Adolescent chronic sleep restriction has short and long-lasting effects on alcohol drinking and behaviours in msP rats

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Background: Sleep disruption is associated with the deterioration of cognitive functions, altered emotions, and an enhanced propensity to engage in risk-taking behaviours. In modern society, chronic sleep restriction (CSR), defined as gaining less than 8-10 hours of sleep per night for consecutive nights, has become an epidemic among adolescents and this has been correlated with increasing risk of developing alcohol use disorders (AUD) and neuropsychiatric diseases, globally. However, a causal link between impaired sleep and development of AUD remains hazy. In this study, we hypothesized that adolescent CSR has short- and long-term effects on alcohol consumption and on AUD neuropsychiatric comorbidities.
Methods: Male Marchigian Sardinian alcohol-preferring (msP) were divided into yoke control (YC, n=18) and sleep-restricted groups (CSR, n=22) and subjected to 6hrs or 20hrs of automatic sleep restriction, respectively, for 4 consecutive days. On the fifth day, rats were exposed to a 2-bottle choice paradigm (between 10% alcohol solution and water) to measure alcohol drinking. This cycle was repeated through the adolescent period (postnatal day 25 to 54) and then rats were allowed to recover for 5 weeks. Behavioural tests were carried out 1 and 5 weeks after the end of the CSR protocol to assess short- and long-term effects, respectively
Results: Automatic CSR was validated by polysomnography in adolescent and young adult msP rats. CSR escalated overall alcohol drinking ($p<0.01$) and triggered higher risky behaviour when rats were tested in the novelty-suppressed feeding test (NSFT, $p<0.003$) relative to YC in short term. Contrary, CSR rats showed no signs of despair in the forced swimming test. After recovery, the CSR group showed persistent higher alcohol drinking ($p<0.04$), and riskier behaviour relative to YC in the NSFT ($p<0.05$). Moreover, CSR triggered an increase in total ambulatory distance travelled in the open field ($p<0.01$) and a trend towards more time spent in the light chamber of the light/dark box test ($p=0.07$) in adulthood
Conclusions: In summary, adolescent CSR accelerated the escalation of alcohol consumption and promoted risky behaviours both in the short term and later in life.