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Effect of metformin on formalin induced chemical pain sensation in male rat

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Background and Aim : Metformin is used as one of the main anti type 2 diabetes medications. There are reports of inhibitory effects of metformin on inflammatory mediators. Since these inflammatory mediators are involved in pain nociception, the purpose of this investigation is to address the metformin effects on the chemical pain induced by formalin in rats.

Methods : In this experimental study, 35 male Wistar rats, weighing 200 to 250 grams, In 5 groups containing control, sham (intra peritoneal injection of metformin solvent) and 3 groups of intraperitoneal administration of 200, 250 and 300 mg / kg metformin, were used. In order to determine the intension of chemical pain sensation , 30 minute after drug or its vehicle administration, 0.05 ml formalin 2.5% was injected sub plantar to the rat right hind paw and immediately after, animal behavioral responses were recorded for one hour.

Results : 250 mg / kg metformin showed the most reductive effect on the chemical pain induced by formalin in contrast to the other doses.

Conclusion : According to the reports, there is an inhibitory effect for metformin on the synthesis of pro-inflammatory cytokines like as TNF- α , IL (interleukin) and IL-6 within the macrophages, and since these mediators can activate their special receptors on the nociceptors it could be suggest that the activation of AMPK by metformin may be at least in part can reduce the chemical pain sensation caused by formalin sub plantar injection.

Keywords : Metformin, Chemical pain, formalin, Inflammation, AMPK