

Modifications of Bleomycin Induced Cytogenetic Damages by 2-Deoxy-D-Glucose on Normal and Tumor Cells

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ABSTRACT The radiomimetic drug bleomycin induced chromosomal aberrations (CA) and micronuclei (MN) were studied in peripheral blood lymphocytes (PBL), as reference to normal cells and Glioma (BMG -1) as reference to tumor cells, with and without exposure to 2-deoxy D- glucose (2-DG, an analogue of glucose). Treatment with bleomycin increased both CA and MN frequency in a dose dependent manner in both cell types. The frequencies of CA are 2 fold higher than MN for a given concentration of bleomycin. Exposure to bleomycin predominantly induced exchange type chromosome aberrations. While in the presence of 2-DG the aberrations induced by bleomycin reduced significantly in PBL, the same was increased significantly in BMG cells ($P < 0.001$) showing a protective effect and sensitizing effect on normal and tumor cells respectively. The dose modulatory factor (protection) for different concentration of bleomycin exposure varied between 0.38 and 0.72 for CA and 0.1 and 0.84 for MN in PBL. In the case of BMG-1 cells, the modulatory factor (sensitization) varied between 1.42 and 2.59 for CA, 1.25 and 1.66 for MN at different concentration of bleomycin exposure. The modulatory effect of 2-DG was also evidenced from the coefficients obtained for the dose-response curves of the aberrations studied. The paper discusses the types of aberrations induced by bleomycin and the mechanism involved for differential modifications of cytogenetic damage by 2-DG in normal (PBL) and tumor (Glioma) cells.