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Role of interleukin-1 system in alcohol drinking and preference

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Behavioral and gene expression studies indicate that the IL-1 system is associated with alcohol drinking behavior. The GABAergic transmission in central nucleus of the amygdala (CeA) is one of the crucial mediators of alcohol addiction. Thus, we hypothesize that the IL-1 system plays an important role in alcohol effects via modulation of CeA GABAergic synapses. It was examined interactions between IL-1 system and ethanol on GABAergic transmission in brain slices containing CeA using intracellular and whole-cell recordings. Superfusion of IL-1 β decreased GABAergic transmission, whereas ethanol enhanced it in B6129SF2/J mice. To elucidate a role of IL-1 receptor antagonist (IL-1ra) in ethanol effects at the CeA GABAergic synapses, we used IL-1ra knockout (KO) and wild type (WT) mice. Differences in baseline phasic and tonic GABA transmission between KO and WT mice were found. The pretreatment of CeA slices with exogenous IL-1ra (Kineret) reversed changes in the baseline phasic GABA transmission in KO mice. Superfusion of ethanol significantly enhanced GABA in majority of WT mice, whereas in KO only 50% of neurons showed an increase. The pretreatment with Kineret also restored ethanol-induced potentiation of the GABA in KO, while it had no effects in WT mice. Our results suggest that the IL-1 system is involved in a regulation of the CeA GABAergic transmission and may modulate ethanol effects at these synapses. Furthermore, IL-1 system may represent a potential therapeutic target for alcoholism.

Biography

Michal Bajo received his PhD in 2002 from Comenius University in Bratislava, Slovakia. He undertook Postdoctoral training in cellular physiology of addictive disorders using electrophysiological techniques at the Scripps Research Institute (TSRI) in La Jolla, California. Currently, he is a staff scientist in the Committee on the Neurobiology of Addictive Disorders at TSRI. His research includes the role of neuroimmune system in development of addiction with focus on alcohol and nicotine.

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