

Abstract

Charles University in Prague, Faculty of Pharmacy in Hradec Králové

Department of Biological and Medical Sciences

Candidate: Bc. Edita Blažková

Supervisor: doc. RNDr. Vladimír Semecký, CSc.

Title of thesis: Experimental myocardial damage affected the administration of D-penicillamine

D-penicillamine is a substance with a wide range of use for the treatment of various diseases, especially Wilson's disease. This standard chelator is known for its ability to bind copper nonspecifically.

The first aim of the thesis was to describe in detail histopathological changes of the myocardium exposed to the effect of catecholamine, namely isoprenaline and to compare these changes with the structure of control group myocardium. The main aim was to verify potentially cardioprotective effect of D-penicillamine on the model of catecholamine induced damage. The description of histological changes complements the extensive results of in vitro and in vivo analysis.

The experiment was performed on adult male Wistar Han rats, which were divided into six groups. The first group was used as a control and only received saline, the second one and third one received D-PA alone at doses of 11 and 44 mg.kg⁻¹. The fourth group received only ISO in a single dose of 100 mg.kg⁻¹. The fifth and sixth groups were premedicated each with a different dose of D-PA (i.v., 11 and 44 mg.kg⁻¹) before ISO was subcutaneously administered to them. Present changes were observed and evaluated semiquantitatively within 24 hours.

In the control groups and rats which received only D-PA alone, no deviations from the physiological structure of the heart were seen, except capillary hyperaemia. ISO application led to moderately significant changes in the morphology of the rat heart, related to capillary hyperaemia, dilatation and edema of interstitial spaces, swelling of connective fibers, necrotic changes of cardiomyocytes, fragmentation of myofibrils and muscle trabecules and presence of macrophages or mast cells. Premedication with both doses of D-PA prior to administration of ISO led to the same result – loss of the morphological changes to slightly or not very significant level of their presence.

The cardioprotective potential of D-penicillamine has been confirmed by histological analysis, but further investigation is still needed.