ABSTRACT

The exact role of opioid receptors in drug addiction and modulatory mechanism of action of monovalent cations on these receptors are still not fully understood. Our results support the view that the mechanism of addiction to morphine is primarily based on desensitization of μ- and δ-opioid receptors. Desenzitization of agonist response proceeds already at the level of G protein functional activity. Long-term exposure of rats to morphine resulted in increase of number of δ-opioid receptors and change of their sensitivity to sodium ions. Analysis of the effect of different monovalent ions on agonist binding in δ-OR-$G_i1\alpha$ (Cys^{351}-Ile^{351})-HEK293 cell line confirmed the preferential sensitivity of δ-opioid receptor to sodium ions. We have distinguished the high- and low-affinity Na^+ sites.

Biophysical analysis of interaction of lithium, sodium, potassium and cesium ions with plasma membranes isolated from HEK293 cells with the help of fluorescent probes indicated that monovalent ions interact, in low-affinity manner, with the polar, membrane-water interface of membrane bilayer.

Key words: morphine, forebrain cortex, opioid receptors, G proteins, monovalent ions, plasma membrane, fluorescence spectroscopy.