

# Abstract

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## Interactions of vitamin A and iodine deficiencies: effects on the pituitary-thyroid axis.

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**BACKGROUND:** Vitamin A (VA) deficiency (VAD) and the iodine deficiency disorders (IDD) affect > 30% of the global population and these deficiencies often coexist in vulnerable groups. VAD has multiple effects on the pituitary-thyroid axis; VA status modulates thyroid gland metabolism, peripheral metabolism of thyroid hormone, and production of thyrotropin (TSH) by the pituitary.

**RESULTS:** Findings from Africa children indicate that VAD in severely-IDD-affected children increases TSH stimulation and thyroid size, and reduces risk for hypothyroidism. In children with VAD, the higher TSH concentrations in the face of higher circulating total thyroxine suggest central resistance to normal TSH suppression by thyroid hormone. In IDD- and VAD-affected children receiving iodized salt, concurrent VA supplementation improves iodine efficacy. Recent VA and iodine depletion studies in rats indicate moderate VAD alone has no measurable effect on the pituitary-thyroid axis; however, concurrent iodine deficiency (ID) and VAD produce more severe primary hypothyroidism than ID alone.

**SUMMARY:** Repletion studies in VA- and iodine-deficient animals suggest: 1) primary hypothyroidism in animals with concurrent moderate VAD and ID does not reduce the efficacy of high doses of oral VA; 2) VAD does not reduce the efficacy of dietary iodine to correct pituitary-thyroid axis dysfunction due to iodine deficiency; and 3) given alone, without iodine repletion, high-dose VA supplementation in combined VAD and ID may reduce thyroid hyperstimulation and reduce risk for goiter.

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