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VGLUT3 and vulnerability to addiction (COFACE)

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Addiction is a compulsive pattern behavior that takes place at the expense of most other activities. It leads to a loss of control and reoccurring episodic abstinence and relapse. The economic and societal costs of addiction are tremendous. The secret of addiction lies in the nervous system, more particularly in the dysfunction of brain communications in the reward system. To communicate with each other, brain cells (or neurons) use a combination of electrical and chemical signals. These messengers, called neurotransmitters, are released by specific neurons. The neurotransmitters, dopamine (DA), acetylcholine (ACh) and glutamate, are key players in addiction. The role of dopamine release in reward prediction and the use of addictive drugs is well documented. The role of acetylcholine neurons, however, is still poorly understood. Acetylcholine neurons have long been believed to communicate solely with ACh. We recently made the surprising discovery that acetylcholine neurons from the nucleus accumbens (a particularly important area of the reward system) use two transmitters: glutamate and acetylcholine. In the COFACE project we investigate the implications of this neuronal “bilingualism” on addiction. Our findings could lead to the establishment of alternative medications for the treatment of addiction.