Editorial

Pharmacological Treatments of Alcohol and Drug Addiction: What's New?

Addiction is a chronic, relapsing disorder characterized by compulsive substance seeking and substance use despite negative consequences [1]. This complex brain disease involves interactions between genetic components, individual and environmental factors (including familial, peer models, exposure to stressful factors, traumatic experiences, incarceration) [2]. Cognitive deficits (memory, learning, decision making, inhibitory control) also play a major role in the development and the persistence of this disease [3]. Many models, such as incentive salience [4], or a progression from impulsivity (positive reinforcement) to compulsivity (negative reinforcement) [5] or reward deficiency [6] have been proposed for addictions. Across these models, motivational neurocircuitry, including dopaminergic systems, is dysregulated. Additionaly, brain imaging studies of dependent-patients have demonstrated brain structural abnormalities as well as changes in reward circuitry and neurotransmitter systems and metabolite changes [2].

Addictive disorders are a significant worldwide public health problem associated with somatic, psychiatric, socio-economic, and legal complications. Substantial advances have been made in pharmacological treatments for addictions due to the better understanding of the underlying neurobiology contributing to drug use and relapse [7, 8]. Many pharmacological agents have been evaluated for their effectiveness in improving alcohol or drug treatment outcomes. Various clinical trials and many meta-analyses in this area have been published. Two major goals are essential in the treatment of addictions: abstinence initiation and relapse prevention [9].

According to the recent literature, the main identified pharmacological targets for addictive disorders are 1) positive reinforcement (drug reward), 2) negative reinforcement and 3) individual vulnerabilities such as psychiatric comorbidity and cognitive deficits [9].

The agonist replacement therapy and antagonist agents are a pharmacological approach that targets drug reward. The first one uses a drug from the same pharmacological family as the abused drug to suppress withdrawal and drug craving. Clinical examples include the use of methadone or buprenorphine treatment for opiate dependence and varenicline or nicotine replacement therapy to treat nicotine dependence. Potential agonist medications for cocaine dependence include d-amphetamine, methylphenidate, modafinil and disulfiram [10]. Antagonist approach uses medications that block the effects of drugs. For example, naltrexone has been found to be effective for opioid and, more recently, alcohol addiction [9]. The recent development of immunotherapies is a more novel pharmacologic approach. Research on these agents is progressing rapidly and nicotine and cocaine vaccines have advanced to the level of human clinical trials [8].

Withdrawal symptoms, drug craving and negative mood states (i.e. anxiety, anhedonia, sadness) are the main negative reinforcing effects of abstinence that play a role in the maintenance of addictions. Pharmacological agents targeting glutamate, GABA, dopamine, norepinephrine systems may play a crucial role in developing new strategies to target negative reinforcement.

Targeting psychiatric comorbidity (including mood and anxiety disorders, attention-deficit hyperactivity disorder and schizophrenia) is another way to use pharmacological treatments in addictions [11, 12]. As we said before, cognitive deficits are also important in addictive disorders, cognitive enhancement strategies may help patients to engage in treatment and to stop their drug use [13].

In this Special Issue focusing on the pharmacological treatments of addictive disorders, international experts have made the state of the art of the question in many areas: tobacco [12], cannabis [13], alcohol [14-16], cocaine [17-20], opiates [21], eating disorders [22], pathological gambling [23]. We hope that these articles will contribute to help clinicians in their daily practice. Additional research efforts should be made to define novel targets for treatment.

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