Abstract:

OBJECTIVE: Hyperthermia has been clinically applied to some types of brain tumors. However, the detailed mechanisms of this growth inhibition are not clear. The effect of mild hyperthermia on cultured human glioblastoma cell line, A172, was studied.

METHODS: A172 cells were heat treated (43-44.5 degrees C) for 1 hour in the growing phase. Cell viability was assessed by trypan blue dye exclusion assay. The presence of apoptosis was determined by the morphological changes observed using phase contrast microscopy and nuclear changes observed using HOECHST 33342 stain. For the evaluation of cellular deoxyribonucleic acid fragmentation, the TUNEL method was used. The expression of p53 and bax proteins was evaluated by Western blot, and the bax messenger ribonucleic acid was detected by Northern blot.

RESULTS: Heat treatment induced cell death in time- and temperature-dependent manners. The nuclear staining with HOECHST 33342 demonstrated morphological changes consistent with apoptosis. The TUNEL stain also demonstrated damages in the deoxyribonucleic acid. These morphological changes were accompanied by the accumulation of p53 protein, bax protein, and messenger ribonucleic acid.

CONCLUSION: These results indicate that mild hyperthermia induces apoptosis in A172 glioblastoma cells.