

Immunogenic cell death (ICD) is characterized by presence of specific molecules including surface exposed calreticulin (CRT) and the heat shock proteins HSP70 and HSP90. Release of ATP and high-mobility group box protein 1 (HMGB1) belongs to other typical characteristics. For induction of ICD in lung cancer cells high-hydrostatic pressure (HHP) was used. Treatment by HHP induces expression of immunogenic markers CRT, HSP70 and HSP90 on the cell surface. HHP also induces secretion of ATP to the extracellular milieu. Dendritic cells (DC) pulsed with HHP-treated tumor cells showed phenotypic maturation characterized by upregulation of maturation molecule CD83, costimulation molecules CD80 and CD86, chemokine receptor CCR7 and MHC class II molecule HLA-DR. Pulsed DCs have also higher rate of phagocytosis of HHP-treated tumor cells and they induce lower numbers of regulatory T cells compared to immature DCs. Moreover, activation of caspases (-8, -9, -3) and other proteins (phosphorylation of eIF2 α) which are crucial in ER-stress mediated apoptotic pathway, was observed after HHP treatment.

Using wide range of methods it was confirmed that HHP treatment is able to induce ICD in lung cancer cell lines, phenotypic and functional characteristics were described and the decreased induction of regulatory T-lymphocytes pulsed with DCs was verified. This constitutes the basis for functional use in the preparation of autologous vaccines aiming lung cancer.