Microfluidic Formation of Nanoscale Liposome by Hydrodynamic Flow Focusing

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Liposomes are artificial lipid vesicles that mimic biological membranes, and they have been spotlighted in the clinical field due to the ability to enclose biologically active substances of any structure and to release it into the host's body. A variety of methods have been employed to prepare liposomes including thin-film hydration, detergent dialysis, reverse-phase evaporation, and ethanol injection, but it was hard to obtain controlled size of liposomes using those methods. We fabricated microfluidic device using conventional photolithography and PDMS molding technique for liposome formation. Lipid containing oil phase was surrounded by water phase and liposomes were formed at oil-water interface. Characteristics of prepared liposomes can be controlled with flow conditions such as flow rate, flow rate ratio (FRR). Size of liposomes was measured by dynamic light scattering (DLS), and zeta potential was measured to estimate the colloidal stability.