2nd International E-Conference on

CANCER SCIENCE AND THERAPY

August 23-24, 2021 | Webinar

Enhanced immunosuppressive effects of 3,5-bis[4 (diethoxymethyl)benzylidene]-1-methyl-piperidin-4-one, an α , β -unsaturated carbonyl-based compound as PLGA-b-PEG nanoparticles

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3,5-Bis[4-(diethoxymethyl)benzylidene]-1-methyl-piperidin-4-one (BBP), a novel synthetic curcumin analogue has been revealed to possess strong in vitro and in vivo immunosuppressive effects. The aim of present study was to prepare and characterize BBP-encapsulated polylactic-co-glycolic acid-block-polyethylene glycol (PLGA-b-PEG) nanoparticles and to evaluate its in vivo efficacy against innate and adaptive immune responses. Male BALB/c mice were orally administered with BBP alone and BBP- encapsulated nanoparticles equivalent to 5, 10 and 20 mg/kg of BBP in distilled water for a period of 14 days. The immunomodulatory potential was appraised by determining its effects of non-specific and specific immune parameters. The results showed that BBP was successfully encapsulated in PLGA-b-PEG polymer with 154.3 nm size and high encapsulation efficiency (79%) while providing a sustained release for 48 hours. BBP nanoparticles showed significant enhanced dose-dependent reduction on the migration of neutrophils, Mac-1 expression, phagocytic activity, reactive oxygen species (ROS) production, serum levels of ceruloplasmin and lysozyme, immunoglobulins and myeloperoxidase (MPO) plasma levels when compared to unencapsulated BBP. Enhanced dose-dependent inhibition was also observed on lymphocyte proliferation along with the downregulation of effector cells expression and release of cytokines, and reduction in rat paw oedema in BBP nanoparticles treated mice. At higher doses the suppressive effects of the BBP nanoparticles on various cellular and humoral parameters of immune responses were comparable to that of cyclosporine-A at 20 mg/kg. These findings suggest that the immunosuppressive effects of BBP were enhanced as PLGA-b-PEG nanoparticles.

Keywords: Immunosuppressive, PLGA-PEG polymer, Immunomodulatory

Biography:

Dr. Laiba Arshad is currently working as Assistant Professor Pharmacology, Department of Pharmacy. She completed her PhD from National University of Malaysia. She has been participating in various national and international conferences and research seminars as well as served as International Conference organizer in her professional career. Also serving as Editorial board member and Reviewer of several Peer reviewed journals; published several research/review papers in peer-reviewed indexed journals. She is actively involved in natural product research and in the field of immunology.