INFLUENCE OF BRANCHED-CHAIN GLYCOLIPIDS ON NANO-EMULSION FOR DRUG DELIVERY SYSTEM

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ABSTRACT

Natural glycolipids are neither easy to synthesize nor extract from biological sources. Therefore, new mimic branched-chain glycolipids were synthesized for examples 2-hexyldecyl-β/α-D-glucoside (2-HDG) and 2-hexyldecyl-β/α-D-maltoside (2-HDM). The influence of these two glycolipids on the stability of nano-emulsion based prepared from water, Cremophor EL and medium chain triglyceride oil has been investigated. 2-HDG enhanced the nano-emulsion stability by reducing the oil droplets size whereas 2-HDM has a minor effect on the nano-emulsion. Both nano-emulsions have shown a capability of ketoprofen encapsulation and a relatively fast release of the drug.

Keywords: Branched-chain Glycolipids, Nano-emulsion, Drug Delivery.

INTRODUCTION

Both natural and synthetic glycolipids have drawn much attention due to their nonionic and biodegradable properties [1-2]. For examples, branched-chain glycolipids (2-HDG & 2-HDM) have been synthesized to mimic natural branched-chain glycolipids such as glycerolglycolipids [3]. A known nano-emulsion prepared from mixture of water, Cremophor EL and medium chain triglyceride oil mixture was used for reference study [4]. These nano-emulsions with size ranging from 20-200 nm give translucent bluish or slightly opaque appearance [5].

MATERIALS AND METHODS

Nano-emulsions were prepared from stepwise addition of water into a mixture of oil and surfactants. The reference nano-emulsion was prepared from the mixture of filtered Milli-Q water, Cremophor EL (nonionic surfactant) and medium chain triglyceride oil (MCT). The samples were prepared from various ratios of Cremophor EL and branched-chain glycolipids. The nano-emulsion stability and the oil droplets radius were determined by 3D Multi-angle Cross-Correlation Spectrometer and Cryo-TEM Microscopy.

Ketoprofen was incorporated into nano-emulsions for drug delivery study. The drug release study was conducted using dialysis technique in phosphate buffer solution at pH 7.40 and being monitored up to 24 hours. The concentration of released drug was determined using HPLC.

RESULTS AND DISCUSSION

The droplets size of reference nano-emulsion has been reduced in the presence of 2-HDG but not with 2-HDM (Figure 1). Surprisingly, both glycolipids were stabilized the nano-emulsion.

REFERENCES