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Repeated topical treatment, in contrast to single oral doses, with Vitamin A-containing preparations does not affect plasma concentrations of retinol, retinyl esters or retinoic acids in female subjects of child-bearing age.

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Source

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Abstract

BACKGROUND:

Vitamin A is widely used in cosmetic preparations. Given that oral Vitamin A and its metabolites present a potential reproductive risk, the present study investigated the effect of topical Vitamin A on human endogenous plasma levels of Vitamin A and its metabolites.

METHODS:

Two groups of 14 female volunteers of child-bearing age were kept on a Vitamin A-poor diet and treated topically for 21 days with creams containing 0.30% retinol or 0.55% retinyl palmitate on approximately 3000 cm² of their body surface area, amounting to a total of approximately 30,000 IU Vitamin A/subject/day. After a 12-day wash-out period, the study groups received single oral doses of 10,000 IU or 30,000 IU retinyl palmitate (RP), corresponding to the maximal EU allowance during pregnancy or three-times higher, respectively. Blood samples were collected over 24h on study days -3 (pre-study), 1, 21 (first and last days of topical treatment) and 34 (oral administration) at 0, 1, 2, 4, 6, 8, 12, 14-16 h and 24 h after treatment for determination of plasma concentrations of retinol (REL), retinyl palmitate (RP), oleate (RO) and stearate (RS), 9-cis-, 13-cis-, all-trans- (AT), 13-cis-4-oxo- or AT-4-oxo-retinoic acids (RAs).

RESULTS:

With the exception of transient mild (RP-group) to moderate (REL-group) local irritation on the treatment sites, no adverse local or systemic effects were noted. On days 1 or 21 of topical treatment, no changes were measured in individual or group mean plasma C_{max}, AUC_{0-24 h} or other pharmacokinetic parameters of REL, retinyl esters or RAs relative to pre-study data. In contrast, single oral doses of RP at 10,000 IU or 30,000 IU produced dose-related and sustained increases in C_{max} and AUC_{0-24 h} values of plasma RP, RO, RS, 13-cis- and 13-cis-4-oxo-RAs, as well as a transient increase in AT-RA. In conclusion, our results provide evidence that human topical exposure to retinol- or retinyl ester-containing cosmetic creams at 30,000 IU/day and maximal use concentrations do not affect plasma levels of retinol, retinyl esters or RAs, whereas single oral doses at 10,000 IU or 30,000 IU produce significant increases in plasma retinyl esters and RA