INCREASE OF ANEUPLOID TUMOR CELLS AS A RESULT OF THE INFLUENCE OF ALLOGENEIC MESENCHYMAL STEM CELLS

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Aim: The effects of MSCs on tumor growth are controversial. Mesenchymal stem cells are an important component of the tumor microenvironment; however, previous studies have produced controversial results regarding whether MSCs promote or inhibit tumor growth and progression. In view of these controversial data, we conducted a study on the influence of allogeneic MSCs on biological properties of the primary tumor cells of Lewis lung carcinoma.

Methods: The investigation was carried out in C57Bl/6 male mice weighing 20-22g aged 2 to 3 months. The tumor cell suspension which was obtained from LLC primary tumor tissues was inoculated intramusculary into mice. Mice of experimental group received the course of inoculation of MSCs in concentration 1,25x10^4 cells. The primary culture was obtained from transplantable Lewis lung carcinoma. The number of living cells was determined using MTT-colorymetric test. Apoptotic level and distribution of cells in primary culture in phases of cell cycle were assessed by cytofluorimetry. After cytofluorimetry the percentage of aneuploid cells was evaluated in control and after impact of MSCs.

Results: MSCs were isolated from primary tumor, incubated 24 hours, then apoptotic level was assessed in control, test samples. The number aneuploid cells increased in 1.3 times upon MSCs influence on transplantable lung Lewis carcinoma. Increase of the aneuploid cells subpopulation in primary culture from animals with the introduction of MSCs population, increase of cells of proliferative pool were detected after MSCs administration in comparison with control (G2/M+S). Decrease of per cent of diploid cells subpopulation in 1.7 times in primary culture after MSCs administration and their more than 90% synchronization G0/G1 phase of cells cycle was shown. Regarding aneuploid cells after MSCs influence, increase of this population to 77.02+3.83% versus 59.20+1.71% in control was accompanied by growth of proliferative pool subpopulation G2/M+S.

Conclusions: Thus, biological characteristics of tumor cells under the influence of MSCs are primarily associated with the increase of aneuploidy. Aneuploidy leads to p53 dysfunction that may be related to our results about apoptotic level in LLC cells of primary culture under the influence of MSCs.

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