

Developmental Thyroid Diseases and GABAergic Dysfunction

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Thyroid hormones (THs) regulate the gestation and lactation periods [1-30]. Also, THs can regulate the development of GABAergic system [14-16]. GABA can play important roles in the neuronal development [31]. In hypothyroid state, there was reduction in the GABAergic circuits [32], glutamate levels [33], glutamic acid decarboxylase (GAD) activities (Virgili, *et al.* 1991), GABA-transaminase (GABAT) and succinate semialdehyde dehydrogenase (SSDH) [34] causing a neuronal and behavioral impairments [35]. However, the GABA-transaminase (GABAT) and succinate semialdehyde dehydrogenase (SSDH) were increased in hypothyroid conditions [35]. This disturbance could be due, at least partially, to TH effects on GABA function. These alterations may retard the neurogenesis and CNS growth. Future studies should be focused on identifying the genomic actions of THs disorders, GABAergic dysfunction and neurogenesis.

Conflict of Interest

The author declares that no competing financial interests exist.

Bibliography

1. El-bakry AM., *et al.* "Comparative study of the effects of experimentally-induced hypothyroidism and hyperthyroidism in some brain regions in albino rats". *International Journal of Developmental Neuroscience* 28.5 (2010): 371-389.
2. Ahmed RG. "Perinatal 2, 3, 7, 8-tetrachlorodibenzo-p-dioxin exposure alters developmental neuroendocrine system". *Food and Chemical Toxicology* 49.6 (2011): 1276-1284.
3. Ahmed RG. "Maternal-newborn thyroid dysfunction". In the *Developmental Neuroendocrinology*. Ed R.G. Ahmed. Germany: LAP LAMBERT Academic Publishing GmbH & Co KG (2012a): 1-369.
4. Ahmed RG. "Maternal-Fetal Thyroid Interactions, Thyroid Hormone". Dr. N.K. Agrawal (Ed.), In *Tech Open Access Publisher*, Chapter 5 (2012b): 125-156.
5. Ahmed RG. "Early weaning PCB 95 exposure alters the neonatal endocrine system: thyroid adipokine dysfunction". *Journal of Endocrinology* 219.3 (2013): 205-215.
6. Ahmed RG., *et al.* "Lactating PTU exposure: II- Alters thyroid-axis and prooxidant-antioxidant balance in neonatal cerebellum". *International Research Journal of Natural Sciences* 2.1 (2014): 1-20.
7. Ahmed RG. "Chapter 1: Hypothyroidism and brain development". In *Advances in Hypothyroidism Treatment*. Avid Science Borsigstr. 9, 10115 Berlin, Berlin, Germany. Avid Science Publications level 6, Melange Towers, Wing a, Hitec City, Hyderabad, Telangana, India (2015a): 1-40.
8. Ahmed RG. "Hypothyroidism and brain developmental players". *Thyroid Research* 8 (2015b): 2.

9. Ahmed RG. "Maternofetal thyroid action and brain development". *Journal of Advances in Biology* 7.1 (2015c): 1207-1213.
10. Ahmed RG. "Gestational dexamethasone alters fetal neuroendocrine axis". *Toxicology Letters* 258 (2016a): 46-54.
11. Ahmed RG. "Neonatal polychlorinated biphenyls-induced endocrine dysfunction". *Annals of Thyroid Research* 2.1 (2016b): 34-35.
12. Ahmed RG. "Maternal iodine deficiency and brain disorders". *Endocrinology and Metabolic Syndrome* 5 (2016c): 223.
13. Ahmed RG. "Maternal bisphenol A alters fetal endocrine system: Thyroid adipokine dysfunction". *Food and Chemical Toxicology* 95 (2016d): 168-174.
14. Ahmed OM., *et al.* "Thyroid hormones states and brain development interactions". *International Journal of Developmental Neuroscience* 26.2 (2008): 147-209.
15. Ahmed OM., *et al.* "Effects of experimentally induced maternal hypothyroidism and hyperthyroidism on the development of rat offspring: I- The development of the thyroid hormones-neurotransmitters and adenosinergic system interactions". *International Journal of Developmental Neuroscience* 28.6 (2010): 437-454.
16. Ahmed OM., *et al.* "Effects of experimentally induced maternal hypothyroidism and hyperthyroidism on the development of rat offspring: II-The developmental pattern of neurons in relation to oxidative stress and antioxidant defense system". *International Journal of Developmental Neuroscience* 30.6 (2012): 517-537.
17. Ahmed RG., *et al.* "The developmental and physiological interactions between free radicals and antioxidant: Effect of environmental pollutants". *Journal of Natural Sciences Research* 3.13 (2013a): 74-110.
18. Ahmed RG., *et al.* "Nongenomic actions of thyroid hormones: from basic research to clinical applications. An update". *Immunology, Endocrine and Metabolic Agents in Medicinal Chemistry* 13.1 (2013b): 46-59.
19. Ahmed RG. "Editorial: Do PCBs modify the thyroid-adipokine axis during development?" *Annals of Thyroid Research* 1.1 (2014): 11-12.
20. Ahmed RG., *et al.* "Immune stimulation improves endocrine and neural fetal outcomes in a model of maternofetal thyrotoxicosis". *International Immunopharmacology* 29.2 (2015a): 714-721.
21. Ahmed RG., *et al.* "Protective effects of GM-CSF in experimental neonatal hypothyroidism". *International Immunopharmacology* 29.2 (2015b): 538-543.
22. Ahmed OM and Ahmed RG. "Hypothyroidism". In *A New Look At Hypothyroidism*. Dr. D. Springer (Ed.), In Tech Open Access Publisher, Chapter 1 (2012): 1-20.
23. Ahmed RG and Incerpi S. "Gestational doxorubicin alters fetal thyroid-brain axis". *International Journal of Developmental Neuroscience* 31.2 (2013): 96-104.
24. Van Herck SLJ., *et al.* "Maternal transfer of methimazole and effects on thyroid hormone availability in embryonic tissues". *Endocrinology* 218.1 (2013): 105-115.
25. Ahmed RG and El-Gareib AW. "Lactating PTU exposure: I- Alters thyroid-neural axis in neonatal cerebellum". *European Journal of Biology and Medical Science Research* 2.1 (2014): 1-16.

26. Incerpi S., *et al.* "Thyroid hormone inhibition in L6 myoblasts of IGF-I-mediated glucose uptake and proliferation: new roles for integrin $\alpha v \beta 3$ ". *American Journal of Physiology - Cell Physiology* 307.2 (2014): C150-C161.
27. Candelotti E., *et al.* "Thyroid hormones crosstalk with growth factors: Old facts and new hypotheses". *Immunology, Endocrine and Metabolic Agents in Medicinal Chemistry* 15.1 (2015): 71-85.
28. De Vito P., *et al.* "Role of thyroid hormones in insulin resistance and diabetes". *Immunology, Endocrine and Metabolic Agents in Medicinal Chemistry* 15.1 (2015): 86-93.
29. El-Ghareeb AA., *et al.* "Effects of zinc supplementation in neonatal hypothyroidism and cerebellar distortion induced by maternal carbimazole". *Asian Journal of Applied Sciences* 4.4 (2016): 1030-1040.
30. Ahmed RG and El-Gareib AW. "Maternal carbamazepine alters fetal neuroendocrine-cytokines axis". *Toxicology* 382 (2017): 59-66.
31. Represa A and Ben-Ari Y. "Trophic actions of GABA on neuronal development". *Trends in Neurosciences* 28.6 (2005): 278-283.
32. Berbel P., *et al.* "Distribution of parvalbumin immunoreactivity in the neocortex of hypothyroid adult rats". *Neuroscience Letters* 204.1-2 (1996): 65-68.
33. Ramirez de Guglielmo and AE Gomez CJ. "Influence of neonatal hypothyroidism on amino acids in developing rat brain". *Journal of Neurochemistry* 13.10 (1966): 1017-1025.
34. Garcia Argiz CA., *et al.* "Hormonal regulation of brain development. II. Effect of neonatal thyroidectomy on succinate dehydrogenase and other enzymes in developing cerebral cortex and cerebellum of the rat". *Brain Research* 6.4 (1967): 635-646.
35. Wiens SC and Trudeau VL. "Thyroid hormone and g-aminobutyric acid (GABA) interactions in neuroendocrine systems". *Comparative Biochemistry and Physiology Part A: Molecular and Integrative Physiology* 144.3 (2006): 332-344.

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