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Preparation of bubble liposome: improved stability and ultrasound imaging

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Introduction: Bubble liposomes are a promising new delivery system for various therapeutic agents. Ultrasound can be used both to monitor and deliver therapeutics of the bubble liposomes directly into target tissue. Therefore, bubble liposome along with ultrasound can be used to enhance the targeted delivery of the therapeutics. We investigated particle size, polydispersity, ultrasound-signal intensity and stability of bubble liposome with existing method of preparation and explored a new method to reflect better result in terms of polydispersity, ultrasound-signal intensity and stability over an extended time frame.

Materials and Methods: Unilamellar pegylated bubble liposomes were prepared using reverse phase evaporation Method followed by supercharging with ultrasound-imaging gas, perfluoropropane.

Results: According to existing method, particle size as well as polydispersity index of bubble liposome increased gradually as the supercharging time increased. Though particle size of the bubble liposomes was in the low nanometer range (_300 nm) but the polydispersity index was in the upper range (0.5-1) of the scale 1. In addition, they showed fluctuation in their particle size over 7 days period of storage at 2-8°C and it was remarkable for the bubble liposomes prepared with more than 5 min supercharging time. After 7 days they showed very weak ultrasound imaging intensity and were barely visible by ultrasound imaging system. On the other hand, using alternative approach bubble liposomes can be prepared for all the supercharging times with consistent particle size and polydispersity index. Bubble liposomes were also in the low nanometer size range (350-400) with acceptable polydispersity index (0.2- 0.4). In addition, particles showed very little fluctuation in their particle size and polydispersity index over 7 days period of storage at 2-8°C. Moreover, they showed strong ultrasound imaging intensity and were visible by ultrasound even after 7 days.

Conclusion: An optimized protocol for generating size controlled pegylated bubble liposome has been achieved. This protocol results in improved ultrasound-signal intensity and stability during storage at 2-8°C.

Biography

Shafiur Rahman is presently a PhD student in the School of Pharmacy, The University of Queensland, Australia. He has been working on the development of lipid based targeted delivery systems for gene and traditional anticancer drug. He has published some papers on Phytochemistry and natural products. He is also a faculty member of Pharmacy Discipline, Khulna University, Bangladesh.