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Chapter

Drug Delivery through Targeted Approach with Special References to Phytosomes

Mahendra Rana, Aadesh Kumar and Amita J. Rana

Abstract

Novel drug delivery is a great tool to deliver the drug at a specific site of action by the means of specific drug carrier like Solid-lipid Nanoparticles, Nano-structured lipid carriers, lipid vesicles, liposomes, phytosomes and ethosomes. Every carrier used in novel drug delivery system to deliver the drug at targeted site requires some special formulation techniques. These techniques help the drug carrier to deliver the active drug at targeted site, by reducing the side-effect, minimizing the dose, increasing the absorption and increasing the efficacy of the drug. There is a recent upsurge to move “back to nature” for healing body ailments because the report states that conventional treatment cause various side effects to the human body after prolonged used. Various novel drug delivery vesicles/somes are being used for the delivery of phytoconstitutents to the targeted site of action. Phytosome is one of the more reliable and best option for the delivery of herbal constituent to the targeted site. The combination of Novel drug delivery with the transdermal route may be a good idea having fast and targeted delivery of drug.

Many health challenges like skin diseases, skin burns, migraine, allergies, cardiac problems, diabetes and trauma like bone fracture could be easily managed by the combination of novel drug delivery and the transdermal route in future.

Keywords: novel drug delivery, Phytosomes, herbal products, trauma, lipid vesicles, trandermal route

1. Background

With the advent of civilization Human beings have demonstrated their dependence on Nature and plant to fulfill all basic needs. In an eventuality of an infirmity, diseased situation or healing of body ailments the use the plant based remedies had been on the anvil. With the passing of time the knowledge of healing from natural resources developed into science of healing and was documented in India as Ayurveda. The other world event over had similar chronological developments that led to the validation of the traditional knowledge of healing, that strength of herbal formulations for the treatment of disease and body ailments. Most of the herbal formulations are administered via oral route and are poorly absorbed due to hydrophobic behavior which leads to decreased bioavailability and increased systemic clearance. Repeated administration or dose increment is required to maintain the therapeutic efficacy thereby limiting the use of herbal medicines [1]. Commonly, the herbal medicines utilize crude powders, extracts be formulation...
in accordance to the statutory compendia which might not be needed in large doses, limited route of drug administration but also could be less effective than the contemporary therapeutic formulations. The rapid progress of allopathic drug lead to its dominance in the therapeutic field. The various types of dosage form of allopathic drugs are available to treat the disease conditions i.e. solid dosage form (tablets, capsules, and powders), Liquid dosage form (syrup, suspension, and emulsion given by oral route and injectables given by parental route), and aerosols. Nausea, vomiting, and dizziness are some common side effects associated with these conventional dosage forms of allopathic system. Major complications have come forth after prolonged use of these formulations. There has been a continuous research on reducing side effects experienced by the patients resulting in some advancement to such conventional dosage form. Novel Drug delivery System (NDDS) is one such area of drug research that focuses on the target specific site of action and to minimize the side effects of the conventional dosage form. Nowadays, there has been a change in global trend from synthetic to natural medicine, which we can say “back to nature.” The efficiency of medicinal plant species, or herbal medicine, depends on the active molecules present since they provide synergistic action and thus enhance the therapeutic effectiveness. Research is being continuously carried out for the amalgamation of Novel drug delivery and phytoconstituents to ward off any prevalent side effects of NDDS in allopathic system of treatment after prolonged used [2].

There are many kinds of herbal medicines and supplements used worldwide. The global market of phytomedicines currently stands at over $60 billion annually. The sale of herbal medicines was expected 6.4% on an average annual growth rate in 2012 [3, 4] (Table 1).

It is widely accepted that 70–80% of people globally rely on natural resources for their treatment. In the year 2017 the American Botanical council accepted that the sale of herbal supplements increased by 7.7% in US (on basis of turnover of herbal market in 2016). Europe leads the chart owing to extensive R&D for herbal medicine owing to considerable increase in funding for research on herbal medicinal plants. America stands on second position in the global herbal medicine market and held 16.2% of market share in 2017. The consumption of herbal supplements in US was majorly used for the conditions such as heart stroke (48.7%), Cancer (43.1%), and arthritis (43%) announced by National center for biotechnology information in 2017. Asia Pacific stands on third position having a growth rate of 5.99% due to the adoption of traditional medicine by pharmaceutical companies, researchers, and policy maker [5].

<table>
<thead>
<tr>
<th>Global herbal market</th>
<th>Market size (US$ billions)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>28</td>
<td>45</td>
</tr>
<tr>
<td>Rest EU</td>
<td>2.4</td>
<td>4</td>
</tr>
<tr>
<td>ASEAN</td>
<td>10.8</td>
<td>19</td>
</tr>
<tr>
<td>Japan</td>
<td>9.8</td>
<td>16</td>
</tr>
<tr>
<td>North America</td>
<td>6.9</td>
<td>11</td>
</tr>
<tr>
<td>Others</td>
<td>4.1</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>


Table 1. Segmentation of global herbal market in 2012.