

Erasmus University Rotterdam, the Netherlands
CSC PhD 2015 Project Description

School/Department:	<p>Erasmus MC University Medical Center, Department of Child & Adolescent Psychiatry and Epidemiology</p> <p>Department of Internal Medicine, Thyroid Division</p> <p>Brain Imaging Unit, Sophia Children's Hospital, Erasmus MC</p>
Project Title:	<p>When the Thyroid Matters Most: Mild Thyroid Hormone Insufficiency and Brain Development in Children</p>
Abstract:	<p>Large parts of China are iodine sufficient and consequently the risk of thyroid disorders is increased at all ages. It is clear that even mild thyroid problems can impact brain function as thyroid hormones play a major role in neurodevelopment from early pregnancy onward. Animal studies demonstrated that thyroid hormones are involved in neocortico-genesis, the formation of the hippocampus and the somatosensory cortex. In humans, low levels of thyroid hormones during pregnancy can lead to mental retardation in the offspring. During early gestation, the fetus depends entirely on maternal thyroid hormones that cross the placenta because the fetal thyroid function does not begin before 12–14 weeks of pregnancy. Even after the onset of fetal thyroid hormone production, the fetus relies upon maternal thyroid hormones. Previous studies from our group suggest that exposure to mild thyroid hormone insufficiency are related to adverse consequences for child cognitive development. However, the underlying neurobiology is largely unknown.</p> <p>In this project we have two aims. First, we will study the relation between mild thyroid hormone insufficiency and impairments with intelligence in children. Mild thyroid insufficiency in mother or child will be assessed in prenatal life, neonatal phase and school age, and will be examined in relation to child cognition through to the school age years in 4500 children participating in Generation R. Second, we will apply cutting-edge neuroimaging techniques to investigate whether children exposed to mild thyroid insufficiency have structural and functional brain alternations observed at school age. Exposure to maternal mild thyroid hormone insufficiency in prenatal life, and child thyroid hormone insufficiency and school age will be explored in relation to brain structure and function.</p> <p>We test the hypothesis that early exposure to mild thyroid hormone insufficiency has a negative impact on child cognition and brain structure and function as observed by neuroimaging at school age.</p> <p>To date, longitudinal, repeated assessments of exposure to mild thyroid hormone insufficiency, and advanced magnetic resonance brain imaging has never been combined in investigation of thyroid</p>

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	<p>insufficiency and cognitive impairments. We will apply innovative neuroimaging techniques and state-of-the-art epidemiological methods to unravel the neurobiology of the relation between thyroid function and cognition in a large population-based study. The findings will provide insights into the effect of mild thyroid insufficiency on brain function and build a foundation for improving screening and intervention programmes for thyroid insufficiency in pregnancy and neonatal period.</p>
<p>Requirements of candidate:</p>	<p>Master degree: Yes</p> <p>Background: A Masters (or equivalent degree) in one of the following or related fields is recommended: medicine, neuroscience, biology, life sciences, biostatistics, neuropsychology, or psychology.</p> <p>This is a collaborative project between an endocrinology & thyroid research group, a brain imaging unit and the epidemiological research team at the Erasmus MC. Thus a biological understanding of endocrine processes is important. The successful candidate will learn the necessary skills to process advanced MRI-data within the framework of large datasets. Affinity with developmental studies or research in children clearly is an advantage. Additionally, a good command of biostatistical techniques in an epidemiological framework is recommended.</p> <p>The successful candidate ideally has above basic understanding of one or more of the following statistical packages: SPSS, R, or SAS.</p> <p>IELTS Grade: 7.0 (<i>minimal 6.0 per component</i>) or TOEFL: 100 (<i>minimal 20 per component</i>)</p>
<p>Supervisor information:</p>	<p>Prof. Dr. Henning Tiemeier h.tiemeier@erasmusmc.nl</p> <p>Dr. Robin P. Peeters r.peeters@erasmusmc.nl</p> <p>Relevant publications: 1) Ghassabian A, Bongers-Schokking JJ, De Rijke YB, Van Mil N, Jaddoe VWV, Hooijkaas H, Hofman A, Visser W, Roman GC, Visser TJ, Verhulst FC, Tiemeier H. Maternal Thyroid Autoimmunity During Pregnancy and the Risk of Attention Deficit/Hyperactivity Problems in Children: The Generation R Study. <i>Thyroid</i>. 2012;22(2):178-86.</p> <p>2) Ghassabian A, Tiemeier H. Is Measurement of Maternal Serum Tsh</p>

	<p>Sufficient Screening in Early Pregnancy? A Case for More Randomized Trials. <i>Clinical Endocrinology</i>. 2012;77(6):802-5.</p> <p>3) Mil van NH, Steegers-Theunissen RPM, Bongers-Schokking JJ, Marroun HE, Ghassabian A, Hofman A, Jaddoe VWV, Visser TJ, Verhulst FC, De Rijke YB, Steegers EAP, Tiemeier H. Maternal Hypothyroxinemia During Pregnancy and Growth of the Fetal and Infant Head. <i>Reproductive Sciences</i>. 2012;19(12):1315-22.</p> <p>4) Tiemeier H, Velders FP, Szekely E, Roza SJ, Dieleman G, Jaddoe VWV, Uitterlinden AG, White TJH, Bakermans-Kranenburg MJ, Hofman A, Van Ijzendoorn MH, Hudziak JJ, Verhulst FC. The Generation R Study: A Review of Design, Findings to Date, and a Study of the 5-HTTLPR by Environmental Interaction from Fetal Life Onward. <i>Journal of the American Academy of Child and Adolescent Psychiatry</i>. 2012;51(11):1119-35.e7.</p> <p>5) Ghassabian A, Herba CM, Roza SJ, Govaert P, Schenk JJ, Jaddoe VW, Hofman A, White T, Verhulst FC, Tiemeier H. Infant Brain Structures, Executive Function, and Attention Deficit/Hyperactivity Problems at Preschool Age. A Prospective Study. <i>Journal of Child Psychology and Psychiatry and Allied Disciplines</i>. 2013;54(1):96-104.</p> <p>6) Langeslag SJE, Schmidt M, Ghassabian A, Jaddoe VW, Hofman A, van der Lugt A, Verhulst FC, Tiemeier H, White TJH. Functional Connectivity between Parietal and Frontal Brain Regions and Intelligence in Young Children: The Generation R Study. <i>Human Brain Mapping</i>. 2013;34(12):3299-307.</p> <p>7) Roman GC, Ghassabian A, Bongers-Schokking JJ, Jaddoe VW, Hofman A, de Rijke YB, Verhulst FC, Tiemeier H. Association of Gestational Maternal Hypothyroxinemia and Increased Autism Risk. <i>Ann Neurol</i>. 2013;74(5):733-42.</p> <p>8) White T, Marroun HE, Nijs I, Schmidt M, Van Der Lugt A, Wielopolski PA, Jaddoe VWV, Hofman A, Krestin GP, Tiemeier H, Verhulst FC. Pediatric Population-Based Neuroimaging and the Generation R Study: The Intersection of Developmental Neuroscience and Epidemiology. <i>European Journal of Epidemiology</i>. 2013;28(1):99-111.</p> <p>9) Ghassabian A, El Marroun H, Peeters R, Jaddoe VW, Hofman A, Verhulst FC, Tiemeier H, White T. Downstream Effects of Maternal Hypothyroxinemia in Early Pregnancy: Nonverbal IQ and Brain Morphology in School Age Children. <i>J Clin Endocrinol Metab</i>. 2014;:jc20134281.</p> <p>10) Ghassabian A, Henrichs J, Tiemeier H. Impact of Mild Thyroid Hormone Deficiency in Pregnancy on Cognitive Function in Children: Lessons from the Generation R Study. <i>Best Pract Res Clin Endocrinol Metab</i>. 2014;28(2):221-32.</p>
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