Hepatoprotective and antiobesity effects of mirabegron, a novel β3-adrenoceptor agonist, on carbon tetrachloride-induced hepatotoxicity in obese rat

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Abstract:

Introduction Mirabegron is a selective β-3 receptor agonist that is used now for the management of overactive urinary bladder disease. It has potential antiobesity and antiadibetic effects. The aim of the present study was to evaluate the possible hepatoprotective and antiobesity effects of mirabegron against carbon tetrachloride (CCl4)-induced hepatic toxicity in obese rats. Materials and methods Five groups of animals were used in the experiment. The first group was used as a control nonobese group. The second group included obese control rats that were fed on a high-fat diet. The third group was obese rats with hepatotoxicity, which was induced by injection of CCl4. The fourth and fifth groups were obese rats with hepatotoxicity and treated with mirabegron (10 mg/kg orally) and silymarin (25 mg/kg orally), respectively. After 30 days of treatment, blood samples were used for evaluation of hepatic function markers and the liver homogenate was used for the determination of malondialdehyde and reduced glutathione levels as indicators of oxidative stress. Results Mirabegron 10 mg and silymarin 25 mg/kg caused a significant reduction of body weight and Lee index of obese rats. CCl4 caused abnormalities in liver enzymes with an increase in oxidative stress markers. Treatment with mirabegron and silymarin caused improvement of hepatic function parameters and a significant reduction of malondialdehyde and increase in glutathione. Conclusion Mirabegron has a modest antiobesity effect and is useful in the treatment of hepatotoxicity. It also has antioxidant activity, which may be responsible for its effectiveness in the treatment of CCl4-induced hepatotoxicity.

Keywords:
antiobesity, β-3 adrenoceptor, hepatotoxicity, mirabegron, oxidative stress

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