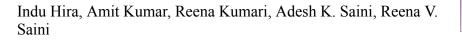
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Pectin-guar gum-zinc oxide nanocomposite enhances human lymphocytes cytotoxicity towards lung and breast carcinomas



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ACCEPTED MANUSCRIPT

Pectin-guar gum-zinc oxide nanocomposite enhances human lymphocytes cytotoxicity towards lung and breast carcinomas.

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Abstract

nanocomposite Pectin-guar gum-zinc oxide (PEC-GG-ZnO) was prepared by precipitation technique. The composite was characterized by using FT-IR, XRD, HRTEM, SAED, EDS, and SEM. TEM images showed the hexagonal shape of nanocomposite with the size range of 50-70 nm. Further, PEC-GG-ZnO was used as an immunomodulator for the first time to improve the cancer cells killing capabilities of human peripheral-blood lymphocytes (PBL). The lymphocyte proliferation assay proved the immunostimulatory property of the PEC-GG-ZnO which increased with the increase in concentration (25 μ g/ml to 200 μ g/ml). ELISA detection confirmed a significant increase in the release of IFN- γ , IL-2 and TNF- α cytokines and flow cytometry analysis revealed enhanced expression of CD3, CD8, and CD56 after treating PBL with PEC-GG-ZnO as compared to PEC and GG treatment. Moreover, we also found that nanocomposite pretreated human PBL displayed enhanced cytotoxicity towards lung (A549) and breast carcinoma (MCF-7) cells as compared to untreated PBL. The microcytotoxicity assay also demonstrated that with increase in effector: target ratios from 2.5:1 to 20:1, there was an increase in the cancer cell death. Taken together, the current data corroborates the immunostimulatory activities of PEC-GG-ZnO, a novel nanocomposite, hence it can serve as a promising cancer therapeutic agent.

Keywords: Immunotherapy, Nanocomposite, Anticancer, Pectin, Guar gum

1. Introduction

Immune system is an extremely sophisticated defense mechanism inside vertebrates to protect them from invading agents. Cancer - immune system interactions activate innate and adaptive immune effector mechanisms to recognize and control tumor. Cancerous cells are detected by cytotoxic T lymphocytes which lead to the destruction of Download English Version:

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