

Abstract

The aim of this bachelor thesis is to describe basic and the most important mechanisms of adenosine signaling, especially in the central nervous system, where the purine nucleoside adenosine plays important role like significant neuromodulator. Strong release of adenosine to extracellular space may occur under some pathological conditions. Adenosine works through his four receptors, which have very diverse functions. Some effects are neuroprotective – these are predominantly mediated through the inhibitory A1 receptor, which can reduce neurotoxicity, others may also induce neurodegeneration, mainly due to increased activation of A2A receptors. This signaling system can be diversely modulated, for example by inhibition of enzymes, which can provide adenosine formation or degradation, blocking its transporters, by agonists or adenosine antagonists, or by inhibition of second messengers and various protein kinases by which adenosine affects cellular processes. Interactions of adenosine receptors with other types of receptors in the brain are also important. Adenosine and adenosine receptors can participate in neurodegenerative processes. A detailed understanding of the specific effects of adenosine can bring great progress in the treatment of neurodegenerative diseases. At present, intensive research of various ligands of adenosine receptors, including caffeine, is underway because these substances have a great therapeutic potential.