

## Absorbable Poly Naproxen

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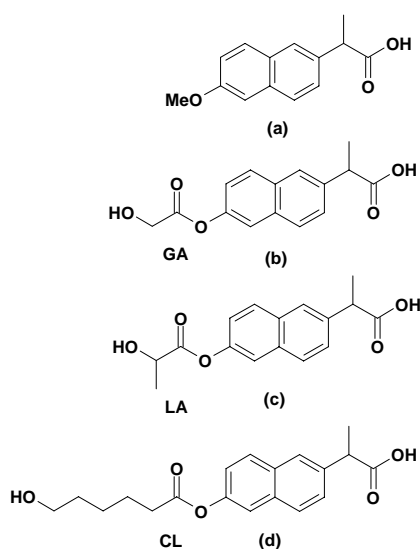
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### Introduction:

The focus of the current work is towards developing novel bioabsorbable polymers, which incorporates pharmaceutical drug molecules into the polymer main chain and upon hydrolytic degradation yields safe and biocompatible products including the drug molecule. This will not only add therapeutic value to these polymers but will also enable these polymers to deliver drug at the site of action over a period of time. In order to meet this need, we have developed novel absorbable polymers derived from functionalized Naproxen monomer. Naproxen (Aleve™) is a member of the profen family of non-steroidal anti-inflammatory drugs (NSAIDs). It is commonly used for the treatment of inflammation and stiffness associated with osteoarthritis, rheumatoid arthritis, tendonitis and menstrual cramps. The naproxen molecule contains a protected hydroxyl and a carboxylic acid group. In the present study, the hydroxyl group of the naproxen 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 Naproxen monomer was then polymerized by self-condensation to yield absorbable therapeutic polymers.

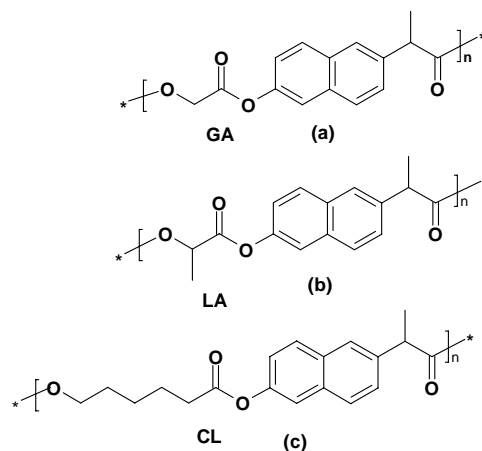
### Results/Discussion:

**Functionalization of Naproxen:** The Naproxen molecule contains a protected hydroxyl and a carboxylic acid functional group as shown in Figure 1 (a). In the present



**Figure 1.** (a) Naproxen (b) Glycolic acid<sup>GA</sup> functionalized Naproxen (c) Lactic acid<sup>LA</sup> functionalized Naproxen (d) Caprolactone<sup>CL</sup> functionalized Naproxen

study, the hydroxyl functional group of the Naproxen 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 AB type monomers derived from Naproxen which were then subjected to self-condensation polymerization to yield novel absorbable polymers containing Naproxen in the backbone as shown in figure 2 (a)-(c). All the functionalized Naproxen



**Figure 2** Absorbable polymers from functionalized Naproxen

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.

**Conclusions:** In this paper we report for the first time the development of absorbable polymers from functionalized Naproxen monomers. These polymers do not only have controlled hydrolytic degradation profiles but 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. 60/728823 (d) Bezwada, R.S. US Patent Application No. 60/748789.
- (2) (a) Bezwada, R, S. PMSE Preprints 2006; 51:825. (b) Bezwada, R, S. PMSE Preprints 2006; 51:401. (c) Bezwada, R, S. PMSE Preprints 2006; 51:399.