

Alterations of in vivo CA1 network activity in Dp(16)1Yey Down syndrome model mice

Matthieu Raveau¹, Denis Polygalov², Roman Boehringer³, Kenji Amano⁴, Kazuhiro Yamakawa⁵, and Thomas J McHugh⁶ Matthieu Raveau¹, Denis Polygalov², Roman Boehringer³, Kenji Amano⁴, Kazuhiro Yamakawa⁵, and Thomas J McHugh⁶

Abstract

Down syndrome, the leading genetic cause of intellectual disability, results from an extra-copy of chromosome 21. Mice engineered to model this aneuploidy exhibit Down syndrome-like memory deficits in spatial and contextual tasks. While abnormal neuronal function has been identified in these models, most studies have relied on *in vitro* measures. Here, using *in vivo* recording in the Dp(16)1Yey model, we find alterations in the organization of spiking of hippocampal CA1 pyramidal neurons, including deficits in the generation of complex spikes. These changes lead to poorer spatial coding during exploration and less coordinated activity during sharp-wave ripples, events involved in memory consolidation. Further, the density of CA1 inhibitory neurons expressing neuropeptide Y, a population key for the generation of pyramidal cell bursts, were significantly increased in Dp(16)1Yey mice. Our data refine the 'over-suppression' theory of Down syndrome pathophysiology and suggest specific neuronal subtypes involved in hippocampal dysfunction in these model mice.

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References





















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