MILLIMETER WAVE INDUCED SUPPRESSION OF SARCOMA GROWTH IN MICE

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Unlike now widely applied traditional methods treatment of tumors by means of ionizing radiation (gamma therapy, proton therapy) and the chemotherapy, the considered method of MM-therapy is non- ionizing and non-invasive and hence is completely deprived of any harmful side effects. The present study was undertaken to investigate whether low-power (non-thermal) millimeter range electromagnetic radiation can act on tumor of mice in vivo without cytostatic agents. The present study has demonstrated the potential clinical application of low power coherent millimeter electromagnetic waves without damaging other tissues, without antitumoral drugs and harmful ionising radiotherapy.

It is known that with the help of differential melting curves (DMC) it can be distinguished DNA tumor sarcoma from DNA isolated from the liver of healthy mice. DMC-2 of tumor DNA are shifted relatively DMC-1 of the DNA healthy animals to lower temperatures, and in the DMC of tumor DNA there are appeared the additional peaks in the 52-60єC, which is absent for DMC of liver DNA of healthy animals. The effect of MM waves with a frequency of 42.2 GHz is investigated in vivo on the structure of DNA secondary structure of sarcoma 37.

As a source of millimeter wave radiation the generator of coherent Extremely High Frequensy (EHF)-oscillations G4-141 was used, operating in range of frequencies of 38,5ч53,5 GHz. A whole-body exposure of mice to EHF non-thermal coherent Electromagnetic Radiation was conducted in the far-field zone of cone-shaped antenna at a distance of 400 mm from the radiating plane of the antenna in the mode of continuous generation with incident power density (IPD) at the location of the object about 10 $\mu W/cm^2$.

After 15 sessions of MM-therapy without cytostatic drugs, at animals of the irradiated 0,5hour was observed an inhibition of tumor growth by 33.5% compared with a control group and a sharp suppression of DNA-methylation level 2.5 times as much. The DNA-2 has the high level of methylation (4,7 mol%), which after 0.5 hour influence of MM-radiation becomes (2.2 mol%) close to the corresponding value for DNA-1 (1,9 mol%). The received results are correlated with the spectrophotometric data. Under the influence of MM-radiation the values of temperature (Tm^0C) and interval (ΔT^0C) of melting of DNA-2 are changed and approach to the corresponding values of DNA-1.

Present original date has demonstrated the potential clinical application of low power coherent millimeter electromagnetic waves without damaging other tissues, without antitumoral drugs and harmful ionising radiotherapy. These preliminary results open a very interesting research direction which is linked to the possible use of low power MMW radiation against tumor cells and antitumor effect of MM-waves shows promising development of MM-therapy for clinical oncology in the treatment of malignant neoplasms.