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NANOTECHNOLOGY DEPENDENT DRUG DELIVERY SYSTEMS: A REVIEW PAPER

Bhupinder Bhyan
Department of Pharmacy
Teerthanker Mahaveer University, Moradabad, Uttar Pradesh, India

ABSTRACT: ***Nanomedicine and nano delivery systems are a relatively new yet rapidly evolving science in which nanoscale materials are used to serve as diagnostic instruments or to supply therapeutic agents in a managed manner to determine targeted locations. In the treatment of chronic human diseases, nanotechnology provides many advantages by site-specific and target-oriented delivery of precise drugs. A variety of outstanding applications of nanomedicine (chemotherapeutic agents, biological agents, immunotherapy agents, etc.) have recently been reported in the treatment of different diseases. The current review provides an updated overview of recent developments in the field of nanomedicine and nano-based drug delivery systems through thorough scrutiny of the discovery and use of nanomaterial's to enhance both the effectiveness of new and old drugs (e.g., natural products) and selective diagnosis through molecules of disease markers. Nan medicine's prospects and problems are also addressed in the delivery of drugs from synthetic/natural sources to their clinical applications. In addition, we have included data on developments and viewpoints in the field of nanomedicine.***

KEYWORDS: ***Compounds, Drugs, Medicines, Materials, Nanomedicine.***

INTRODUCTION

Since ancient times, humans have widely used plant based natural products as medicines against various diseases. Modern medicines are mainly derived from herbs on the basis of traditional knowledge and practices. Nearly, 25% of the major pharmaceutical compounds and their derivatives available today are obtained from natural resources. Figure 1 illustrates the application of the nanomedicine in diverse range of the biomedical investigation[1].

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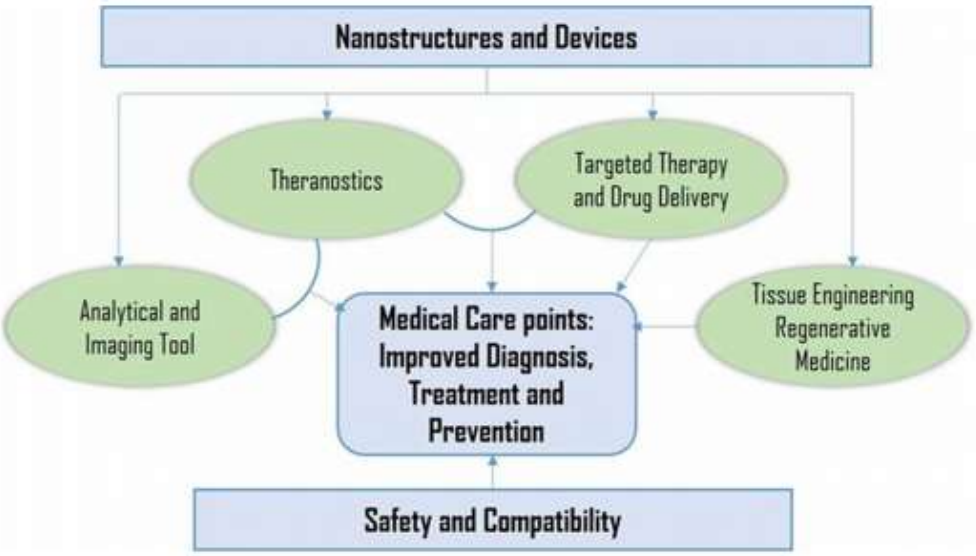

Figure 1: Illustrates the application of the nanomedicine in diverse range of the biomedical investigation.

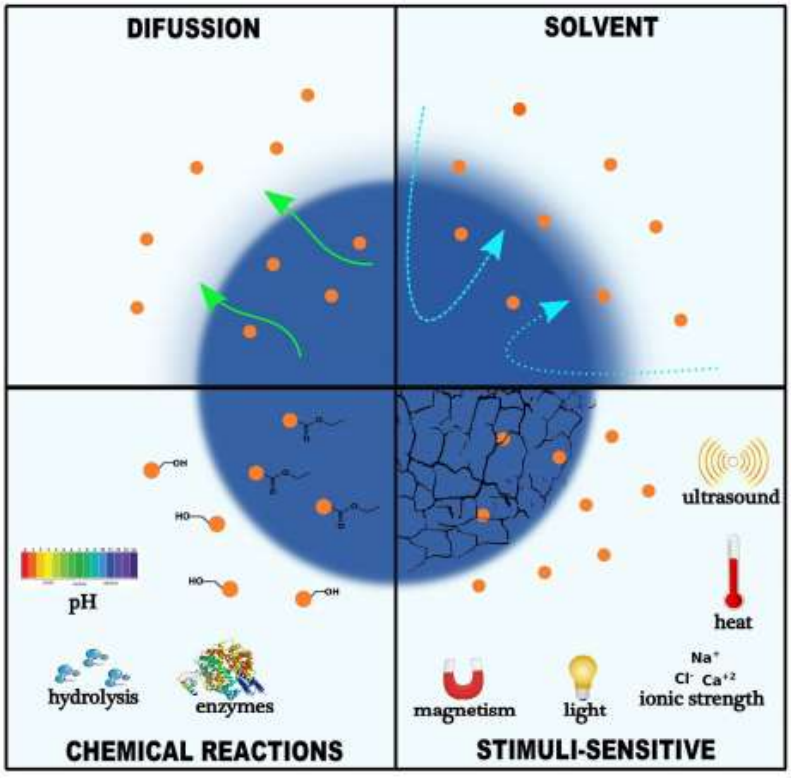

Figure 2: Depicts the mechanisms for controlled release of drugs.

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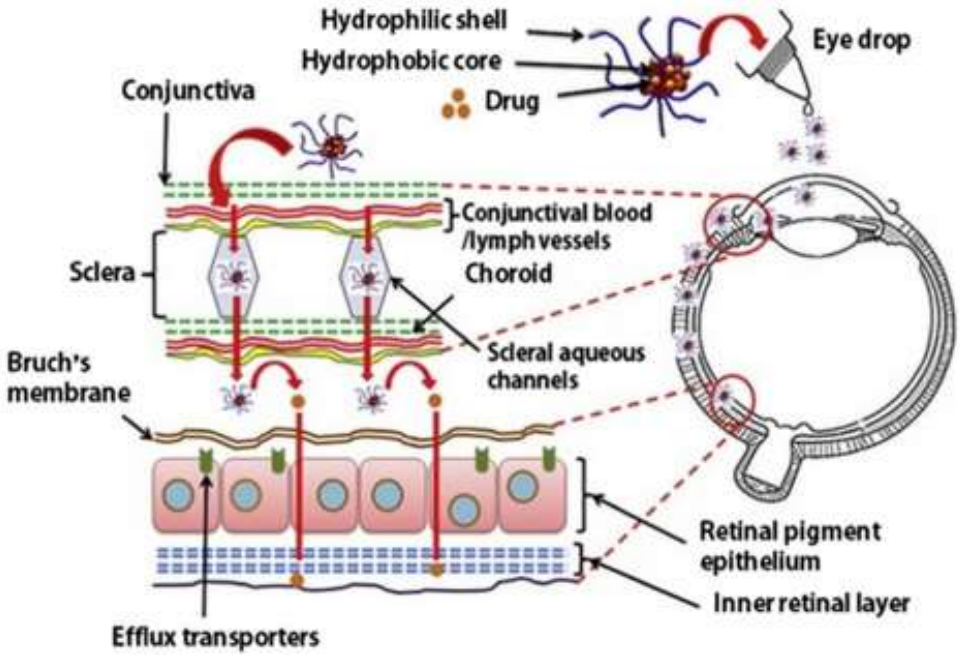

Figure 3: Depicts the polymeric micelles utilized for the reaching the posterior ocular tissues[2]**.**

A base for the development of new drugs is natural compounds of various molecular backgrounds. The interest in developing synthetically suitable lead molecules, which imitate the chemistry of their counterparts, has been a recent development in the discovery of natural product-based drugs. Natural products display impressive characteristics, such as excellent chemical diversity, macromolecular-specific chemical and biological properties and less toxicity.

In the discovery of novel drugs, these make them favorable leads. Computational studies have also helped to envisage molecular drug interactions and to establish drug technologies for the next decade, such as target-based drug discovery and drug delivery. Pharmaceutical companies are reluctant to invest further in natural product-based drug development and drug delivery technologies, considering many benefits, and instead exploit the existing libraries of chemical compounds to discover new drugs[3]. However, natural substances, including cancer, diabetes, cardiovascular, inflammatory, and microbial diseases, are now being studied for the treatment of many major diseases. This is mostly because there are specific benefits of natural medicines, such as reduced toxicity and side effects, low costs, and good therapeutic ability[4]. Concerns regarding the biocompatibility and toxicity of natural substances, however, present a greater challenge when it comes to using them as medicine. As a result, due to these issues, many natural substances do not clear the phases of the clinical trial[5].

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DISCUSSION

Figure 2 depicts the mechanisms for controlled release of drugs. Figure 3 depicts the polymeric micelles utilized for the reaching the posterior ocular tissues. Figure 4 illustrates the different sources of natural biopolymers utilized in nanomedicine applications.

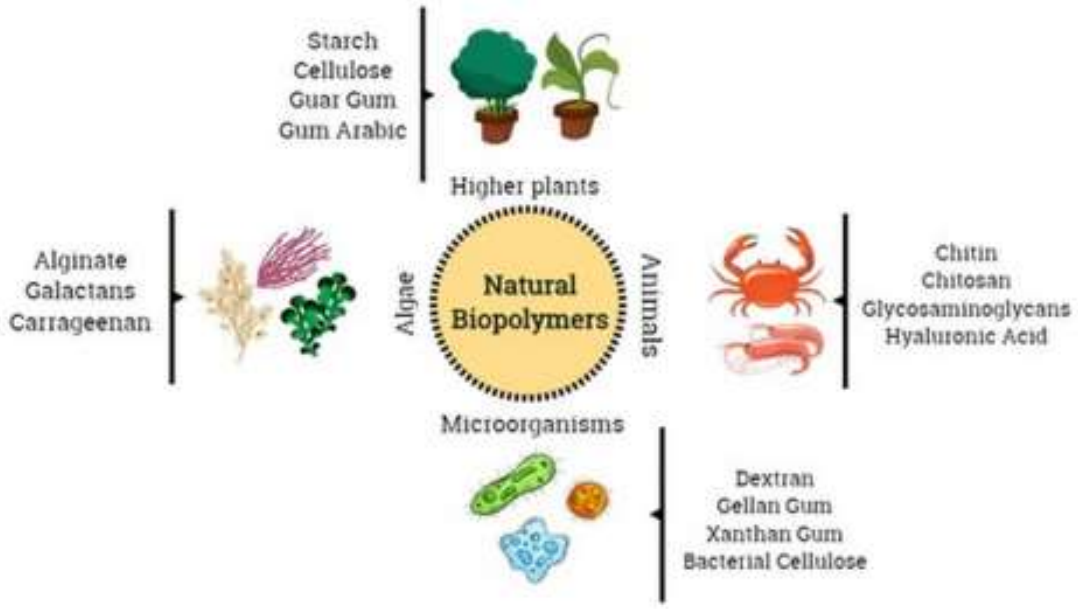

Figure 4: Illustrates the different sources of natural biopolymers utilized in nanomedicine applications.

The use of large-scale drug delivery materials presents significant challenges, including in vivo volatility, poor bioavailability, and poor solubility, poor body absorption, target-specific delivery problems, tonic efficacy, and possible drug adverse effects. Therefore, it could be a choice to use modern drug delivery technologies to target drugs to classify body parts that could address these crucial problems. Therefore, in advanced medicine/drug formulations, nanotechnology plays an important role, targeting the arena and its controlled release of drugs and delivery with immense success. By applying nanostructures and nanophases to various fields of science, nanotechnology has been shown to bridge the barrier of biological and physical sciences, especially in nanomedicine and nano-based drug delivery systems where such particles are of major interest. Nanomaterial's can be well characterized as a material with sizes ranging from 1 to 100 nm that affects the frontiers of nanomedicine, beginning with biosensors, microfluidics, drug delivery and tissue engineering microarray studies. To build nanomedicine, nanotechnology employs curative agents at the nanoscale stage[6].

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CONCLUSION

Recent developments in nanomedicine, including technical advancement in the delivery of old and new medicines, as well as novel diagnostic methodologies, are addressed in the current study. A variety of nano-dimensional materials have been illustrated, including nanorobots and nanosensors that are applicable for diagnosing, accurately distributing, sensing or triggering materials in a live system. The use of nanotechnology was initially primarily focused on improving drug solubility, absorption, bioavailability, and controlled-release. Although the discovery of nanodrugs is subject to high levels of uncertainty, and the discovery of pharmacologically active compounds from natural sources is not a preferred choice today, as opposed to some 50 years ago, it has become a common feature to enhance the effectiveness of known natural bioactive compounds through nanotechnology.

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