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Quantification of urocanic acid isomers in murine skin during development and after irradiation with UVB light.

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Abstract

Urocanic acid has been postulated as the photoreceptor mediator of immunosuppression induced by ultraviolet-B (UVB) irradiation. We have shown previously that transplanted epidermal cells from neonatal mice, irradiated mice or mice skin painted with cis-urocanic acid suppress the immune responses to herpes simplex virus. Dorsal skin from foetal mice at 3 weeks gestation and from neonatal mice within 1 day of birth were assayed for the presence of cis- and trans-urocanic acid and compared with the amounts in the ears of 2, 4, 6 and 8-week old mice. Foetal mice had a low skin urocanic acid content (11.9 ng/mg wet weight), neonatal mice 227 ng/mg, while the other ages had at least 340 ng/mg. Neonatal mice were found to have 11.4% urocanic acid as the cis-isomer, whereas foetal mice had undetectable amounts and all remaining ages had about 4%. Irradiation of 7-week-old mice with 96 mJ/cm² UVB light resulted in the presence within the ears of 31.1% urocanic acid as the cis-isomer. This level was maintained for at least 16 h, then declined slowly until, after 7 days, 16.2% was in the cis-form. Nonirradiated ears contained 4.7% cis-isomer. It is known that UVB irradiation of mice suppresses the delayed type hypersensitivity response to HSV. The suppression was found to be dependent on the time interval between irradiation and infection with virus; this had to be longer than 5 h and less than 14 days.(ABSTRACT

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