ABSTRACT

In this Thesis, we examined the influence of morphine administration to the laboratory rats on the amount of μ-opioid receptors and caveolins in their cerebral cortex. Effect of morphine is known to be caused by its binding to opiod receptors, in particular to the μ subtype, and a long-term exposure to morphine reduces the functionality and number of these receptors as part of the resulting tolerance and addiction.

Caveolins are proteins essential for formation of the membrane microdomains of caveolae, although it is known today that presence of these proteins is not limited to caveolae and their function is probably independent of these domains (they may participate in the regulation of cell signaling pathways, lipid transport, etc.). The function of caveolins in brain cells is not precisely known yet.

In the experimental part of this work, we used the Western blot method to estimate the presence of caveolin-1 and caveolin-2 in the cerebral cortex of the rats after ten-days morphine application and in control animals. A significant increase of caveolin-1 was observed after morphine treatment as compared to control animals; a smaller, non-significant increase of caveolin-2 was also found. The amount of μ-opioid receptors in morphine affected animals was significantly decreased compared to controls. Thus, the changes corresponding to the long-term adaptation were observed already after ten days.

Key words: opioid receptors, biological membranes, lipid rafts, caveolins, morphine