

Abstract

Charles University in Prague, Faculty of Pharmacy in Hradec Králové

Department of Biological and Medical Sciences

Candidate: Bc. Petr Hruška

Supervisor: Doc. RNDr. Vladimír Semecký, CSc.

Title of thesis: Influencing the early phase of ischemic injury of rat myocardium selected flavonoids

Flavonoids are integral constituent of plants, to which are attributed many health beneficial biological activities. In this work we have studied possible cardioprotective effects of their two representatives, quercetin and rutin.

The aim of this experiment was to record the effect of quercetin and rutin on influence of possible pathological changes of building components of myocardium. The substances were given to the rats for 7 days p.o. through intragastric tube.

The model heart injury of a laboratory rat (adult male Wistar) was induced by one-time administration of isoprenaline (ISO) in both cases of studied substances. The changes caused by ISO have been observed for 24 hours. ISO hasn't been applied to the control groups in either of the experiments. The control group in the experiment with rutin was given sodium bicarbonate instead of rutin.

In the groups that weren't pretreated with either quercetin or rutin, there was found similar histological picture after ISO administration. Compared to the control group, there was markedly significant interstitial edema with dilatation, moderate local capillar hyperemia, necrotization of cardiomyocytes, and moderate fragmentation of myofibrils in endocardium, myocardium, and epicardium. The infiltration of leucocytes was also present in all parts of myocardium.

All the rats in the experiment with rutin have been given either sodium bicarbonate or rutin. Each substance has been applied in two different doses daily: 2,3 and 4,6 mg/kg of bicarbonate, 11,5 and 46 mg/kg of rutin. Compared to the control groups, in the groups pretreated with rutin there weren't found any marked changes of histological picture of myocardial tissue. The finding was similar at both doses.

The daily dose of 10 mg/kg quercetin has been applied to the first half of the specimen in the experimental group. The second half got physiological solvent (2 mg/kg) instead. While the experiment had been conducted, we have been noting histological changes, and also representative haemodynamic and biochemical parameters (blood pressure, heart rate, ejection fraction, ECG, cTnT, vitamin C, vitamin E, MDA). The wet weight of ventricles had been determined at the same time. Compared to the control groups, the ISO group pretreated with this substance showed similar histological, biochemical, and haemodynamical changes as the ISO group without pretreatment.

There was similar histological picture in the control groups of rats pretreated with flavonoids and in the control groups, to which were given substitute solutions.

According to our results, there were less morphological changes of ISO-induced heart injury after rutin premedication in this experimental setting. The pretreatment with quercetin didn't influence any signs of cardiotoxicity.