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Possible Genetic Dysregulation in Pediatric CFS

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ABSTRACT

Hypocortisolism is a frequent finding in individuals with chronic fatigue syndrome (CFS) and could play an explanatory role in the development of illness symptomatology. The etiologic mechanism behind this finding could be genetic variance in glucocorticoid receptor expression (GR) or increased resistance to the effects of glucocorticoids. Several investigators believe that allelic variance in a GR (NR3C1) mediates the expression of chronic fatigue possibly through influence on hypothalamic-pituitary-adrenal (HPA) axis function [1]. In addition, several immunologic variables are associated with CFS. The nuclear factor kappa beta (NFkB) pathway is heavily involved in cellular transcription and regulation and has been shown to be associated with the development of CFS. The NFkB pathway is directly regulated by and influences the presence of GR [2]. Our study focused on assessing whether such inflammatory transcription is occurring during adolescent years. Findings indicated decreased expression of NFkB1, NFkB2, and NR3C1. A decrease in the expression of these genes may have effects on immune cell function and cytokine production that could explain immunologic findings seen in individuals with CFS.

KEYWORDS

Pediatric, Chronic Fatigue Syndrome, Hypocortisolism, Glucocorticoid Receptor Expression

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References

- [1] M. S. Rajeevan, A. K. Smith, I. Dimulescu, E. R. Unger, S. D. Vernon, C. Heim and W. C. Reeves, " Glucocorticoid Receptor Polymorphisms and Haplotypes Associated with Chronic Fatigue Syndrome," *Genes, Brain, & Behavior*, Vol. 6, No. 2, 2007, pp. 167-176.
- [2] A. Amsterdam, K. Tajima and R. Sasson, " Cell-Specific Regulation of Apoptosis by Glucocorticoids: Implication to their Anti-Inflammatory Action," *Biochemical Pharmacology*, Vol. 64, No. 5-6, 2002, pp. 843-850.
- [3] S. K. Johnson and J. DeLuca, " Chronic Fatigue Syndrome and the Brain," In: J. DeLuca, Ed., *Fatigue as a Window to the Brain*, MIT Press, Cambridge, 2005, pp. 137-156.
- [4] A. J. Cleare, " The Neuroendocrinology of Chronic Fatigue Syndrome," *Endocrine Reviews*, Vol. 24, No. 2, 2003, pp. 236-252.
- [5] J. Gaab, D. Huster, R. Peisen, V. Engert, V. Heitz, T. Schad, T. H. Schurmeyer, and U. Ehlert, " Hypothalamic-Pituitary-Adrenal Axis Reactivity in Chronic Fatigue Syndrome and Health under Psychological, Physiological, and Pharmacological Stimulation," *Psychosomatic Medicine*, Vol. 64, No. 6, 2001, pp. 951-962.
- [6] W. K. Jerjes, A. J. Cleare, S. Wessel, P. J. Wood, and N. F. Taylor, " Diurnal Patterns of Salivary Cortisol and Cortisone Output in Chronic Fatigue Syndrome," *Journal of Affective Disorders*, Vol. 87, No. 2-3, 2005, pp. 299- 304.

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- [7] T. G. Dinan, T. Majeed, E. Lavelle, L. V. Scott, C. Berti, and P. Behan, " Blunted Serotonin-Mediated Activation of the Hypothalamic-Pituitary-Adrenal Axis in Chronic Fatigue Syndrome," *Psychoneuroendocrinology*, Vol. 22, No. 4, 1997, pp. 261-267.
- [8] A. Kavelaar, W. Kuis, L. Knook, G. Sinnema and C. J. Heijnen, " Disturbed Neuroendocrine-Immune Interactions in Chronic Fatigue Syndrome," *Journal of Clinical Endocrinology & Metabolism*, Vol. 85, No. 2, 2000, pp. 692- 696.
- [9] S. R. Torres-Harding, M. Sorenson, L. Jason, N. Reynolds, M. Brown, K. Maher and M. A. Fletcher, " The Associations between Basal Salivary Cortisol and Illness Symptomatology in Chronic Fatigue Syndrome," *Journal of Applied Biobehavioral Research*, Vol. 13, No. 3, 2008, pp. 157-180.
- [10] D. J. Torpy, and J. T. Ho, " Corticosteroid-Binding Globulin Gene Polymorphisms: Clinical Implications and Links to Idiopathic Chronic Fatigue Disorders," *Clinical Endocrinology*, Vol. 67, No. 2, 2007, pp. 161-167.
- [11] A. K. Smith, P. D. White, E. Aslakson, U. Vollmer-Conna and M. S. Rajeevan, " Polymorphisms in Genes Regulating the HPA Axis Associated with Empirically Delineated Classes of Unexplained Chronic Fatigue," *Pharmacogenomics*, Vol. 7, No. 3, 2006, pp. 387-394.
- [12] F. Tanriverdi, Z. Karaca, K. Unluhizarci and F. Kelestimur, " The Hypothalamo Pituitary-Adrenal Axis in Chronic Fatigue Syndrome and Fibromyalgia Syndrome," *Stress*, Vol. 10, No. 1, 2007, pp. 13-25.
- [13] J. R. Kerr, R. Petty, B. Burke, J. Gough, D. Fear, L. I. Sinclair, D. L. Matthey, S. C. Richards, J. Montgomery, D. A. Baldwin, P. Kellam, T. J. Harrison, G. E. Griffin, J. Main, D. Enlander, D. J. Nutt and S. T. Holgate, " Gene Expression Subtypes in Patients with Chronic Fatigue Syndrome/Myalgic Encephalomyelitis," *Journal of Infectious Diseases*, Vol. 197, No. 8, 2008, pp. 1171-1184.
- [14] S. J. Mathew, J. D. Coplan, R. R. Goetz, A. Feder, S. Greenwald, R. E. Dahl, N. D. Ryan, J. J. Mann and M. M. Weissman, " Differentiating Depressed Adolescent 24 h Cortisol Secretion in Light of their Adult Clinical Outcome," *Neuropsychopharmacology*, Vol. 28, No. 7, 2003, pp. 1336- 1343.
- [15] T. Miike, A. Tomoda, T. Jhodoi, N. Iwatani and H. Mabe, " Learning and Memorization Impairment in Childhood Chronic Fatigue Syndrome Manifesting as School Phobia in Japan," *Brain and Development*, Vol. 26, 2004, pp. 442-447.
- [16] T. Y. Segal, P. C. Hindmarsh and R. M. Viner, " Disturbed Adrenal Function in Adolescents with Chronic Fatigue Syndrome," *Journal of Pediatric Endocrinology & Metabolism*, Vol. 18, No. 3, 2005, pp. 295-301.
- [17] M. Maes, I. Mihaylova, M. Kubera and E. Bosmans, " Not in the Mind but in the Cell: Increased Production of Cyclo-Oxygenase-2 and Inducible NO Synthase in Chronic Fatigue Syndrome," *Neuro Endocrinology Letters*, Vol. 28, No. 4, 2007, pp. 463-469.
- [18] K. de Brosscher, W. V. Berghe and G. Haegeman, " The Interplay between the Glucocorticoid Receptor and Nuclear Factor-kb or Activator Protein-1: Molecular Mechanisms for Gene Repression," *Endocrine Reviews*, Vol. 24, No. 4, 2003, pp. 488-522.
- [19] M. Phillip, M. Aviram, E. Leiberman, Z. Zadik, Y. Giat, J. Levy and A. Tal, " Integrated Plasma Cortisol Concentration in Children with Asthma Receiving Long-Term Inhaled Corticosteroids," *Pediatric Pulmonology*, Vol. 12, No. 2, 1992, pp. 84-89.
- [20] M. Ter Wolbeek, L. J. P. van Doornen, A. Kavelaars, E. M. van de Putte, M. Schedlowski and C. J. Heijnen, " Longitudinal Analysis of Pro- and Anti-Inflammatory Cytokine Production in Severely Fatigued Adolescents," *Brain, Behavior, and Immunity*, Vol. 21, No. 8, 2007, pp. 1063-1074.
- [21] D. Kovalovsky, D. Refojo, F. Holsboer and E. Arzt, " Molecular Mechanisms and Th1/Th2 Pathways in Corticosteroid Regulation of Cytokine Production," *Journal of Neuroimmunology*, Vol. 109, No. 1, 2000, pp. 23-29.
- [22] K. de Bosscher, M. L. Schmitz, W. Vanden Berghe, S. Plaisance, W. Fiers and G. Haegeman, " Glucocorticoid-Mediated Repression of Nuclear Factor-KappaB-Dependent Transcription Involves Direct Interference with Transactivation," *Proceedings of the National Academy of Science USA*, Vol. 94, No. 25, 1997, pp. 13504-13509.
- [23] C. M. McCormick and I. Z. Mathews, " Adolescent Development, Hypothalamic-Pituitary-Adrenal Function, and Programming of Adult Learning and Memory," *Progress in Neuropsychopharmacology and Biological Psychiatry*, Vol. 34, No. 5, 2009, pp. 756-765.

