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## Negligible Thyroid Hormone Content Present in Nonprescription U.S. Weight Loss Products

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### Dear Editor:

The U.S. Food and Drug Administration (FDA) does not scrutinize over-the-counter (OTC) supplements to the same degree as food or drug products under the Dietary Supplement Health and Education Act of 1994 (1). Nonprescription weight-loss products have become increasingly popular, including products with potentially misleading claims to decrease obesity (2). Recently, the State of Oregon brought suit against General Nutrition Centers (GNC), a popular global supplements retailer, for their knowing inclusion of a prescription amphetamine-like medication in 22 supplement products (3). In a study reported in *Thyroid* by Kang *et al.*, OTC thyroid health supplements contained clinically significant quantities of triiodothyronine (T3) and thyroxine (T4), surreptitiously exposing consumers to risk of thyrotoxicosis, the effects of which include weight loss, cardiac arrhythmias, and bone loss (4).

We tested the hypothesis that OTC dietary supplements marketed for weight loss also contain thyroid hormone (a prescription medication). We surveyed OTC dietary supplements marketed for weight loss (none of which list thyroid hormone as an ingredient) at large-volume U.S. retailers, focusing on popular products identified by online consumer ratings or shelf placement, with the intent to sample products utilized by the average U.S. consumer. Twenty-nine different OTC weight-loss supplements were purchased for the assessment of exogenous T4 and T3 content by high-performance liquid chromatography (HPLC) in our laboratory and further quantified by mass spectrometry (MS) in two different laboratories. All measurements were performed in duplicate. For those nine products containing T4 and/or T3 as assessed by HPLC, five products were reanalyzed by HPLC to include three to five additional manufactured batches per product. Values are reported as micrograms per day, indicating the manufacturer's daily recommended dose.

Of the 29 products, nine (31%) contained substances that migrated as thyroid hormone (either T3 or T4, or both) by

HPLC (range 1.4–57.6  $\mu\text{g/day}$ ;  $M = 25.3 \mu\text{g/day}$ ) but which were confirmed to be negligible when quantified by the much more specific MS technique (0.014–1.02  $\mu\text{g/day}$  of T3 [ $n = 9$ ] and 0.57–0.90  $\mu\text{g/day}$  of T4 [ $n = 4$ ]), and non-detectable when repeated in an independent MS laboratory. The HPLC measurements were similar between the original and three to five additional manufactured batches per product (original vs. repeat: T3 19.2 vs. 14.4, 19.2 vs. 16.6, 66.6 vs. 54.6, 43.6 vs. 32.1, 9.9 vs. 7.6  $\mu\text{g/day}$ ; T4 29.6 vs. 27.5  $\mu\text{g/day}$ , and undetectable T4 in both assays for four products).

In conclusion, contrary to previous reports of thyrotoxicosis arising from the ingestion of nonprescription supplements, the current findings from 29 common OTC weight-loss products in the United States do not demonstrate sufficient thyroid hormone content likely to result in clinically significant thyrotoxicosis. It should be noted that these findings only pertain to the measured products and are not generalizable to other formulations, which may still pose adverse health risks to the general consumer. This report adds to our understanding of the present potential risks encountered by supplement users, as the finding of any occult thyroid hormone content is potentially alarming. We advocate for increased regulation to ensure that thyroid hormone is completely absent from weight-loss supplements.

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### Author Disclosure Statement

No competing financial interests exist.

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