery system, site targeted delivery system, feedback regulated delivery system are helping the pharma companies in an excellent way.

“Development of new forms of drug delivery systems has an impact on all branches of medicine like oncology, cardiology, and immunology and pain management. Drug delivery systems (DDSs) that can target drugs to specific body sites or precisely control drug release rates for prolonged times available as extended release, sustained release, etc. have become a practical reality since the 1990s,” added Zarine Khety.

Generally, drug delivery system is differentiated according to various factors like physical state (gaseous, liquid, semisolid and solid dosage forms), route of administration (Oral drug delivery, first pass metabolism) and mechanism of drug release.

A drug can enter into the body either through direct entry into the body, entry into the body by overcoming the skin, entry into the body by overcoming mucosal membranes and the oral route which is the most convenient route for drug delivery.

Future of drug delivery systems

Advanced drug delivery technologies hold a major part of drug delivery market and will play a major role in shaping the future of drug delivery domain and also in finding the cure for diseases like diabetes and cancer.

“Inhaled insulin, Insulin buccal sprays, Phytobiochemicals, Nanotechnological systems and Oral insulin all are currently under trials and it seems that day is not far when we should be able to manage diabetes more conveniently and for more sustained therapeutic effect,” said Dr Mradul Kaushik.

“However, in various types of cancers the intent has been to deliver optimal therapeutic dose to cancer cells directly with no or minimal systemic effects. Various types of carriers like nanoparticles, monoclonal antibodies etc. have been developed and are being used successfully in cancer therapy. It will be very crucial to develop these Drug Delivery Systems (DDS) for cancer treatments,” he added.

BCC analysis says, “Advanced drug delivery technologies have been a boon for the market as advanced formulations have proven to increase the efficiency and efficacy of drug-delivery systems, resulting in better outcome of treatments. Advanced drug-delivery systems have become what the firm deems. The market is growing at a moderately healthy rate that should continue for the next five years. The market is not expected to saturate any time soon.”

Promising higher efficacy, localised treatment of diseases, duration of drug delivery, convenient routes of administration and better targeting and lower dosing frequency, fields like gene therapy and nanotechnology are expected to open up further opportunities for growth.

However Dr Daryl believes that, “Different countries have different healthcare administration and policies. For example, in Singapore and Hong Kong, drug approvals usually take on average about 1-2 years after FDA approvals. For other countries, various other factors such as industry representation and activeness play a part. Countries like Japan and China require domestic data before drug approvals.”

Nano & Micro Technology

Nano and micro are considered as most promising tools for the targeted delivery of drugs to specific anatomical sites. In particular, nanomedicine, which refers to the application of nanotechnology to medicine is gaining a lot of attention because of its focussed imaging, early diagnosis, pathological tissue analysis and most importantly its applications in drug delivery.

Smart nanotubes that encapsulate drug and then open up to deliver a drug in a particular location in response to a stimulus and also microprocessors that are capable enough to deliver drug at predetermined times are some of the areas with promising amount of research happening. “Nanoparticles of different sizes and forms are extensively used in the targeted or site-specific release of chemotherapeutic agents, owing to their biocompatible and /or biomimetic features and their physical and chemical characteristics,” Dr Bhoudhankar.

“Major types of nanomaterial-based drug delivery systems comprise the liposomes, synthetic copolymers of drugs or RNA molecules and functionally labelled nanoparticles. However, these delivery systems find practical relevance only in the treatments involving biological therapeutic agents,” he also added.

Biologicals

Biologicals have gained a lot of momentum in past decade. Human monoclonal antibiotics, particularly their derivatives are a rapidly growing category of targeted therapeutic agents. Apart from this, small interfering RNA, cytokines, enzymes and a variety of peptide drugs are among the most studied biological.

According to a research paper published in PubMed, “Currently, there are about 200 therapeutic proteins in the market, of which about 10% have been rationally designed in respect to their pharmacokinetics. For example, over 20 monoclonal antibodies have been approved by the US Food and Drug Administration and the European Medicines Agency and are currently the fastest growing category of targeted therapeutic agents and are expected to retain the same attractiveness.”

“Recent research in drug development has evolved sophisticated and highly potent drugs comprising biological molecules (biologics), such as proteins, DNA, RNA and lipids for the treatment of challenging diseases like cancer, certain genetic disorders, etc. Stability and toxicity are the formidable challenges associated with these drugs,” said Dr Bhoudhankar.

Conclusion

Although in recent years, information technology has been combined with health care and pharma fields and has started to establish a foundation for personalised medicines but with number of challenges. Advanced form of drug delivery system is helping to a great extent but still they haven’t replaced the traditional ways completely. Developing and designing a drug delivery system but also focussing equally on overcoming the challenges is the need of the hour.