Effect Of Natural Antioxidant Lycopene On Hemin-Induced Oxidative Stress In Endothelial Cells

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INTRODUCTION. The most common inherited blood disease in Brazil is sickle cell disease (SCD). The oxidative stress plays a role of major importance in the development of chronic vascular inflammation and endothelial activation in people with SCD. A drug delivery system based on nanoparticles offers a novel direction of drug discovery as well as an improved delivery system for use with conventional drugs. The imbalance between the production of reactive oxygen species (ROS) and antioxidant enzyme activity in SCD generate oxidative stress and antioxidants, such as lycopene (the most potent active antioxidant among carotenoids), can counteract its effects. However, it has adverse effects and nanostructured drug delivery technologies could be improved the performance, decreasing its toxicity on the body. Nanoliposomes can be used as a vehicle to enhance targeted cellular delivery of therapeutics and nutrients. **OBJECTIVES:** Address the effect of lycopene on hemin-induced oxidative stress in endothelial cells. **MATERIALS AND METHODS:** Lycopene-loaded nanoliposomes will be prepared by extrusion method and characterized. The content of lycopene in the nanoliposomes will be determined by HPLC method. **RESULTS AND DISCUSSION**: Human umbilical vein endothelial cells (HUVEC) pre-incubated with lycopene-loaded nanoliposomes, empty nanoliposomes or lycopene dissolved in DMSO will be exposed to hemin to induce oxidative stress. The cellular effect of lycopene on intracellular ROS, glutathione level, apoptosis, inflammatory cytokines and DNA damage will be analyzed by flow cytometry (FACS). The expression of heme-oxygenase, endothelial nitric oxide synthase, superoxide dismutase and adhesion molecules in endothelial cells will be investigated by qRT-PCR. **CONCLUSIONS:** The data obtained in this project will indicate the potential of lycopene, especially the nanostructured formulation, to inhibit the hemin-induced oxidative stress in endothelial cells and may therefore provide a basis for the future development of therapies for SCD.

Palavra chave: lycopene, nanoliposomes, oxydative stress, hemin, intracellular ROS.
Patrocínio: CNPq, CAPES and FAPESB