Abstract

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Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are in an organism generated under normal or pathological conditions. There are antioxidant mechanisms, which protects the organism from their harmful effect. In case of imbalance between ROS/RNS production and antioxidant mechanisms, an oxidative stress is initiated. The oxidative stress is involved in the pathogenesis of many diseases, including cardiovascular desease. In consequence of higher presence of mitochondria and lower presence of antioxidants cardiomyocytes are more sensitive to the oxidative stress. Iron, by catalysing radical's reactions, significantly participates on formation and development of oxidative stress. Elimination of the free iron by iron chelators is one option how to prevent or moderate oxidative stress.

The aim of this master theses was to study cardioprotective effect in presence of H_2O_2 and own toxicity of newly synthetized aroylhydrazone iron chelators (H21, H22, H23, H24, H25 and H26) on rat embryotic cardiomyoblasts H9c2.

Protective and toxic properties of studied chelators were evaluated by cell viability assay based on neutral red uptake by living cells. Photographic documentation was made out by fluorescent microscopy of cells stained by mitochondrial probe JC-1.

All studied substances showed relatively low toxicity against H9c2 cells. Although, they were not able (with the exception of H24) to protect cells in a presence of 200 µM hydrogen peroxide. From all tested substances, only chelator H24 showed ability to protect cells from oxidative stress caused by H_2O_2. However, chelator H24 showed the highest own toxicity after 24 and 72 hours.

Even though my data haven´t showed expected results, they remain a source of important information for the next synthesis and study of new iron chelators with potentially cardioprotective properties.