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## 4-Chloroethcathinone (4-CEC) in a single binge exposure triggers immediate and long sustained cognitive dysfunction in mice

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### Abstract

**Background:** Synthetic cathinones (SC) are  $\beta$ -keto analogues of amphetamine. They usually produce short-lived stimulant effects, which trigger higher desire of re-dosing with potential risk of overdosing. Its consumption occurs frequently in the form of multiple administration during a single exposure-event (binge), mostly by young party attendees. Adolescence is a critical time of brain development, and any disruption has a high risk of inducing brain dysfunction. 4-chloroethcathinone (4-CEC), a briefly studied SC, has been identified in seized samples and linked to overdose cases [1,2], but its repercussions on cognitive functions have not been assessed, yet. Currently, there is limited information, even contradictory, on the short- and the long-term cognitive implications associated to SC use during adolescence, and even fewer when binge exposure is thought. Hence, this study aimed to demonstrate the short- and long-term effects of a single binge exposure to 4-CEC on cognitive and emotional functioning of young compared to adults. **Methods:** Young (1-month) and adult (6-months) mice were exposed to a single-binge (2x16mg/kg or 2x32mg/kg, ip, 2h interval) of 4-CEC or saline and the effects on learning/memory were assessed, by the Morris watermaze, at 24h, one and 6-months (long-term) post exposure. Effects on emotional behaviors were assessed at the same three time points, too. **Results:** The obtained results demonstrate that a single binge exposure to 4-CEC elicited, long lasting, learning and memory impairment, associated to anxiolytic behaviour and increased apathy. Most importantly, young mice seem to be more susceptible to 4-CEC than adult mice. **Conclusions:** These results alert the cognitive impact and on mental health that a 4-CEC single binge exposure may have, especially during adolescence, when brain plasticity is still occurring.

**Keywords:** synthetic cathinones; 4-chloroethcathinone; binge

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