Nanoformulated betulinic acid analogue distinctively improves colorectal carcinoma: An advanced technology for cancer therapy

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Recently Betulinic acid, a naturally occurring plant secondary metabolite, has gained significant attention due to its antiproliferative activity over a range of cancer cells. In our previous study, we have reported a promising betulinic acid analogue (2c) with better therapeutic efficacy than the parent molecule to colon carcinoma cells. Despite its impressive biological activity, poor water solubility and low bioavailability creates difficulties in its pharmacological activity. To overcome these lacunas and making it a promising drug candidate we have formulated PLGA encapsulated 2c in the present study followed by evaluated its *in vitro* and *in vivo* therapeutic efficacy in both mice and rat colon carcinoma model. Nanoformulated drug delivery provides several advantages over free drug such as large loading capacity, minimum drug loss, sustained drug release and long-term *in vivo* stability. Additionally, due to enhanced permeability and retention effect in the tumor microenvironment, nano sized drug molecules preferentially penetrate the tumor vessel and retain at that site which ensures minimum cytotoxicity to normal cells. Herein we observed that nanoformulation of 2c developed a perfect nano size sphere with smooth surface area, effective cellular uptake, 8% drug loading and *in vitro* sustained drug release profile. *In vitro* antiproliferative activity significantly enhanced over free drug, which is measured by MTT assay, Annexin V positivity, JC1 analysis, DNA degradation and cell cycle study. *In vivo* therapeutic potential measured in mice and rat model also reflects its ability as a promising drug candidate for treatment of colon carcinoma and future potential clinical aspect.

Biography

Debasmita Dutta is presently pursuing Post-doctoral research as a DBT-Research Associate, in Department of Pharmaceutical Technology, Jadavpur University, India. She was associated with West Bengal State University, India as a Guest Faculty in Department of Microbiology for last three years. She has completed her PhD in Cancer Biology from CSIR-Indian Institute of Chemical Biology. She has published her research findings in highly circulated reputed international journals like Nature Communications, ACS Applied Biomaterials, European Journal of Medicinal Chemistry etc. She has received many scholarships and awards like Post-doctoral fellowships from Department of Biotechnology, Government of India in 2016 and Council of Scientific and Industrial Research (CSIR), Government of India in 2017, International Travel Grant Award from Indian Council of Medical Research (ICMR), Government of India to attend 23rd EACR (European Association for Cancer Research) in Munich, Germany in 2014, best oral presentation award at "3rd Pharm Tech IAPST International Conference" at Centurion University, India in 2019.

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