

## **Abstract**

The group of G protein-coupled receptors (GPCRs) represents a large and important family of membrane receptors that transduce extracellular signals into the cell. There are many known types of GPCRs involved in most mediator systems of the nervous system. The present thesis focused on  $\beta$  adrenergic receptors, adenosine receptors, muscarinic acetylcholine receptors and opioid receptors.

The main goal of this paper was to use SDS-PAGE and Western blot methods to detect and analyse changes in the expression of selected GPCRs that occur during differentiation into neural cell types. Experiments were performed using the human neuroblastoma model line SH-SY5Y, where differentiation was induced by retinoic acid. The second used model line was human pluripotent stem cells (iPSCs) that differentiated after fibroblast growth factor 2 withdrawal. The consequent aim of the thesis was to compare the measured data across the two lines and to put the results into the context of existing publications.

The results of the experiments showed that changes in the levels of GPCRs occur during cellular differentiation of SH-SY5Y and iPSC lines. Both increases and decreases in the expression of individual receptors were observed. Changes in expression not only varied among the different receptor subtypes examined, but also depended on the cell line used, suggesting that changes at the level of GPCRs can be highly variable during differentiation.

Keywords:

induced pluripotent stem cells, SH-SY5Y cells, G protein-coupled receptors, differentiation, adrenergic receptors, adenosine receptors, muscarinic acetylcholine receptors, opioid receptors