Eri Yoshida, J Bioequiv Availab 2014, 6:5
http://dx.doi.org/10.4172/0975-0851.S1.017

OMICS Group Conferences
Accelerating Scientific Discovery

5th World Congress on
Bioavailability and Bioequivalence
Pharmaceutical R&D Summit

September 29-October 01, 2014 DoubleTree by Hilton Baltimore-BWI Airport, USA

Micrometer-sized giant vesicles composed of amphiphilic random block copolymers prepared by photopolymerization-induced self-assembly

Eri Yoshida
Toyohashi University of Technology, Japan

Micrometer-sized giant vesicles are possible artificial models for biomembranes of cells and organelles based on the similarity of their size and structure. In recent years, the importance of the giant vesicles has been increasing for their industrial applications as microcapsules in drug and gene delivery systems, microreactors, and selective membranes. The giant vesicles have a closed bilayer structure formed by the self-assembly of amphiphiles. While the biomembrane bilayer is composed of various kinds of lipids having the respective critical packing shapes, amphiphilic diblock copolymers vary their critical packing shapes dependent on the block length, various kinds of monomer units, and their combination. This paper describes a novel method to prepare micrometer-sized giant vesicles composed of an amphiphilic poly(methacrylic acid)-block-poly(methyl methacrylate-random-methacrylic acid) random diblock copolymer, PMAA-b-P(MMA-r-MAA) by the polymerization-induced self-assembly employing the nitroxide-mediated photocontrolled/living radical polymerization. The random block copolymerization of MMA and MAA was performed in an aqueous methanol solution by UV irradiation using a PMAA end-capped with 4-methoxy-2,2,6,6-tetramethylpiperidine-1-oxyl to produce spherical vesicles with a several micrometer diameter. The vesicular morphology was dependent on the physical conditions including the water content, growing polymer chain concentration, and stirring speed during the photopolmerization-induced self-assembly. The morphology was well-controlled from spherical vesicles into films, and vice versa by manipulating the hydrophobicity of the random copolymer block. The hydrophobic energy estimation of the random copolymer blocks containing alkyl methacrylate units with the different alkyl chain length demonstrated that the respective morphologies had definite hydrophobic energies independent of the alkyl chain length.

Biography

Eri Yoshida has completed her PhD from Tokyo Institute of Technology, Japan and Postdoctoral studies from University of North Carolina at Chapel Hill. She is an Associate Professor of Toyohashi University of Technology. She has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of some reputed journals.

eyoshida@ens.tut.ac.jp