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Role of BK channels in anesthesia

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Millions of people suffer from pain worldwide, and annually, great economic costs are imposed on societies for pain relief. Analgesics such as alpha-2 adrenergic receptor agonists, which have low risk of complications, can be effective in assuaging pain and reducing costs. According to former studies, potassium channels play an important role in the analgesic mechanism of these receptors. This study aimed to determine the role of BK potassium channels in analgesia induced by alpha-2 adrenergic receptors. This study was performed on 56 male Wistar rats weighing 250-300 g that were divided into seven groups of eight rats. We administered 0.7 mg/kg intraperitoneal (IP) injection of clonidine, 1 mg/kg IP injection of yohimbine, and 5 mg/kg intracerebroventricular (ICV) injection of yohimbine. Iberiotoxin at a dose of 100 nm was also injected ICV. Normal saline and DMSO were applied as solvents. Pain severity was evaluated using formalin test at a concentration of 2%. The chronic pain induced by formalin injection was relieved by IP injection of 0.7 μ /kg clonidine. Moreover, 5 μ g/kg and 1 μ g/kg ICV administration of yohimbine with mean chronic pain scores of 2.29 \pm 0.13 and 2.09 \pm 0.07, respectively, could significantly inhibit analgesic effect of clonidine with mean chronic pain score of 1.55 \pm 0.14 (p <0.001). ICV injection of iberiotoxin with mean chronic pain score of 2.33 \pm 0.16 at a dose of 100 nm significantly diminished analgesic effects of clonidine. Alpha-2 adrenergic receptor agonists could induce analgesia in the animals, and the antagonist of this receptor inhibited the analgesic effect of agonists of these receptors. BK channel inhibition prevented analgesic effect of adrenergic receptor agonists, as well.

Biography

Ghassem Attarzadeh worked as an Assistant Professor, Physiology Department, Hormozgan University of Medical Sciences, 1996, Iran. He pursued PhD in Neuroscience, Department of Neuroscience, University of Edinburgh (2002-06). He completed MSc in Human Physiology from Tarbiat Modarres University-Tehran-Iran (1992-95). B.Sc. of Biology: Ferdowsi University-Mashad-Iran, 1984-89. Hormozgan University of Medical Sciences, Department of Physiology, lecturer, 1995-2002.

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