



Advancement of Nanomedicine and Targeted Drug Delivery in Perspective of Liver Disease



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Abstract

Unhealthy life style such as consumption of alcohol, drug, chemicals, cigarette, unhealthy eating, various biological infections and lack of physical activity is a major factor to increase the disease burden on the liver. There are more than hundred different kinds of liver diseases, some of them is serious and life threatening such as liver cancer. Nanomedicine is playing very effective an alternative potential agent to overcome the liver diseases by targeting the different pathway, such as hepatocytes, macrophages, receptor, intracellular molecular network and hepatocellular carcinoma. There are very few Nanomedicine is available in the market and few are under a clinical trial to treat the various liver problem. Therefore, there is further need to focus and explore the variety of Nanomedicine to treat the liver diseases including the liver cancer.

Keywords: Nanomedicine; Liver diseases; Oxidative stress; Inflammatory cytokine

Introduction

The liver is the largest solid organ of the body that have multi-function in which some is the very important such as metabolism and detoxification of xenobiotics [1,2]. Every day we are exposed to various toxic chemicals intentionally or unintentionally by breathing air, drinking water, eating food or drug etc and increasing the chemical burden on the human body especially for the liver. Plastic, chemicals, drugs and lifestyle certainly responsible for increase the burden of liver [3]. In the Fourth National Report on Human exposure to environmental chemicals, the Centre for Disease control(CDC) USA reported that the average person in the USA has at least 212 chemicals in their blood and urine that actively contribute the chemical burden on the body [4]. Thus, our lifestyle is directly or indirectly responsible to increase the liver disease burden in human body. Our body has a self-cleansing mechanism which helps to clear the burden of xenobiotics from the body by detoxification process, but the continuous exposure of drug/chemical lead to accumulation and resulted in variety of liver problem [5]. In spite of that chemical, drug or some biological infection such as bacterial, viral, parasitic also responsible for severe liver diseases [6]. There are more than hundred different kinds of liver diseases, some of them is serious and life threatening such as liver cancer. The current scenario of liver diseases prospect throughout the globe is that millions of people suffering from the variety of liver diseases from childhood to old age. Some important liver diseases such as viral hepatitis, liver cirrhosis

and hepatocellular carcinoma is global health challenges due to the limited curative treatment options [7]. Therefore, there is need to develop a safe and potent target drug to overcome the liver problem. Thus, Nanomedicine can be a good option to contribute the potential effect towards the targeted delivery of hepatic diseases.

Discussion

The application of nanoparticle has been emerging as a potential, delivering targeted drugs to treat various liver diseases [8]. Advancement of nanotechnology has been open a new gateway to improve the targeted and delivery of drug to treat the various diseases. Present review design to focus and understand the effect of Nanomedicine in perspective of liver diseases specially hepatocellular carcinoma [9]. The advancement of Nanomedicine will helps to improve the therapeutic index of anticancer drug via modulation of pharmacokinetics and tissue distribution to targeted delivery [10]. Nanomedicine can be easily targeted to the hepatocytes in case in viral, fungal, bacterial, parasitic infection of liver diseases [11,12]. It also may be targeted as macrophages, hepatocellular carcinoma. Therefore, the Nanomedicine attracting the scientific community to think and continue the research to overcome with the different kind of diseases. Now the updated progress in this field is that some of Nanomedicines are in clinical trial phase while some are already available in the market with a different brand name. The first

liposomal doxorubicin (Doxil TM /Caelyx Tm) was the first anti cancer Nanomedicine approved by the FDA in 1995. The other Nanomedicine named Irinotecan brand Onivyde Merrimack Pharmaceuticals is approved for the use of pancreatic cancer while some of the nano drug such as Doxorubicine brand Therm DoxTM/Celsion can used as primary hepatocellular carcinoma which is under final trial. A drug named Oxaliplatin brand name MBP-426/Mebiopharm is also under the clinical trial of phase -II which will be used for gastrointestinal adenocarcinoma. Thus the Nanomedicine is effective to over the liver disease.

Conclusion

The Nanomedicine is an exciting and promising field of research for the treatment of liver diseases and it can be contributed significant role towards the targeted delivery of various hepatic diseases. There is further need to continue the research to find out the more economical, suitable and safer Nanomedicine to fight the various kinds of liver problem.

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