

Utilization of Drug Delivery Technologies & Screening in Present Day Drug Development and Discovery

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Abstract

In this following thesis the technologies that offer an effectiveness and efficiency during drug delivery will be discussed in an explained and detailed way. Drug delivery can be considered towards the engagement in order to manufacture systems, formulation, storage systems or inventory and other critical technologies that can offer sufficient work efficiency and smoothness in the area of transporting towards the destined site. This essential movement provides desired therapeutic effects in requirement of drug development and delivering a pharmaceutical compound towards the target area.

Keywords

Drug development, Drug, Pharmaceutical, Technologies, transportation.

INTRODUCTION

In order to gain critical effect in the segment of delivering of therapeutic agents towards the targeted site or controlled release of the pharmaceutical components, drug delivery systems can be considered as engineered technologies. Current drug development success rate in the segment of preclinical is 31.8% in academia. In addition the success rate is 75.1% for phase 1, Phase 2 contains 50% of success rate and phase 3 comes with 58.6%. In the area of emerging a suitable drug delivery system, there are several issues that can be experienced during the transportation of drugs towards the destined body location with an efficient amount. As an example to this, there are error factors in order to protein drug delivery. There are issues such as bioavailability hurdles towards the imperfectly clinical applicants, generating a rational formulation design in requirement of poorly soluble compounds and other novel approaches in the area of imperfect drug soluble transportation.

An inappropriate drug delivery system can cause several tissue or cell damages towards the target body location with a negative effect. In this area of drug transportation there are several issues can be explored that are mentioned below-

- Overcoming challenges in requirement of drug delivery of imperfect soluble agents.
- Critical error factors in protein drug delivery.
- Addictive nature of the soluble drugs and the negative impact towards the patient or the users.
- Critical issues in the area of rational formulation for soluble drug compounds with efficient amounts of dose.

Aims and objectives

- To overcome the challenges in poorly soluble drug delivery
- To construct an effective rationale formulation for imperfect soluble drug compounds
- To avoid the addictive nature of excessive drug usage
- To overcome the obstacles in mass availability of the drugs for the poorly soluble clinical patients.

LITERATURE REVIEW

Utilization of drug delivery technology

In terms of expanding lives and enhancing the external and internal health conditions with more effectiveness, drug delivery technologies have a positive effect in this area. Recent drug development success rate in the segment of *NDA* and *BIA* indicates the amount of 87.5% in the area of drug delivery systems [10]. In order to monitor or screening the parameters that are relevant to the health conditions, and transport the pharmaceutical agents towards the target site of the body location, the drug delivery system plays a critical role in the segment. Moreover, utilizing the proper and suitable drug delivery systems can offer several beneficial factors in the area of pharmaceutical compound provision. The advantages of using the drug transportation technologies are mentioned below-

- The drug administration towards the target body location can be untangled through using the drug delivery system in order to enhance the health condition and life expansion.
- Using the drug transportation system can offer a

clear vision that indicates a smaller amount of drug administration with an efficient dose in order to claim the desired therapeutic effects in the area.

- Reducing the volume of distribution of drugs can have a massive impact in terms of reducing the toxicity of the drugs by targeting and drug transportation
- Nanotechnologies in the segment of drug delivery systems contain the potential to offer solutions towards different critical health issues such as cancer because of their sizes.

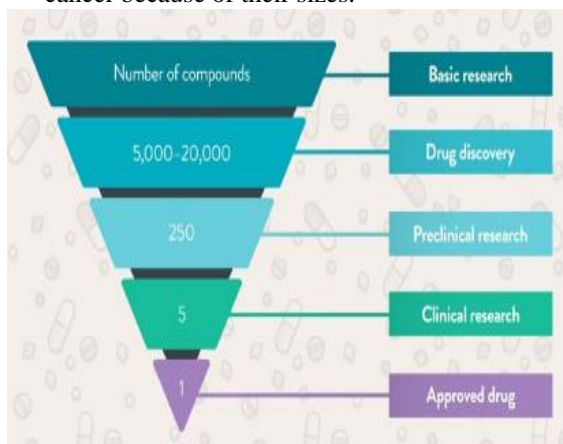


Figure.1 Exploring drug development Process (Source: [17])

Current drug development and discovery

Nowadays, the drug development experts have emerged several strategies in terms of developing the next generation of drug delivery technologies. Moreover, through utilization of the drug delivery technologies, the chance of exploring the different layers of drug development can be enhanced in an effective way (Patra *et al.* 2018). Therefore, **DDS** or drug delivery system offers indubitable benefits in the requirement of drug administration. New approaches and technologies have been suggested from the past three decades in order to enhance the carrier and future scopes of the drug delivery system. As compared to the current expenses for drug delivery systems improvement such as the amount of **\$1,430.5 billion**, it can rise up to **\$2, 015 billion** dollars by the end of 2025 [16]. On the other hand, adoption of new and upgraded technologies based on multidisciplinary engagements looks forward to generating a broad range of personalized treatments that can have a positive effect in reducing the highly prevalent diseases such as diabetes and cancer.

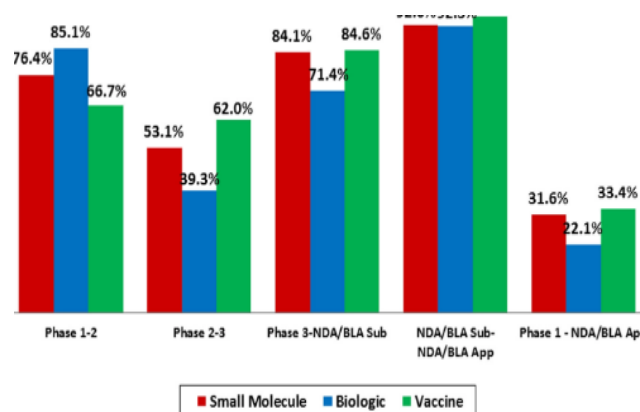


Figure 2. Development of times and approval success rate for drugs (Source: [4])

Therefore, it is important to implement major changes in the area of drug delivery and development through using proper approaches and technologies such as Genome sequencing [17]. On the other hand, through emerging critical strategies and changes in terms of enhancing the value of next generation clinical sequencing towards the drug developers, different layers of drug developing and delivering systems can be explored. Therefore, the emergence of new and strategic approaches towards the field of drug delivery systems and drug development can have a massive impact over obtaining pharmaceutical success with a positive effect in current days. According to [6], the drug development of drug transportation systems and enhancing the efficiency in the area of exploring new layers of drug invention required new approaches and technologies in terms of mitigating critical diseases such as cancer, internal and external infections and diabetes.

METHODOLOGIES

Research philosophy

For this research study, **positivism research philosophy** has been selected as this offers an observative viewpoint towards the research topic [2]. In order to extract information and other critical data that can explain the error factors in drug delivery systems and the issues during the utilization of drug transport technologies, positivism research philosophy can offer a clear outline over this topic.

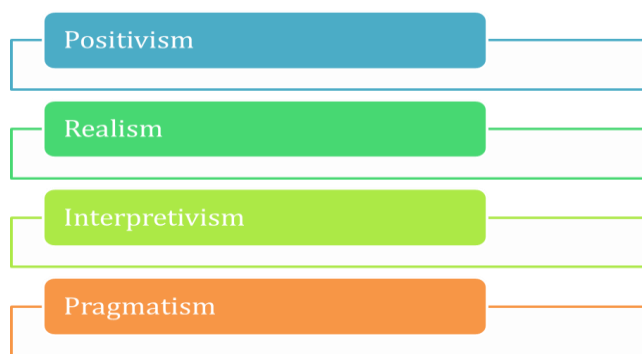


Figure 3. Research Philosophy
(Source: [2]).

Research approach

For this research study *deductive research approach* has been chosen in order to extract critical information about the drug delivery system issues and development of the poorly soluble drug compounds with more effectiveness. As per the words of Plikas *et al.* (2017), the adoption of deductive research approach can offer the information or the data can be found from different authentic sources such as previous articles, journals and newspapers. The deductive research approach is suitable for this research study as this offers a critical overview about the entire study infrastructure by analyzing and comparing the earlier data that are relevant to the topic.

Research design

Descriptive research design has been selected for this research study in terms of gaining more understanding about the nature and the phenomenon of the drug transportation system and technologies with more efficiency and a positive effect [15]. Deductive research design has been selected for this study because it offers a deep overview about different layers of circumstances among the entire research infrastructure in an explained and detailed way.

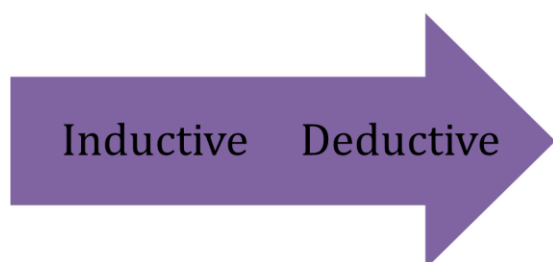


Figure 4. Research design
(Source: influenced by [15]).

Data collection method

Due to the COVID-19 pandemic situation, the *secondary* and *quantitative* data collection method has been chosen because the information and the critical data can be gathered from authentic resources such as newspapers, previous

articles, journals of other experts and other resources that are published after 2012 [19]. On the other hand, the secondary data collection method is based on extracting the critical information or data from the previous theories and hypotheses that are relevant to the research study [7]. This offers a detailed overview about the issues of utilizing the drug delivery technologies in terms of implementing major changes in the area.

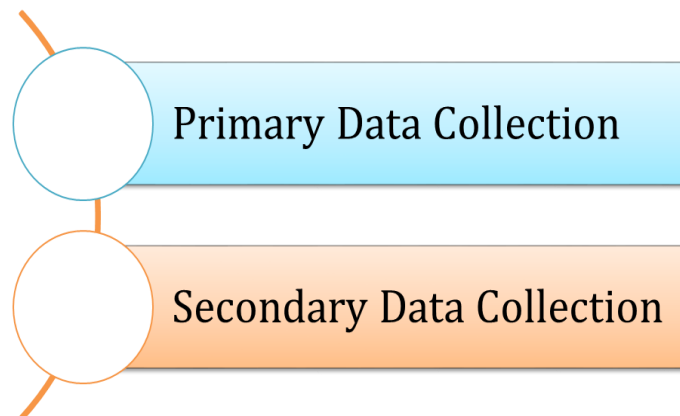


Figure 5. Data Collection methods
(Source: influenced by [7])

FINDINGS AND DATA ANALYSIS

Mitigating challenges in imperfect soluble drug delivery

From this entire research study, a critical overview about avoiding the challenges in the area of poorly soluble drug delivery has been explained and discussed in an elaborated way. Among the major challenges in drug transportation, 2 out of 4 critical issues have been identified as poorly drug soluble agent delivery. In the segment of imperfect water-soluble drug delivery, new approaches and technologies need to emerge in order to gain more success in terms of obtaining therapeutic success towards the clinical candidate [11]. As per the research study, the extracted information states that there is a necessity to adopt new and upgraded technologies such as AmBisome and Doxil in terms of avoiding the issues in terms of delivering protein soluble drugs [1]. Through emerging different approaches and analysing the error factors during the poorly soluble drug delivery, the reduction of the challenges can be explored with more efficiency and effectiveness.

Overcoming the addictive nature of excessive drug usages and other obstacles in drug transportation through drug delivery system development and drug improvement

The entire research study contains a clear explanation about the error factors in drug delivery systems such as the addictive nature of the drugs has been discussed in an effective way. In order to mitigate the obstacles there is a necessity to adopt strategies in terms of drug delivery and provision of the drugs within an efficient and suitable amount towards the clinical candidates. As per the research, there are several strategies and approaches that can be adopted in terms

of reducing the rate of drug addiction caused by the excessive usage and intake of inappropriate amounts of drug compounds [8]. Moreover, the cognitive behavioural theory, detoxification can be used in order to avoid drug addiction. According to the entire thesis, the entire infrastructure offers a deep overview about recent drug development as well as enhancing drug delivery technologies and screening as this can have a positive effect over the medical segment and gain pharmaceutical success.

Important of drug delivery improvement in present day

As per the entire research study, it indicates the importance of development of the drug transportation system in recent days. Drugs have been used for the past few decades in order to reduce the critical diseases such as diabetes, cancer and other critical diseases. Developing the drugs and improving the drug delivery system can enable a wide range of beneficial factors towards the medical industry through offering proper medical observation and monitoring through the technologies [3]. Different and critical layers of drug delivery technologies improvement has been discussed among the entire thesis as this provides a deep insight about the necessity of drug development and discovery.

In order to meet with the development of the drug delivery systems and screening in the present day, there are different kinds of technologies and strategies that can be adopted. According to [9], through using *stimuli responsive strategy*, *controlled drug released through stimuli responsive technologies*, develop penetration through using *stimuli responsive technologies* and Co-delivery strategies *theranostics* can enhance the drug delivery system with a positive effect.

Discussion

There are different types of drug delivery systems available in terms of control of the drug release towards the desired destination. According to [18], in order to evaluate the measurement of critical amounts of drug dose by targeting, there is a necessity in terms of emerging suitable drug transportation strategies such as *AmBisome* (Trade name - Amphotericin B), *Doxil* (Trade name-Doxorubicin). On the other hand, drug delivery technologies have provided a long range of approaches in terms of developing different layers of pharmaceutical products. There is a necessity to implement major changes in the area of developing the recent status of drug exploration and delivery systems in order to reduce the negative impacts towards the soluble clinical candidates. Upgraded technologies and innovation is required for the enhancement of the drug delivery system and discovering next generation drugs in terms of obtaining pharmaceutical success in the area.

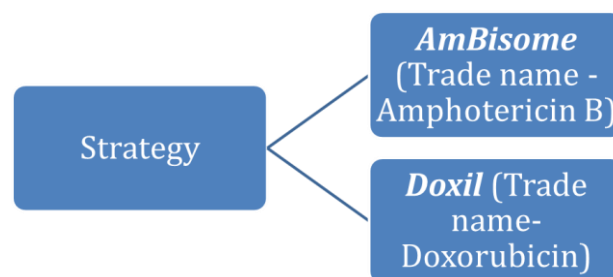


Figure 6. Types of strategies for drug transportation
(Source: [18])

In the area of improving the external and internal health condition, drugs have been used for a long time as this helps to extend lives. In order to control the rate of the location in the body that the drug is released and the amount of drug is released, drug delivery technologies have a massive and positive impact in the area. The extracted information from this entire thesis indicates that there is a necessity in terms of implementing major changes in the area of the modern day drug delivery system and drug development strategies through emerging new and upgraded technologies [5]. Several difficulties can be experienced during the time of poorly soluble drug compound provision towards the clinically candidates. Therefore, there is a necessity

CONCLUSIONS

The entire thesis is based on the clear elaboration of utilization of drug delivering technologies and screening. On the other hand, the entire thesis infrastructure is constructed on the basis of present day drug development and exploitation of different layers in discovering next generation drugs with more effectiveness and efficiency. Moreover, the research study indicates towards implementing major changes in the area of drug delivery strategies through adopting several strategies such as *stimuli responsive strategy*, enhanced uptake and penetration level through adopting *stimuli responsive technologies*. Drug delivery systems have formulated on the basis of investigating *Nasal* and *pulmonary delivery* that includes critical platforms or different target sites such as *cyclodextrins*, *prodrugs*, *gels*, *liposomes*, *proliposomes*, *microspheres* and among others. In terms of increasing the medical and pharmaceutical efficiencies, the development of drug delivery systems have taken place of more concern nowadays. Through offering appropriate amounts of drug dose towards the imperfect clinical candidates can offer benefits such as enhancing the immune system, expanding life and avoiding critical diseases such as cancers with more efficiency and effectiveness. In order to gain more success in the area of medical industry, drug development and drug delivery technologies needs to be enhanced and improved in terms of increasing the success rate along with avoiding different obstacles during the soluble drug delivery.

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