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**Effect of excess iodine on immune system; An in-vitro study**

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**Introduction:** While iodine is an essential element for the synthesis of thyroid hormones, epidemiological studies showed consumption of iodine leads to autoimmune thyroid diseases, with unknown mechanism. Previous studies showed disturbance in the circulating cytokines could lead to autoimmune diseases. To determine the role of iodine in cytokine production and development of thyroid autoimmune diseases, whole blood was stimulated with NaI (10 mM) and I<sub>2</sub> (0.5 mM).

**Materials and methods:** After evaluation of laboratory results of 25 healthy middle age female (age 40–45 years), 10 subjects who had matching results were selected. Ten ml of sterile heparinized peripheral blood was collected for each subject and immediately divided to 6 groups (control, NaI stimulated, I<sub>2</sub> stimulated and matching groups in presence of standard stimulators (LPS 1 µg/ml & PHA 10 µg/ml). Three identical sets were setup to investigate the

cytokine production at 24, 48, and 72 hours. All samples were incubated in cell culture incubator (95% O<sub>2</sub> and 5% CO<sub>2</sub>) and after elapse of appropriated time, plasma were separated from each well and kept at - 70 °C till the time of cytokines (IL-4, IL-10, INF- $\gamma$  and TGF- $\beta$ 1) analysis.

**Results:** Statistical analysis of data showed NaI could decrease ( $P < 0.02$ ) the production of TGF- $\beta$ 1 at all time points, while it did not affect the level of other cytokines. On the other hands, I2 significantly decreased the level of IL-4 and IL-10 ( $P < 0.01$ ). In presence of LPS/PHA, NaI also reduced the production of IL-10 ( $P < 0.02$ ), while I2 decreased the level of IL-4 as well as IL-10 ( $P < 0.01$ ).

**Conclusion:** For the first time the results of the study indicated high levels of NaI and I2 may reduce the level of protective cytokines in circulation. Finally, since neither thyroid hormones nor thyroid gland had role in this process, it may be conclude high consumption of iodine could leads to imbalance cytokine production in blood and initiation autoimmune thyroid.

**Keywords:** Autoimmune thyroid diseases, High iodine intake NaI, I2, TGF-beta, INF-gama, IL-4 and IL-10