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Mice With Thyrotoxicosis Exhibit Lipotoxicity and Immunosenescence

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ABSTRACT

Currently, COVID-19 is a widespread outbreak that has been linked to aging. For COVID-19, immunosenescence may be a serious and predisposing factor. In addition, a lot of infectious infections are age-related in clinics, and senior patients have worse prognoses and longer hospital stays. Finding appropriate aging models is crucial for battling age-related disorders and improving the prognosis of aged people. In this investigation, routine detection and serum metabonomics in mice were used to examine the connection between thyrotoxicosis and aging. In thyrotoxicosis mice, standard blood tests and flow cytometry revealed a considerable reduction in neutrophils, lymphocytes, CD4+/CD8+, and CD4+IFN-+ lymphocytes. Biochemical analysis in conjunction with a serum metabolomics analysis revealed that a serious disorder of lipid metabolism, including lower cholesterol levels, lower levels of VD and bile acids, high levels of glucocorticoids, triglycerides, free fatty acids, Sphingolipids, and a decrease in docosanoids, particularly DPA, may be one of the causes of immunosenescence.

Keywords: Immunosenescence, Mice

INTRODUCTION

The metabolism, growth, and development of nearly all bodily tissues are controlled by thyroid hormones. Serum thyroxine homeostasis is carefully monitored and controlled. Hyperthyroidism or hypothyroidism will result from factors internal or external interfering with homeostasis. One of the effects of aging is a large rise in thyroid disease, and those over 65 now have a 7-fold higher prevalence of hyperthyroidism. Additionally, hyperthyroidism can resemble numerous other illnesses. Untreated hyperthyroidism can cause some systemic issues, such as heart, bone, and muscle disorders as well as cognitive decline. Infectious diseases like COVID-19 and all of these illnesses have an aging component, and biological age is more important than chronological age. In actuality, hyperthyroidism not only has a higher incidence rate as people age but also has a faster pace of biological aging. Most bodily tissues consume more energy as a result of thyroid hormones, which is associated with quicker kinetics. Accelerating metabolism is certain to trigger several chain reactions, which will change metabolites and have a significant impact on the body's internal environmental balance, increasing factors associated with aging. There are few investigations on the changes in lipid metabolites throughout this process, and most recent studies have concentrated on the thermogenic impact of thyroid hormones on brown and/or white adipose tissue. It is important to remember that metabolites have a significant impact on the body, and there is still room for improvement in the comprehensive description of metabolites in hyperthyroidism and their relationship to aging.

The total amount of White Blood Cells (WBC), Neutrophils (NEUT), Lymphocytes (LYMPH), Red Blood Cells (RBC), Hemoglobin (HGB), Hematocrit (HCT), and Platelets (PLT) were all lowered in regular blood tests, which revealed that pancytopenia was brought on by too much thyroxine in mice.

CONCLUSION

This study establishes that thyrotoxicosis mice are a reliable model for accelerated aging. The primary performance in the current investigation is immunosenescence, which may be brought on by lipotoxicity. This suggests that whether or not anti-thyroxine is used, the immunosenescence state can be improved by reducing lipotoxicity. To give more complete data, system biology has to be used to continue studying other thyroid toxicity mice models modeling aging manifestations, such as organ aging.