According to World Health Organization, alcohol abuse is responsible for over 3 million of people deaths worldwide every year. The most severe form of alcohol abuse is alcohol addiction, alternatively referred to as alcoholism. Alcoholism is a psychiatric disorder of the central nervous system related to a loss of control over repetitive alcohol drinking patterns. Along with numerous health complications, it follows with socio-economic burdens that affect the drinkers, their families, and society as a whole. Unfortunately, mainly due to the massive withdrawal symptoms, treatment of alcohol addiction remains exceptionally challenging. Simultaneously, there are no medications that might be prescribed for current drinkers and those who want to give up drinking. For that reason, a lot of efforts are made to recognize neural mechanism involved in the shaping of alcohol addiction-related behaviors.

It was found that chronic alcohol consumption results in the abnormal release of dopamine, which is the primary neurotransmitter responsible for feeling pleasure and motivation. Moreover, dopamine alters the action of others neurotransmitters in the brain, mainly glutamate. Numerous evidence demonstrated that glutamate induces structural changes of connections between the brain cells. These changes are essential, e.g., for memory formation, however, they also underly the development of addiction.

Identification of trace amine-associated receptor 1 (TAAR1) shed some light on the neural mechanism involved in the development of addiction. TAAR1 is an essential regulator of dopaminergic neurotransmission and thus, may participate in dependency process. Importantly, activators of TAAR1 attenuated the behaviors observed in addiction of psychostimulants. Some evidence suggests that TAAR1 may also be a key target in the therapy of alcoholism. Therefore, following project aims to determine, whether activation of TAAR1 affect the behaviors related to alcohol addiction and induce the structural changes within the brain. For this purpose, mice will be trained for alcohol addiction, and TAAR1 activators will be administered to assess their role in attenuation of motivation to obtain alcohol, alcohol-seeking during withdrawal and anxiety. Finally, confocal microscopy and standard molecular biology methods will be used to evaluate structural modification in brain cells connection as well as to determine expression levels of Taar1 in parts of the brain associated with the shaping of alcohol addiction. This study may prove the potential role of TAAR1 in the regulation of alcohol addiction-related behaviors and thus, contribute to novel methods of therapy in the treatment of this disease.