



Lectins of *Sambucus nigra* in Regulation of Cellular DNA-protective Mechanisms

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Genomes of living organisms are constantly affected by exogenous and endogenous factors, which lead to generating cytotoxic, carcinogenic, and/or mutagenic DNA lesions. However cells possess a number of protective mechanisms directed against DNA damage. The repair enzyme O6-methylguanine-DNA methyltransferase (MGMT) plays a key role in the repair of primary damages of DNA caused by alkylating compounds, which are widely used in industry and medicine. In humans MGMT protects the integrity of the genome, but also contributes to the resistance of tumors to DNA-alkylating chemotherapeutic agents. Therefore, modulation of MGMT expression is a possible strategy to improve the efficiency of cancer therapy and defend normal cells from toxicity of alkylating drugs...

Protective and antimutagenic activity of *S. nigra* lectins against some DNA-damaging factors with different mechanism of action (nickel ions and alkylating agents) have been studied in mammalian cells *in vitro*. Lectins are known to exhibit no enzymatic activity, but can up- and down-regulate the activity of different enzymes and other regulatory proteins such as cytokines... These lectins were shown to be able to affect in concentration-dependent manner the genotoxic activity of damaging agents and to modulate MGMT gene expression at the protein level. The obtained results give us the reason to assume that one of the protective mechanisms of the lectin acting is stimulating DNA repair in a cell, including direct reversal repair with the help of the MGMT enzyme.

In this research, elderberry lectins indirectly enhanced the repair of DNA damage in the lab. The elderberry lectins beneficially affected proteins and enzymes including messaging cytokines. These experiments evidenced “**direct reversal repair**” of damaged DNA in cells. Elder bark lectins may be more effective. Also, this research suggests regular ingestion of elderberry particularly before, and in connection with, chemotherapy sessions in order to protect healthy cells.