

Abstract

Thermally responsive Ca-loaded lipid vesicles, designed to release Ca^{2+} when heated to body temperature, were employed along with Na-alginate to form a fluid suspension that rapidly gelled when heated to body temperature. The liposomes were exploited to prevent alginate hydrogel formation at room temperature by isolating intravesicular Ca^{2+} from extravesicular Na-alginate. Heating of the fluid liposome/alginate mixture to 37°C resulted in release of Ca^{2+} from the liposomes and formation of Ca-alginate hydrogel. The 37°C gelation time was found to be dependent on the lipid composition used to prepare the liposomes, and the liposome/alginate ratio. Optimized formulations gelled within 30 seconds at 37°C . The addition of drug-filled liposomes to the formulation resulted in a thermally gelled hydrogel that released entrapped drug in a controlled manner. The kinetics of drug release was affected by lipid composition, which permitted the systematic control of drug release rate. This approach may prove advantageous to the use of pre-crosslinked alginate spheres for certain local drug delivery applications in which *in-situ* gelation is desired.