Complex of C_{60} fullerene with doxorubicin as promising agent in antitumor therapy

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The purpose of this work was to evaluate the effect of C_{60} fullerene with antitumor drug doxorubicin (C_{60}+Dox) complex on the growth and metastasis of Lewis lung carcinoma and to perform a primary screening of the potential mechanisms of C_{60}+Dox complex action. The volume of tumor from male C57Bl/6 mice treated with the C_{60}+Dox complex was 1.4 times less than that in *control* untreated animals. The number of metastatic foci in animal lungs from the group treated with C_{60}+Dox complex was 2 times less than that in *control* untreated animals. Western blot analysis of tumor lysates revealed significantly decreased level of heat-shock protein 70 in animals treated with C_{60}+Dox complex. Moreover, the treatment of tumor-bearing mice was accompanied by the increase of cytotoxic activity of immune cells. Thus, the potential mechanisms of C_{60}+Dox complex antitumor effect are direct action on tumor cells by inducing cell death and by increasing of stress sensitivity as well as immunomodulating effect. The obtained results provide scientific basis for further application of C_{60}+Dox nanocomplexes as agents in cancer chemotherapy.