

Abstract

This work deals with the specifics associated with the use of opioid analgesics in pain relief. In terms of antinociceptive effects, opioids have not yet been surpassed by other available drugs. However the use of these analgesics is quite problematic in many respects. For over 30 years, studies have shown that opioids can adversely affect components of the immune system (IS) and thus the overall condition of the patient. To understand the relationship between opioids and IS, it is necessary to know the mechanisms leading to immunomodulatory processes. Contact with opioids occurs at the cellular interface through interactions with opioid receptors (ORs). Within IS, we encounter all three basic types of OR – μ (MOR), δ (DOR), κ (KOR) and non-classical nociceptin receptors (NOP). Stimulation of these receptors induces activation of signaling cascades in target cells which can lead to dysregulation of cellular processes, thus modulating the immune response. However, the effect of opioids on IS cells may not be exclusively direct. More complex regulatory pathways have been found, involving parts of the central nervous system (CNS), the sympathetic nervous system (SNS), and endocrine-active tissues. Activation of these pathways then affects the activity of whole lymphoid organs.

Each cell type within an IS is unique in terms of immunomodulation. The resulting effect depends on the way the stimulus is processed and passed on – it depends on the level of expression of the respective receptors and signaling molecules. These conditions differ not only between individual cell lines of the immunocytes but also between the developmental stages of the cell. Furthermore, the naive cell will respond differently than the activated cell. Opioids affect the production of cytokines and antibodies, alter the expression level of receptors, interfere with the specific functions of a given cell type, and cause dysregulation of the differentiation and proliferation of said cells. All these effects can ultimately lead to the disruption of the integrity of the organism and reduce its defense against external influences.