Absorbable Polymers from Functionalized Salicylic Acid

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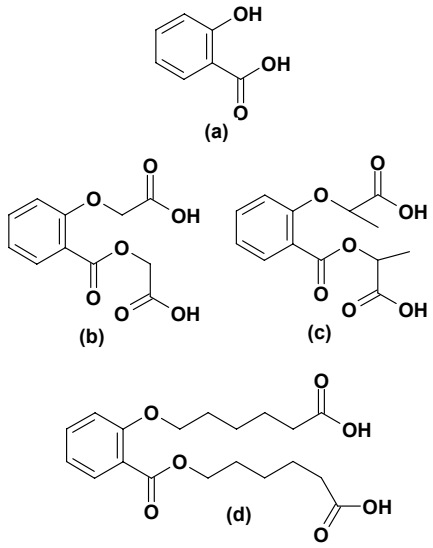
Introduction:

The medicinal properties of Salicylic acid are well known to the mankind. Its therapeutic values have resulted in it being used as an additive in number of cosmetic and skin care products for the treatment of acne, psoriasis, corns and warts. Furthermore, it is the key precursor of the non -steroidal anti-inflammatory drug, Aspirin. Aspirin is used in the treatment of a number of conditions including fever, pain, migraine and even coronary ailments. Motivations to incorporate the therapeutic value of the Salicylic acid in the polymer backbone led us towards development of novel bioabsorbable polymers from functionalized Salicylic acid, which upon hydrolytic degradation yields safe and biocompatible products. The Salicylic acid molecule contains a hydroxyl and a carboxylic acid group. In the present study, the hydroxyl and the carboxylic acid group of the salicylic acid molecule was conjugated with glycolic acid, lactic acid, p-dioxanone and caprolactone monomers. These monomers are the building blocks of majority of biodegradable polymers used to make commercial medical devices. The resulting functionalized Salicylic acid monomer was then polymerized by condensation with diols to yield absorbable therapeutic polymers.

Results/Discussion:

Functionalization of Salicylic Acid: The Salicylic acid molecule contains a hydroxyl and a carboxylic acid functional group as shown in Figure 1 (a). In the present study, the hydroxyl functional group of the Salicylic Acid was etherified and carboxylic acid group was esterified with glycolic acid, lactic acid and caprolactone moiety as shown in figure 1 (b), (c) and (d) respectively. This functionalization resulted in the formation of novel absorbable monomers derived from Salicylic acid which were then subjected to condensation polymerization with ethylene glycol to yield novel absorbable polymers containing Salicylic acid in the backbone as shown in figure 2 (a)-(b). All the functionalized Salicylic acid monomers and the polymers derived from them were characterized using NMR spectroscopy. The details of the monomer and polymer synthesis and their characterization will be presented in detail in the meeting.

Figure 1. (a) Salicylic Acid (b) Glycolic acid functionalized Salicylic Acid (c) Lactic acid functionalized Salicylic Acid (d) Caprolactone functionalized Salicylic Acid



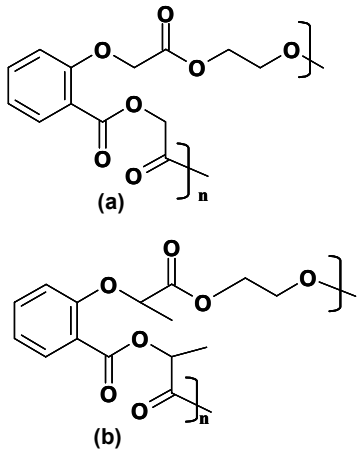


Figure 2 Absorbable polymers from functionalized Salicylic Acid

Conclusions: In this paper we report for the first time the development of absorbable polymers from functionalized Salicylic acid monomers. These polymers are designed to degrade into safe and biocompatible molecules. These polymers will find potential applications in drug delivery and polymer therapeutics.

References:

(1) (a) Bezwada, R. S., US Patent Application No. 2006/0173065 (b) Bezwada, R.S., US Patent Application No. 2006/0172983 (c) Bezwada, R.S., US Patent Application No. 2006/0188547
(2) (a) Bezwada, R. S., PMSE Preprints 2006; 95:825. (b) Bezwada, R. S., PMSE Preprints 2006; 95:401. (c) Bezwada, R. S., PMSE Preprints 2006; 95:399.