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## Interactions between GS and GI protein-coupled receptors and their potential role in pathophysiology and treatment of brain disorders Eliyahu Dremencov

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It was reported that  $G_{as}$ -coupled dopamine receptor  $D_1$  and adenosine receptor  $A_{2A}$  form dimers with  $G_{al}$ -coupled adenosine receptor A1 and dopamine receptor  $D_2$ , respectively. Similar dimer is formed by  $D_1$  and  $D_2$  receptors. Since these dimers are  $G_{aQ}$ -coupled, the dimerization might have strong functional output.  $G_{as}$  and  $G_{al}$  receptors play an important role in regulation of serotonin, norepinephrine and dopamine transmission. Since monoamines play an important role in pathophysiology of brain disorders, interactions between  $G_{as}$  and  $G_{al}$ -coupled receptors might be a target for CNS drugs. Indeed, co-activation of  $D_1$  and  $D_2$  receptors stimulates neuronal activity in pirifirm cortex and suppresses hippocampal synaptic plasticity, social interactions and working memory in rats. It suggests that interactions between  $D_1$  and  $D_2$  receptors play a role in age, memory and cognitive disorders. Activation of  $A_{2A}$  receptors inhibits the firing activity of NE and DA neurons in locus coeruleus and ventral tegmental area, respectively. This inhibition reversed by subsequent blocking of  $A_{2A}$  receptors and restored by administration of agonists of  $D_2$  or  $\alpha_2$ -adrenoceptors. Antagonists of  $A_{2A}$  receptors potentiate stimulatory effect of haloperidol on extracellular levels of NE and DA in prefrontal cortex and nucleus accumbens, respectively, and reduce haloperidol-induced catalepsy in rats. It suggests that molecular and functional interactions between  $G_{as}$  and  $G_{al}$ -coupled receptors potentiate stimulatory effect of haloperidol on extracellular levels of NE and DA in prefrontal cortex and nucleus accumbens, respectively, and reduce haloperidol-induced catalepsy in rats. It suggests that molecular and functional interactions between  $G_{as}$  and  $G_{al}$ -coupled receptors might be a common pattern playing an important role in pathophysiology and treatment of various CNS disorders.

## **Biography**

Dr Dremencov completed his BSc in Biology (1996) and MMedSc (2000) in Neurobiology in Hebrew University of Jerusalem. Performed PhD studies in Bar-Ilan University (2005, Israel) and Postdoctoral fellowship in the University of Ottawa, Canada (2007). Senior scientist in Brains On-Line BV, BMC Netherlands, and University of Groningen, the Netherlands (since 2008). Member of the International College of Neuropsychopharmacology (ICNP) and laureate of ICNP Rafaelson Prize (2006) and Honorary Mention (2008). Member of European College of Neuro-psychopharmacology (ECNP) and winner of ECNP (2008) and Society of Biological Psychiatry (2007) Fellowship Awards. Author of two books, six book chapters, and thirty-three (33) peer-reviewed manuscripts and more than fifty (50) congress presentations.

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