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Anti- inflammatory effects of cannabinoid 2 receptor agonist, GW405833, in a model of carrageenan-induced acute inflammation of the rat paw

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In our previous studies, we had evaluated some effects of the cannabinoid (CB)2 receptor activations during the inflammatory processes of peripheral tissues after intestinal ischemia/reperfusion. This study was designed to investigate the anti-inflammatory effects of selective CB2 receptor agonist, GW405833, in the carrageenan paw oedema test of rats. Mix type and neurogenic inflammation were induced by giving an intraplantar injection of carrageneen (50 µl, 1%) or capsaicin (50 µl, 0.1%) respectively, into the hind left paw. The study was designed in two series of groups: In the first group, plasma extravasations were measured via Evans blue dye method. The dye was injected in the tail vein 15 min before the end of the experiments. The anaesthetized animals were sacrificed by decapitation, and hind paws were incubated with formamide, and then the extracted dye was measured by spectrophotometry at 620 nm. In the second group, paw thickness was measured with electronic digital callipers, prior to and 4 h following carrageenan or 1 h following capsaicin administration, which corresponds to peak oedema. The anti-oedematous effects of GW405833 (3 mg/kg, i.v.) were compared to diclofenac (10 mg/kg, i.v.), a nonselective cyclooxygenase inhibitor, 15 min before these intraplantar injections of inflammatory agents. CB receptor involvement in the anti-inflammatory effects of GW405833 was evaluated by administration of the CB2 receptor antagonist, AM630 (1 mg/kg, i.v., 5 min before CB2 agonist injection). Pretreatment of rats with both GW405833 and diclofenac significantly attenuated carrageenan-induced paw oedema ($P<0.05$) compared to vehicle-treated group. Likewise, GW405833 strongly inhibited capsaicin induced-oedema. In the second group, GW405833 significantly decreased the plasma extravasations in both carrageenan-induced mix type inflammation and capsaicin-induced neurogenic inflammation of rat paw. CB2 receptors mediate the anti-oedematous and anti-plasma extravasations effects of GW405833. The pretreatment with AM630 clearly reversed the all those effects of GW405833, which suggests a significant interaction between GW405833 and AM630. These results suggest that the GW405833 reduces inflammation through the activation of CB2 receptors when administered after carrageenan, and that effect seems to be related to the suppression of neurogenic inflammation.

Biography

Seyfullah Oktay Arslan has completed his PhD in 1995 from Istanbul University. He is the Director of Pharmacology at Faculty of Medicine, Yildirim Beyazit University, Ankara, Turkey. He has research experience of 25 years and has published over 30 papers in reputed journals. His areas of research interest are inflammation, asthma, and ischemia/reperfusion. He performed as the member of Drug Bioequivalence Commission of Health Ministry in 2004-2010 years. In addition, he has GLP and GMP knowledge experiences.

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