

The use of different types of psychoactive drugs, especially by young people, is a great concern for EU societies. Novel psychoactive substances (NPS) is the common name for various kinds of products containing psychoactive substances that for some time has not been listed in the act on prevention of drug abuse. One of these substances is mephedrone (also known as 4-methylmetcathinone, 4-MMC, M-CAT), a synthetic derivative of cathinone. For a long time, mephedrone has been easily accessible for sale both online and in some stores called "smart shops". An increase in the popularity of mephedrone in Europe and in the whole world has resulted in fatal cases among abusing adolescents. In Poland, the production, use and sale of mephedrone were banned on the 25th of August 2010. Unfortunately, this action has only slightly reduced the drug sale, which has moved to the Internet. Mephedrone is being currently increasingly used, along with other club drugs such as weed, MDMA and cocaine. It is frequently compared to MDMA and amphetamines based on their similar mechanism of action and pharmacological effects. It has been shown that mephedrone increases dopamine (DA) levels in a similar manner to amphetamine and produces a more pronounced increase in serotonin (5-HT) level than MDMA. The first clinical study found significant similarities between mephedrone and MDMA in regard to euphoria, well-being and changes in perception. Whilst it appears that mephedrone's effects in animal studies have been studied extensively, the social interactions induced by this drug are still unrecognized. Our question regarding these effects arose based on insights of similarities between mephedrone and MDMA mechanisms of action and perception changes described by users. The research has been planned so as to apply an interdisciplinary approach, including biochemical studies (immunoenzymatic and chromatographic methods) and animal behavioral studies. The main objective is to assess the dopaminergic and serotonergic mechanisms underlying the mephedrone effects on social interactions, as well as the involvement of neuropeptides such as oxytocin and vasopressin in the observed effects. The implementation of the proposed project will explain the unknown effect of mephedrone-induced response to social interactions in rats. Moreover, it will allow to identify the possible molecular targets of this effect. This will provide an opportunity to determine neuronal pathways associated with these effects and give the necessary background for further, more precise research to evaluate these mechanisms in detail. Furthermore, the results obtained in this project will help to understand the processes underlying the social effects of mephedrone which are key steps to predicting the risk of NPS abuse.