

Chemoprotective action of L-Selenomethionine in HepG2 cells: evaluation of stress genes expression induced by H₂O₂.

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Introduction: Among the agents that have been analyzed for chemoprotective potential for cancer, the components of diet have been the best scores, with the adequate intake of certain foods having the property to protect the DNA and consequently prevent the development of several cancers. Such studies provide evidence that foods provide nutrients and bioactive substances that can alter gene expression. The antioxidant activity of selenium appears to be responsible for its effectiveness in treating diseases which have as their development process the oxidative stress. Due to these aspects, it have been growing interest in investigating the roles of different selenium compounds as a therapeutic agent in various chronic degenerative diseases, such as cancers. **Objective:** The present study aimed to evaluate the cytotoxicity of L-Selenomethionine (SeMet) in HepG2 cells by the MTT assay and evaluate gene expression by RT-qPCR of genes of oxidative stress (GPx1, CATALASE) endoplasmic reticulum (EIF2AK3) and apoptosis (CASP9, BCL-XL) induced by H₂O₂ in HepG2 cells treated with L-Selenomethionine in order to ascertain its modulating and chemoprotective action. **Methods:** For the MTT assay 7 concentrations of SeMet were tested (5, 50, 100, 250, 500, 1000 and 2000 ng/mL) alone or associated with H₂O₂ (80 µM, 30 min) for 24h of treatment. In RT-qPCR were used 3 treatments: SeMet (500 ng/mL, 24h), H₂O₂ (80 µM, 30 min) and associated (SeMet, 24h + H₂O₂, 30min). The values of measured parameters in MTT were compared by ANOVA followed by Dunnett's test (p <0.05). Levels of gene expression were determined by Pfaffl et al. (2001), with statistical analysis performed using the software REST-2009, with p <0.05.

Results: In the MTT assay, treatment with SeMet showed cytotoxicity in 24h only in the two highest concentrations (1000 and 2000 ng/mL). In associated treatment, SeMet at 100, 250 and 500 ng/mL showed a cytoprotective action against the damage caused by H₂O₂, while higher concentrations (1000 and 2000 ng/mL) increased the cytotoxic effect caused by H₂O₂. In RT-qPCR there was no difference in expression of CASP9 and CATALASE with the control in any treatment. In BCL-XL, there was an up-regulation of 2,337 times in the associated treatment, while in EIF2AK3 down-regulated 3,333 times in the same treatment. GPx1 showed up-regulation of 5,162 times in the treatment with SeMet and 2,142 times in the associated treatment.

Conclusion: These results show that SeMet in the associated treatments increased antioxidant activity and shown to be antiapoptotic, protecting cells against damage caused by H₂O₂ and might be an alternative in preventive medicine.

Keywords: L-Selenomethionine, chemoprotective, cellular stress, RT-qPCR.

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