Sulforaphane inhibited expression of hypoxia-inducible factor-1alpha in human tongue squamous cancer cells and prostate cancer cells.


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Abstract

Previous studies show that a number of natural compounds from our diet have anticancer effects. Sulforaphane is the most characterized isothiocyanates (ITCs), which are identified in cruciferous vegetables. Sulforaphane is viewed as a conceptually promising agent in cancer prevention. Because of its ability to induce cancer cell apoptosis, it inhibits progression of benign tumors to malignant tumors and interrupts metastasis. However, the effect of sulforaphane on tongue cancer cell proliferation has not yet been reported, and the mechanisms that sulforaphane inhibits cancer development are still unclear. Hypoxia-inducible factor 1 (HIF-1) expression is associated with tumorigenesis and angiogenesis. It regulates the expression of many genes including vascular endothelial growth factor (VEGF), inducible nitric oxide synthase, and lactate dehydrogenase A. In our study, we investigated the effects of sulforaphane on expression of hypoxia-inducible factor-1alpha (HIF-1alpha), which was overexpressed in many human malignant tumors, human tongue squamous cell carcinoma and prostate cancer DU145 cells. Sulforaphane inhibited hypoxia induced expression of HIF-1alpha via inhibiting synthesis of HIF-1alpha. Sulforaphane was also found to inhibit hypoxia induced HIF-1alpha expression through activating JNK and ERK signaling pathways, but not AKT pathway. Inhibition of HIF-1alpha by sulforaphane resulted in decreasing expression of VEGF. Taken together, these results suggest that sulforaphane is an effective chemopreventive compound against tongue cancers and prostate cell angiogenesis in vitro, and that the HIF-1alpha target provides a new sight into the mechanisms of sulforaphane's inhibition against tumor cell proliferation.

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