

Serum Concentrations of Ghrelin and Leptin according to Thyroid Hormone Condition, and Their Correlations with Insulin Resistance (*Endocrinol Metab* 2015;30:318-25, Kyu-Jin Kim et al.)

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We thank Professor Kim, who read our manuscript and provided helpful comments and advice.

In our study published in volume 30, issue 3 of *Endocrinology and Metabolism*, we reported that there were no differences in mean concentrations of ghrelin among the three groups (hyperthyroid, hypothyroid, and euthyroid group) [1]. Prof. Kim suggested that it might be helpful to consider thyroid peroxidase (TPO) antibody (Ab) status in the study subjects to identify more clearly the crosstalk between thyroid function and ghrelin. We agreed with the reviewer's opinion. Thus, we re-evaluated the medical records of study subjects and reanalyzed the data using TPO Ab status.

There were significant differences in TPO Ab levels between the groups with thyroid dysfunction and the control group ($P < 0.001$), although no significant difference was found between the hyperthyroid and hypothyroid groups according to a *post hoc* test (54.9 U/mL vs. 48.4 U/mL, $P = 0.918$). We divided hypothyroid patients into two groups according to TPO Ab titer (< 100 U/mL vs. ≥ 100 U/mL) and compared the plasma levels of ghrelin between them. There was no significant difference between the two groups in mean ghrelin levels (907 ± 224 ng/mL vs. 899 ± 231 ng/mL, $P = 0.93$). Additionally, bivariate cor-

relation analysis showed that plasma levels of ghrelin were not significantly correlated with TPO Ab in the three groups.

However, a study by Altinova et al. [2] showed ghrelin levels were decreased in hypothyroid patients with high TPO Ab titers, compared with hypothyroid patients with low TPO Ab titers. Also, they showed that ghrelin levels correlated negatively with TPO Ab levels. However, ghrelin levels were not increased after thyroid hormone replacement. Thus, they suggested that the immune system, in association with the thyroid, may be able to inhibit ghrelin production. In fact, some previous studies have shown that ghrelin has been detected in thyroid tissue and altered levels have been reported in some autoimmune diseases [3,4].

Although the differences between the results of our and their studies can be explained partially by differences in subject characteristics, degree and duration of thyroid dysfunction, and variability in the assays, we do not yet have a complete explanation. To date, relatively few studies have been performed to examine the relationship between ghrelin and thyroid autoantibodies. Thus, further studies with larger numbers of patients are needed to confirm the relationship.

Thank you again for your insightful and comprehensive re-

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view of our paper.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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