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ROLE OF THYROID STIMULATING HORMONE RECEPTOR IN ADHD

Investigators from Meijo and Nagoya Universities, Nagoya, Japan, studied the role for thyroid stimulating hormone receptor (TSHR) in TSHR knockout mice with phenotypes of ADHD such as hyperactivity, impulsiveness, and impairment of short-term memory. Administration of methylphenidate reversed impulsiveness, aggression and object recognition memory impairment. Monoaminergic changes in the brain, including an increase in the ratio of homovanillic acid/dopamine, were accompanied by an increase in the expression of noradrenaline transporter in the frontal cortex. These changes were attributed to the loss of the TSH-TSHR pathway, suggesting a novel role for TSHR in behavioral and neurological phenotypes of ADHD. (Mouri A, et al. Thyrotropin receptor knockout changes monoaminergic neuronal system and produces methylphenidate-sensitive emotional and cognitive dysfunction. *Psychoneuroendocrinology* 2014 Jun 24;48C:147-161).

COMMENTARY. Dysregulation of TSH and its receptor TSHR is implicated in the pathophysiology of ADHD, and ADHD is reported in association with resistance to thyroid hormone, a disease caused by a mutation in the thyroid hormone receptor B (TRB) gene. Investigators at the National Institutes of Health, Bethesda, MD, evaluated the presence and severity of ADHD in 18 families with a history of generalized resistance to thyroid hormone. Among the children, 19 of 27 subjects resistant to thyroid hormone (70%) and 5 of 25 unaffected subjects (20%) met criteria for ADHD ($P < 0.001$). The odds of having ADHD were 3.2 times higher for affected male subjects than for affected females and were 2.7 times higher for unaffected male subjects than for unaffected female subjects. The mean symptom score was 2.5 times higher in the affected group than in the unaffected group (7.0 vs 2.8, $P < 0.001$). The frequency of other psychiatric diagnoses was similar in the two groups. In this study sample, ADHD is strongly associated with generalized resistance to thyroid hormone [1]. In a later Australian study, the prevalence of thyroid hormone abnormalities in children with ADHD attending the State Child Development Centre in Perth was 2.3%, and none had generalized resistance to thyroid hormone [2]. Routine screening for thyroid hormone abnormalities in children with ADHD is supported by the NIH study but not by the Australian study. We recommend screening of patients with a family history of thyroid dysfunction [3].

References.

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