

2. Abstract

The curative actions of opioids have been known over two millenia. However, the mechanisms of their analgesic effects were only decoded in the last 20 years. There are 3 main types of opioid receptors (μ , κ , δ), that are together with the opioid peptidic system involved in antinociceptive processes and are widespread in the nervous system. Calcium plays a very important role in the pain perception and antinociception. Changes in its concentration are crucial for the neurotransmitter release. The relationship between the analgetic actions of opioids and the availability of Ca^{2+} in the CNS is explained in the way that, decreasing extracellular concentration of Ca^{2+} and/or by passaging through the membrane, antinociception will increase. Opioid analgesic effects are limited by their relatively high ability to create tolerance or addiction. Since these effects only result from heavy doses and long-term usage, severe complications should not arise during the right usage of these drugs. However, opioids can also have neurotoxic effects. The opioid-induced toxicity occurs in case when opioids release toxic metabolites during the process of their degradation in the liver. The neurotoxicity can be induced by the oxidation of the double bond in the opioid's chemical structure, thus producing free radicals damaging the tissue. This work summarizes the contemporary knowledge, concerning opioid antinociceptic and neurotoxic effects.

Keywords: nociception, neurotoxicity, opioids, opioid receptor, tolerance, dependence