

Abstract

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Vitamin A repletion in rats with concurrent vitamin A and iodine deficiency affects pituitary TSHbeta gene expression and reduces thyroid hyperstimulation and thyroid size.

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BACKGROUND: Concurrent vitamin A (VA) deficiency (VAD) and iodine deficiency (ID) are common in developing countries. VAD has effects on thyroid metabolism that may be dependent on iodine status.

OBJECTIVE: The aim of this study was to investigate the effect of VA supplementation (VAS) and/or dietary iodine repletion, alone and in combination, on the thyroid-pituitary axis in rats with concurrent VAD and ID.

METHODS: Weanling rats (n = 96) were fed diets deficient in VA and iodine or sufficient in both (control), for 30 d. Subsequently, deficient rats were repleted with iodine and/or single VAS or remained deficient for 10 d. Serum retinol (SR), thyroid hormones, serum thyrotropin (TSH), pituitary TSHbeta mRNA expression level, and thyroid weight were measured.

RESULTS: High-dose VAS restored SR concentrations to normal in both iodine-deficient and iodine-sufficient rats. Despite continuing VAD, provision of the iodine-sufficient diet entirely reversed the abnormalities of the pituitary-thyroid axis produced by VAD and ID. In iodine-sufficient rats, VAS had no discernible effects on the pituitary-thyroid axis; in iodine-deficient rats, VAS reduced pituitary production of TSH and thyroid stimulation but had no discernible effects on circulating thyroid hormone concentrations. Primary hypothyroidism in rats with concurrent VAD and ID does not reduce the efficacy of VAS, nor does VAD reduce the efficacy of dietary iodine to correct pituitary-thyroid axis dysfunction due to ID.

CONCLUSION: In concurrent VAD and ID, VAS, independent of iodine repletion, reduces thyroid hyperstimulation and size, an effect likely mediated through the effects of VA on pituitary TSHbeta gene expression.

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