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Therapeutic natural lipid nano-formulation rectifies molecular parameters of critical-inflammation pathogenesis.

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Background: Nano-formulating natural biomolecules, including naturally occurring polyunsaturated fatty acid rich systems with proven therapeutic benefits, are being viewed as elegant solutions for unlocking the untapped potential of such molecules for translational research against critical disease pathogenesis. However, despite preliminary and at best theoretical promises, empirical evidences to establish the higher bio-functionality of therapeutic lipids as nano-templates are starkly lacking. In this context, this work presents encouraging real-time findings against both *in vivo* and *ex vivo* inflammation models for a therapeutic lipid, alpha-eleostearic acid (ESA), encapsulated in a novel and thoroughly characterized bio-compatible nano-emulsion (NE) system (particle sizes less than 200 nm).

Methods: A protocol involving high pressure homogenizer was developed to fabricate novel formulations of ESA and was characterized with standardized methods of DLS and TEM. Molecular biological tools and assays were employed to arrive at a definite conclusion.

Results: Among the treated experimental groups, the pro-inflammatory profile was found to be significantly mitigated in the hypersensitized rats administered with 0.25% ESA-NE formulation. ESA NE also restored the cell cycle phases of splenocytes to normal conditions and in a more emphatic manner as compared to ESA CE. The short-term effect of the formulations in the isolated human PBMCs challenged with and without lipopolysaccharide (LPS) for cell-surface bio-marker (CD 14, CCR5/CD195) expressions, also revealed novel findings.

Conclusion: The novel ESA NE formulation shows lot of palpable promise for clinical applications against pathogenic and delayed type-hypersensitivity.

Biography

Debjyoti Paul, is presently a post-doc in the laboratory of Sr. Professor Parimal Chandra Sen, Molecular Medicine division of the Bose Institute, Centenary Campus, located in Kolkata. Dr. Paul did his PhD. from the University of Calcutta in nano-formulations of therapeutic conjugated linolenic acid isomer, and has provided one of the earliest evidences of such lipids as nano-systems in ameliorating bio-molecular parameters against, diabetes, pathogenic mitogens and allergens. He has also been a pioneer in putting forward a stable formulation system to emulsify such PUFAs for clinical applications that can be nano-sized without leading to the formation of undesirable lipid-artifacts. His present focus is in developing nano-carriers to deliver novel drugs against mi-RNAs associated with Triple Negative Breast Cancer Cells.

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