

GENERAL PUBLIC SUMMARY

Alcohol addiction is a complexed psychiatric disorder influenced by genetic, social and psychological factors. The development of neurobiological methods helps to broaden the knowledge about the interactions between these factors and aetiology of the disease.

In our research we use a model of alcohol addiction which takes under the consideration both social and psychological factors in the development of the disease. The mice live in groups and have access to food, water and alcohol. They chose what and when they want to consume. Their activity is observed and analysed so that we are able to measure not only consumption of alcohol but also pathological behaviours, which are components of alcoholism in people. After a month of alcohol drinking we observe that some animals drink more alcohol, are more motivated to get access to alcohol, are more persistent in alcohol seeking when the access to it is limited, show increased reactivity to alcohol-associated cues and drink more alcohol in relapse than before withdrawal.

Brain reward system is a network of few structures which is said to be underlying the development of the addiction. The structures communicate with each other using neurotransmitters, such as glutamate. Thanks to the development of electrophysiology it was observed that specific changes in glutamatergic communication underlie addiction-related behaviours. In particular glutamatergic synapses become silent as they lose receptors, called AMPA.

In our research we observed that silent synapses appear also in the brains of mice trained to drink alcohol. These synapses disappear after few days of withdrawal and reappear after 90 minutes of exposure to alcohol-related cue. In this project we would like to test the effect of a therapeutic drug widely used to treat alcoholics – acamprosate, on silent synapses. The molecular processes regulated by acamprosate are not fully understood but the recent findings suggest that it might indirectly influence the appearance of silent synapses. The better understanding of the processes regulated by acamprosate shall lead to development of more successful treatments of alcoholism.