Anti-leukemic Effect of Umbelliferone β-d-galactopyranoside against DMBA Induced Leukemic Rat Model: Possible Mechanism of Action

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Background: Leukemia is a malignant disease of blood forming tissue inducing the over-production of large number of immature blood cells that enter the peripheral blood. Leukemia considered as the 9th most common cancer in men and 12th in women. Available treatment for leukemia are chemotherapy, allogeneic cell transplantation and radiation therapy with side effects. Due to side effect linked with the treatment, medicinal herbs treatment having the more attraction to treat the leukemia. The current study was to scrutinize the anti-leukemic effect of Umbelliferone β-D-galactopyranoside(UFG) against 7, 12-dimethyl benza[a]anthracene (DMBA) induced leukemia in rats and explores the underlying mechanism.

Materials and Method: DMBA was used for the induction of leukemia in experimental rats. The rats were divided into different groups and body weight, hematological parameters, DNA fragmentation and cell cycle regulatory parameter were also estimated. RT-PCR was used for the estimation of mRNA expression of sphingosine-1-phosphate receptor-1.

Results: UFG treated rats showed the up-regulation body weight as compared to other groups. Moreover, UFG reduced the blasts (67.8%) in leukemic rats. Its also altered the hematological parameters such as RBC (69.8%), WBC (54.5%), lymphocytes (47.6%), neutrophils (48.9%), monocytes (44.7%), eosinophils (48.7%), monocytes (64.5%) and basophils (43.5%), respectively. UFG treated rats showed the increased level of p21 and p53 and reduced level of cyclins D1 and E. RT-PCR showed the up-regulated of mRNA expression of sphingosine-1-phosphate receptor-1 (48.4%) of umbelliferone treated group rats as compared to other groups.

Conclusion: The current study, showed the anti-leukemic effect of UFG and highlights the possibility of its use in leukemia to minimize the side effect of the usual therapy.

Keywords: Leukemia, DMBA, Sphingosine-1-phosphate receptor 1, Umbelliferone β-D-galactopyranoside