

Title of Research:

12_PT01-01

Multi-functional testing method for attention ability by elaborating the target detection method and application to developmental neurotoxicology: testing for selective, sustained, shifted, and bisectonal attention

Principal Investigator:

Hiromi Wada (Hokkaido University, Graduate School of Letters, Division of Psychology)
060-0810 Kita 10 Nishi 7, Kita-ku, Sapporo, Hokkaido
(tel) +81-11-706-3321 (e-mail) wada@let.hokudai.ac.jp

Collaborators:

Hiroyuki Iso (Hyogo Health Science University, General Education Center)
650-0045 Minatojima 1-3-6, chuou-ku, Kobe, Hyogo
(tel) +81-78-304-3123 (e-mail) iso@huhs.ac.jp

Summary of Research:

Pregnant rats were treated with 0.01% or 0.015% Methimazole. The resulted pups were trained with the selective, sustained, shift, and divided attention tasks. The hypothyroid rats displayed longer reaction times than the control rats in the selective attention task. In the sustained attention task, the hypothyroid rats exhibited increased variability of reaction times compared with the control rats. In the shift attention task, the hypothyroid rats exhibited increased reaction times when they were required to shift attention from one target to the other target. We conclude that the hypothyroid rats were difficult to pay attention to a target quickly, to maintain attention to a target, to shift attention from a target to another target. The hypothyroid rats reduced total T4 to 49-55% and 35-38% of control levels at age of 21-22 in the treatments of 0.01% and 0.015% Methimazole, respectively. Total T3 and TSH did not change at all. At age of 55-56, the hypothyroid rats displayed increased TSH but normal levels of total T4. It is necessary to maintain total T4 level more than 55% of the control level.

Timeline: November 1, 2012 –

Topics:

2nd Meeting of JCIA-new LRI Poster presentation "The testing methods for selective, sustained, shifted, and divided attention by elaborating the target detection method"

Publications:

- 1, Wada Hiromi and Seto Yukina "Effects of perinatal hypothyroidism on shift attention in rats." Organohalogen Compounds, 74 : 1385-1388, 2012 (<http://www.dioxin20xx.org/>).
- 2, Wada Hiromi and Seto Yukina "Developmental effects of perinatal hypothyroidism on cognitive functions: Focused on attention." Psychiatria et Neurologia Japonica 114(8) : 949–956, 2012
- 3, Wada Hiromi and Seto Yukina "Effects of perinatal hypothyroidism on divided attention in rats." Scientific Committee on Neurotoxicology and Psychophysiology, Cape Town, South Africa, March 2013.
- 4, Seto Yukina and Wada Hiromi "Effects of perinatal hypothyroidism on shift attention in rats." 73rd Annual Meeting of the Japanese Society for Animal Psychology, Tsukuba, August 2013
- 5, Wada Hiromi, Yumoto Syoko, and Iso Hiroyuki. "Irreversible damages to auditory system functions caused by perinatal hypothyroidism in rats." Neurotoxicology and Teratology, 37: 18-22, 2013.
3. Innovation Kansai, Poster Announcement "Toxic judgment method of using pluripotent stem cell" December 6, 2012, Osaka International Conference Hall