

Optimization of a translationally relevant mouse model of binge eating and binge drinking comorbidity in outbred stocks of mice

Individuals with eating disorders experience greater risk for developing substance use disorders, and approximately 20% of individuals with a history of binge eating will be diagnosed with alcohol use disorder (AUD) during their lifetime. Although eating disorders and AUD are heritable, only a limited number of genetic loci have been identified that influence the comorbidity between these conditions. To address this gap, our research group recently developed a novel behavioral model to investigate the cross-sensitization between binge-like eating (BE) and binge-like drinking (BD) in mice. In this model, C57BL/6NJ mice showed cross-sensitization in a sequential BE-BD paradigm. Here, we expanded on these findings by examining how the duration of BE history influences subsequent BD in outbred CFW and CD-1 mice. Mice (n = 4/sex/stock/timeline) were assigned to undergo a sequential BE-BD protocol that entailed either 2-weeks of BE followed by 2-weeks of BD ("short timeline") or 4-weeks of BE followed by 4-weeks of BD ("long timeline"). BE was assessed using a limited access paradigm in which mice were presented with sweetened palatable food during daily 30-min sessions (5 days/week). CFW mice showed pronounced escalation of food intake, while CD-1 mice showed minimal escalation. Mice then underwent a modified drinking-in-the-dark paradigm in which they were presented daily (5 days/week) with 20% and 40% ethanol solutions. During the short timeline, CD-1 mice consumed more ethanol than CFW mice, although neither stock displayed a robust escalation of BD. During the long timeline, however, CFW females consumed significantly more ethanol than all other mice. Together, these findings indicate that CFW mice are more prone to BE and the subsequent enhancement of ethanol drinking, especially female CFW mice.

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