Manipulation of the DA signal on the onset of relapse of ACD

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It's widely known that all addictive drugs show analogous pathological behaviours consisting in compulsive drug seeking, loss of self –control and propensity to relapse. This evidence is suggestive of a common brain mechanism involving the Ventral Tegmental Area and Nucleus Accumbens whereby mesocorticolimbimc dopamine pathway. Different and apparently anthitetic classes of drugs of abuse manage to increase DA release, in the aforementioned areas (Di Chiara, 1988; 1995). Reductions in activity of the mesolimbic dopamine system in the nucleus accumbes occur during drug withdrawal in animal studies (Weiss F et al. 1992; 1996).
Experimental evidences have proven D2 receptor involvement in drug seeking and reinstatement behaviours. In that, according to the hypo-dopaminergic hypothesis of drug abuse, striatal D2-receptors significantly decrease during forced abstinence (Thanos, 2008). These premises suggest that D2 receptor manipulations might represent a valid strategy for alcohol dependence.
Ropinirole, a D2-D3 receptors agonist, apparently acting on post-synaptical terminal and thus previously administered in methamphetamine withdrawal (Hoefer, 2006), could reduce drug intake in the reinstatement by means of its presumable properties in compensating DA reduction during abstinence. Acetaldehyde, alcohol first metabolite, is able to induce and maintain an operantdrinking behaviour, because of its addictive properties (Cacace, 2012).
This research pointed at evaluating Ropinirole protective effect on ACD relapse as a possible therapeutic tool, together with a dose-response investigation.
Rats were trained to self-administer ACD 3,2% solution along 30 days. Then, animals underwent three cycles, each one consisting of withdrawal (7days) followed by relapse phase (5 days). The first withdrawal-relapse cycle provided basal information of animal responses for ACD. During the second withdrawal phase, rats were treated i.p. daily with Ropinirole under the dosage of 0.03mg/kg. A third cycle of withdrawal and relapse was performed so as to correlate the drug potency to a higher dosage of 0.05mg/kg. Preliminary data convey that the aforementioned DA agonist is able to reduce animal responses for ACD also at the latter dosage, which is proved by a lower frequency of lever presses during the third relapse phase.
An open field test was used to exclude a not specific Ropinirole effect on reducing locomotor activity and to assess dopaminergic activation by measuring the number of episodes of stereotypes, such as grooming and rearing. Our results indicated that this DA agonist, administered during withdrawal phase, is able to limit ACD reinstatement with responses dose-related. Such studies may be implemented in order to assess Ropinirole efficacy in other drug addictions, starting with alcoholism investigations.

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