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Maternal hypothyroidism alters the pattern of cytokines in the serum that are important for learning and the permeability of blood brain barrier for the entry of immune cells to the central nervous system

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Hypothyroidism is a thyroid hormone deficiency condition. Around the world, 7% of pregnant women suffer maternal hypothyroidism. It causes low intellectual quotient (IQ), and mental retardation in the offspring. Gestational hypothyroidism increases the intensity of experimental autoimmune encephalomyelitis (EAE), an experimental model for multiple sclerosis (MS). Given that the immune system is important for learning, we propose the following hypothesis: "The offspring gestated in hypothyroidism will affect the pattern of inflammatory cytokines in the serum that will alter learning, the BBB permeability and the migration of the immune system to the CNS". To evaluate this maternal hypothyroidism was induced to pregnant mice. The learning capacity was analyzed and the serum levels of cytokines were analyzed by ELISA and multiplex in the offspring. The permeability of BBB was analyzed by Evans Blue (EB) extravasation in the CNS and the integrity of BBB was analyzed by immunofluorescence. The migration of immune cells to the CNS was analyzed by FACS. We found that the offspring gestated in hypothyroidism has impaired learning and low levels of IL-4, high basal levels of TNF α and IL-17, high EB extravasation and a higher number of CD4⁺ T cells in the CNS with an altered expression of BBB proteins. In conclusion, our data support that maternal hypothyroidism have altered cognition, BBB permeability and the presence of the immune system in the CNS. Together with an altered pattern of cytokines in the serum that are important for learning and for altering the BBB.

Biography

Luis Venegas S has completed his under graduation from Universidad de Antofagasta and has completed his PhD from Universidad Andres Bello in 2016. His Doctoral thesis was on the thyroid hormones during the gestation in the development and function of blood brain barrier. Currently, he is pursuing his Post-doctoral studies from Pontificia Universidad Catolica de Chile.

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