Opioids are considered as a dangerous addictive substances which are widely used in medicine for their strong analgetic effects. Opioids (such as morphine and methadon) may nevertheless play an important role in the resistance of the heart to ischemia by reducing the rate of cell damage. This protective effect is well understood about morphine but we don´t know almost nothing about effects of methadone on the myocardium. The main aim of this thesis was to find out how chronic methadone treatment affects ischemic tolerance of rat hearts.

For our experiments we used Wistar rats in two series. In the first series we administered morphine (10 mg/kg/day, i.m.) or methadone (2 mg/kg/day, i.m.) for 10 days. In the second experiment series we administered methadon for 28 days (2 mg/kg/day, i.m.). For analysis of the ischemic heart tolerance we used the isolated perfused heart method. Incidence and severity of ischemia and reperfusion arrhythmias were analyzed during the 50 min of ischemia and early reperfusion. Infarct size was analyzed histochemically, using tetrazolium salts and $KMnO_4$ 1 h after reperfusion and was determined by planimetric method.

In the first series of experiments analyzing the effect of 10-day administration of both opioids on the resistance of the heart to ischemia we did not find a significant effect of morphine and methadon on ischemic and reperfusion arrhythmias and the infarct size. In the second series of experiments, there was no significant change in the incidence and severity of ischemic arrhythmias in the rat heart due to the 28-day administration of methadone. Other parameters we could not compare because of the high incidence of ventricular fibrillation in the early reperfusion. The results suggest that chronic administration of high doses of methadone has no significant effect on ischemic tolerance of rat heart.