

Abstract

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Vitamin A deficiency induces a decrease in EEG delta power during sleep in mice.

Kitaoka K, Hattori A, Chikahisa S, Miyamoto K, Nakaya Y, Sei H.

Department of Integrative Physiology, Institute of Health Biosciences, The University of Tokushima Graduate School, Tokushima 770-8503, Japan.

BACKGROUND: Recent report (Maret, S., Franken, P., Dauvilliers, Y., Ghyselinck, N.B., Chambon, P., Tafti, M., 2005. Retinoic acid signaling affects cortical synchrony during sleep. *Science* 310, 111-113.) has suggested that vitamin A (retinol and its derivatives) is genetically involved in the electroencephalogram (EEG) delta oscillation during sleep. However, this finding has not yet been confirmed by other studies.

OBJECTIVE AND METHODS: In this study, we attempted to record the sleep EEG and behavior, and to quantify striatal monoamines in mice fed a vitamin A-deficient (VAD) diet for 4 weeks, in order to clarify the linkage between the delta oscillation and vitamin A.

RESULTS: VAD mice demonstrated a significant decrease in the delta power of the EEG. However, 6-h sleep deprivation caused the recovery of the delta power in VAD mice to a level similar to that of the control. VAD also caused the decrease of spontaneous activity throughout 24-h period. Furthermore, dihydroxyphenylacetic acid, a metabolite of dopamine, was decreased significantly in the striatal tissue of VAD mice.

CONCLUSIONS: Our present results suggest that the deficiency of vitamin A causes the attenuation of delta power in NREM sleep and spontaneous activity. These attenuations may be related to the alteration of striatal dopaminergic function.

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