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Abstract

Prostate cancer (PC) is one of the most common cancers in men and localized PC has good prognosis. However, the prognosis of castration-resistant prostate cancer (CRPC) is poor and, a novel treatment for CRPC is in demand. To this end, hyperthermia (HT) was investigated as an alternative therapy. In this study, the analysis focused on the association between CRPC and heat shock protein nuclear import factor “hikeshi (HIKESHI)”, a factor of heat tolerance. Silencing the HIKESHI expression of 22Rv1 cells (human CRPC cell line) treated with siRNAs inhibited the translocation of heat shock protein 70 from the cytoplasm to the nucleus under heat shock and enhanced the effect of hyperthermia. Moreover, a novel magnetic nanoparticle was developed via binding carbon nanohorn (CNH) and iron oxide nanoparticle (IONP) with 3-aminopropylsilyl (APS). Tumor-bearing model mice implanted with 22 Rv1 cells were examined to determine the effect of magnetic HT (mHT). We locally injected CNH-APS-IONP into the tumor, which was set under an alternative magnetic field and showed that tumor growth in the treatment group was significantly suppressed compared with other groups. This study suggests that HIKESHI silencing enhances the sensitivity of 22Rv1 cells to HT, and CNH-APTES-IONP deserves consideration for mHT.