Neurobiological correlates of cocaine-induced anxiety in withdrawn rats

El Hage C., Morel A.L., Luppi P.H. & Bérod A.
CNRS UMR 5292, INSERM U1028, Centre de Recherche en Neurosciences de Lyon, France

1. Context

Chronic cocaine treatment
Withdrawal ➔ Characterization of anxiety symptoms during cocaine withdrawal
20 mg/kg, i.p for 14 days ➔ Anxiety

Identification of neurobiological correlates underlying cocaine-induced anxiety

2. Behavioral study

○ Cocaine withdrawal increases anxiety in high anxiogenic environments

Elevated Plus Maze
Open Arm
Shock Probe burying

Reversed by diazepam (0.5 mg/Kg)

Effects of cocaine withdrawal on anxiety-related behaviors assessed in the elevated plus-maze, open arm and shock-probe burying tests in cocaine-treated rats (black bars) compared to saline-treated rats (white bars). Behaviors were assessed at day 2, 7 and 28 of withdrawal. Data are expressed as mean ± SEM, *p < 0.05, **p < 0.01 versus the corresponding group of rats in basal conditions.

○ Cocaine withdrawal does not affect depression-like behavior in forced-swim and sucrose preference tests

3. Neuroanatomical study

○ Cortical region reactivity after OA exposure

Anterior cingulate
Prelimbic
Infrolimbic

○ Sub-cortical region reactivity after OA exposure

Lateral septal nucleus
Accumbens nucleus
Paraventricular hypothalamic nucleus
Paraventricular thalamic nucleus
Anterior hypothalamic area
Lateral hypothalamic area
Medial amygdala
Subiculum
Periaqueductal grey

Number of Fos positive cells/mm² in different brain regions in saline- and cocaine-treated rats before and after OA exposure. Data are expressed as mean ± SEM, *p<0.05, **p<0.01 versus the corresponding group of rats in basal conditions.

4. Conclusion

Cocaine withdrawal

Difficulty to cope with high anxiogenic environments

Role of the mPFC in the expression of anxiety-related behaviors during withdrawal? (Muscimol/Picrotoxin microinjections in the mPFC)

Contact: Cynthiaelhage@hotmail.com