Evaluation of Anticancer Potential of Ethanolic Extracts of three *Dendrobium* Species on Human Cervical Cancer Cells and Inhibition of Tumour Growth in Mice

Ritika Prasad[1] and Biplob Koch[2]

Genotoxicology and Cancer Biology Laboratory, Department of Zoology,
Banaras Hindu University, Varanasi-221005, U.P., India
E-mail: kochbiplob@gmail.com

Abstract—*The ethnobotany provides a rich source for natural drug research and development. In recent years, research in traditional medicine to combat cancer has received considerable interest. Dendrobium, commonly known as "Shihu" or "Huangcao", is one of the second largest genera of family orchideacae. Dendrobium has been reported to possess various therapeutic activities like antimicrobial, antioxidant, immunomodulatory, hepatoprotective, anticancer, and neuroprotective activities. Thus, the aim of this study was to investigate the anticancer property of the ethanolic extract of three Dendrobium species, Dendrobium formosum, Dendrobium chrysanthum and Dendrobium crepidatum. To assess their anticancer activity in vitro, cytotoxicity assay, generation of reactive oxygen species (ROS), induction of apoptosis and cell cycle analysis were evaluated in human cervical cancer (HeLa) cells and the in vivo anticancer activity was assessed in Dalton's lymphoma (DL) bearing mice. All the three ethanolic extracts showed dose dependent cytotoxicity against HeLa cells by MTT assay. The fluorescence resulting from oxidation of ROS-sensitive dye, dihydrorofluorescein (DHF) also showed increase in fluorescence intensity, exhibiting elevated ROS production by the extracts. Likewise, apoptotic induction was observed in HeLa cells as examined by Hoechst 33342/Propidium iodide staining. Further, flow cytometry study done exhibited that the extracts perturbed cell cycle progression and leads to delay the cell cycle. In addition, in vivo antitumor activity showed that the ethanolic extracts exhibit significant increase in the life span of DL bearing mice when compared to control along with decreased tumor volume in mice treated with the extracts. These findings suggest that the ethanolic extract has potential to combat cancer both in vitro and in vivo. However, further investigations are needed to elucidate the detailed molecular mechanism.*

Keywords*: Dendrobium, HeLa cells, Dalton's Lymphoma, ROS, Apoptosis, Flow cytometry.*