SUMMARY

Effects of sodium selenite in human colon cancer cells with different p53 status

Colorectal carcinoma (CRC) is one of the leading causes of cancer - associated mortality. Great effort is spent on the investigation of prevention possibilities by various types of environmental factors. Several epidemiological studies and clinical studies have shown an inverse association between selenium intake and the risk of different types cancer including CRC. Also in animal models and cell lines *in vitro* selenium compounds have shown ability to inhibit proliferation and induce cell death. The aim of this study was to assess the antiproliferative effects of sodium selenite in colorectal cancer cells in vitro, particularly in two model colorectal cancer cell lines HCT 116 differing in their p53 status.

We have shown that sodium selenite in concentration range of 2.5 μM–10 μM inhibited proliferation and induced cell death in HCT 116 cells in a time- and concentration-dependent manner. Sodium selenite blocked the progression through the cell cycle in the S/G2-M phases, induced superoxide production in mitochondria, DNA damage and expression of p53 protein and activated cell death with involvement of caspases. Sodium selenite also increased the expression of autophagy markers. The HCT 116-p53KO cells, lacking functional p53 gene, were significantly less sensitive to sodium selenite treatment that the wild type HCT 116 cells. The HCT 116 cells were able to activate the effector caspases following sodium selenite treatment, but to significantly smaller extent compared to the wild type cell line. These results suggest that p53 status affects the reaction of model cell lines to sodium selenite treatment, however, they also indicate the presence of p53-independent mechanisms of selenite – induced cytotoxicity.