The Role of the Thalamus in ADHD Symptomatology and Treatment

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Abstract
Attention-deficit hyperactivity disorder (ADHD) is a chronic disorder with symptoms of inattention and impulsivity that partially remit with age. A review of longitudinal studies of children and adolescents with ADHD showed that the majority will have continued cognitive and functional impairments into adulthood. The thalamus likely plays a prominent role in ADHD symptomatology, based on evidence that the thalamus generates waking-state electroencephalography (EEG) rhythms along with extensive thalamic neural circuitry connections with cortical and subcortical areas. Research demonstrates a specific abnormality in the thalamic pulvinar nucleus in ADHD populations. The thalamus can also play a role in ADHD treatment, based on solid evidence that both animals and humans can learn to self-regulate EEG oscillations. Given the underarousal and sleep disturbance commonly seen in ADHD, along with data that indicate an increased dosage of ADHD medication may improve behavioral control at a cost of lowered cognitive functioning, further investigation of the role for self-regulation through EEG training is warranted.