Microparticles production for drug delivery using glass microfluidic devices

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1. Introduction

- The production of uniform microparticles from microdroplets by emulsification of different organic phase solutions has been achieved via 3D flow focusing in microfluidic glass capillary devices (Chu et al., 2007; Vladisavljevic et al., 2014).
- The size and morphology of produced microparticles of biodegradable poly(lactic acid) (PLA) and poly(lactic-co-glycolic) acid (PLGA) particles were varied and modified (with nanoclay or a non-solvent) to ascertain their effect on drug release.

2. Methodology

- Properties (microstructural and drug release) of monodispersed biodegradable polymer microparticles (PLA/PLGA) produced via microfluidic devices were shown to be dependent on dispersed phase formulation, device orifice size, phase flow rates, polymer concentration in organic solvent, and orifice size.

3. Droplet Generation

- The production of uniform microparticles from microdroplets by emulsification of different organic phase solutions has been achieved via 3D flow focusing in microfluidic glass capillary devices (Chu et al., 2007; Vladisavljevic et al., 2014).
- The size and morphology of produced microparticles of biodegradable poly(lactic acid) (PLA) and poly(lactic-co-glycolic) acid (PLGA) particles were varied and modified (with nanoclay or a non-solvent) to ascertain their effect on drug release.

4. Results

- Figure 3. Experimental and simulated droplet size variations as a result of flow rate and orifice differences.

5. Conclusion

- Properties (microstructural and drug release) of monodispersed biodegradable polymer microparticles (PLA/PLGA) produced via microfluidic devices were shown to be dependent on dispersed phase formulation, device orifice size, phase flow rates, polymer concentration in organic solvent, and orifice size.