

Immunomodulation-Mediated Anticancer Activity of a Novel Compound from *Brugmansia suaveolens*

Sunil Kumar ¹, Aditi Gupta ², Reena Vohra Saini ^{2,3}, Amit Kumar⁴, and Neeraj Mahindroo ³

¹ Himachal Institute of Pharmacy, Paonta Sahib, Distt Sirmour 173025, Himachal Pradesh, India

² School of Biotechnology, Shoolini University, Post Box 9, Solan 173212, Himachal Pradesh, India

³ Centre of Research on Himalayan Sustainability and Development, Shoolini University, Post Box 9, Solan 173212, Himachal Pradesh, India

⁴ Instrumentation Division, Indian Institute of Integrative Medicine (CSIR), Canal Road, Jammu 180001 India

Abstract:

Immunomodulation activity-guided fractionation of ethanol extract of *Brugmansia suaveolens* leaves was carried out to isolate a novel compound SUPH036-022A (**1**) by co-culturing test fraction/compound activated PBMC with MCF7 and A549 cancer cell lines. Assessment of immune markers in PBMC, and analysis of apoptosis markers and cell cycle was carried out for cancer cells. The structure of the isolated compound was elucidated by spectral analysis. Compound **1** enhanced secretion of immune markers, IL-2 and IFN- γ , from PBMC. Further, compound **1** treated PBMC increased cell death in MCF7 and A549 cell lines and induced ROS production and mitochondrial membrane perturbation, leading to apoptosis. Flow cytometry analysis revealed that compound **1** stimulated PBMC cause five-fold increase in cell cycle perturbations in the sub-G1 stage of cancer cells as compared to negative control, while compound itself had weak cytotoxicity against tested cell lines. Compound **1**, increases secretion of immune markers in PBMC inducing apoptosis in co-cultured MCF7 and A549 cancer cells while compound itself had weak cytotoxic activity against these cell lines. Compound **1** is a novel lead for immunomodulation-mediated anticancer activity.

Keywords: *Brugmansia suaveolens*; immunomodulation; cancer; bioactivity-guided fractionation; apoptosis.