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Effect of Metformin on thermal pain threshold in tail flick test in rat

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Background and Aim : Metformin is used as one of the main medications against type 2 diabetes. Inhibitory effects of Metformin on TRPV1 receptors are reported within the scientific literature. TRPV1 receptors are among the receptors which are involved in the perception of thermal pain. So the purpose of this investigation is to address the Metformin effect on the thermal pain in rat.

Methods : In this experimental study, 35 male Wistar rats, weighing 200 to 250 grams were used. Animals were categorized In 5 groups including control, sham (intraperitoneal injection of Metformin vehicle) and 3 groups of intraperitoneal administration of 200, 250 and 300 mg/kg Metformin. Tail flick test was used to measure the threshold of thermal pain.

Results : Metformin elevated pain threshold to a certain extent, thus it alleviated thermal pain sensation in tail flick test, as the dose of 250 mg/kg Metformin showed the most reductive effect on the thermal pain in contrast to the other doses.

Conclusion : According to the reports, inflammatory factors such as nerve growth factor, adenosine triphosphate, bradykinin and cytokines lead to increase of TRPV1 sensitivity. The sensitivity of these channels reduces the threshold for detecting painful thermal stimuli. Since Metformin decreases the production of inflammatory factor, it could be possible to say that this drug was able to decrease the sensation of thermal pain through the reduction of TRPV1 receptor sensitivity.

Keywords : Metformin, Thermal pain, Tail flick test, TRPV1