Non-Lamellar Liquid Crystalline Nanostructures as a Promising Immune-safe and Biocompatible Drug Delivery System.

Intan Diana Mat Azmi

ABSTRACT: Cubosomes and hexosomes are receiving much attention in drug delivery, particularly due to their unique properties, nanostructural versatility and capability of solubilizing various drugs and bio-imaging probes. However, their poor biocompatibility in human blood and the possibility of inducing hemolysis and inadvertent activation of the complement system (which is the first line of the body's defense system) are limiting their use in parenteral application (e.g., IV). Therefore, it is imperative to understand the factors affecting these incompatibility issues, including the stability of these nanostructured dispersions on direct exposure to biological fluids such as plasma and the potential toxicity of the main lipid constituents or stabilizers, which need to be considered as a first step towards designing safe and efficient injectable nanocarriers. This work present complementary biophysical methods involving SAXS, cryo-TEM, and NTA that were used to gain insight into the structural stability, morphological and size characteristics of these non-lamellar liquid crystalline (LC) nanodispersions upon plasma incubation, as well as to highlight the mechanistic issues pertaining hemocompatibility. Through optimization of lipid core, we showed an intriguing LC nanodispersions that could totally overcome plasma-induced destabilization effect on the internal nanostructures and bypassed hemolysis and complement activation as well as potentially modulate the susceptibility to macrophage uptake, which particularly interesting and beneficial in the application of non-inflammatory MPS targeting. Although there is still a long way to go for the development of pharmaceutical viable cubosomes and hexosomes as injectable nanocarriers, this study could be of interest for future exploitation in the development of immune-safe and cost-effective soft nanocarriers for delivering sensitive therapeutic/contrast agents.

Biography:-

Intan Diana Mat Azmi1 has completed his PhD at the age of 28 years from CSIR-Indian Institute of Integrative Medicine, Jammu and GNDU Amritsar India and Postdoctoral Studies from Genomics Research Institute, University of Pretoria, South Africa. He is the Coordinator of Department of Botany, Satellite Campus Kargil, University of Kashmir. Dr. Mir has many national and International awards to his credit. He has published more than 30 papers in reputed journals and has been serving as an editorial board member of repute..

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Department of Chemistry, Faculty of Science and 2Centre of Foundation Studies for Agricultural Science, Universiti Putra Malaysia, Malaysia