Ultraviolet exposure and vitamin d synthesis in a sun-dwelling and a shade-dwelling species of anolis: are there adaptations for lower ultraviolet B and dietary vitamin d3 availability in the shade?

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We compared the natural ultraviolet B (UV-B) exposure, dietary vitamin D, and skin-generated vitamin D synthesis for adult males of two species of Jamaican anoles. The more shade-tolerant and thermal-conforming Anolis lineotopus merope, rarely exposed to full sun, experienced less UV-B irradiation in its shady environment than the more heliophilic and thermophilic Anolis sagrei, which frequently basked in full sun during the morning hours (0800-1100 hours). Both species obtained detectable levels of vitamin D(3) in their diet, but the heliophilic A. sagrei obtained more. To compensate for less availability of UV-B and dietary vitamin D, the skin of A. lineotopus merope seems to have acquired a greater sensitivity than that of A. sagrei regarding UV-B-induced vitamin D(3) photobiosynthesis. We assessed this by observing a greater conversion of provitamin D to photoproducts in skin exposed to UV-B from a sunlamp. The reduced skin sensitivity of A. sagrei regarding vitamin D photobiosynthesis may reflect a correlated response associated with less need for vitamin D photobiosynthesis and greater need for UV-B screening capacity as an adaptation to a more damaging UV-B environment. However, the possibility that adaptations for photobiosynthesis of vitamin D and for protection from skin damage could involve independent mechanisms needs investigation. Also, the ability to behaviorally regulate UV-B exposure, as shown for the panther chameleon, would benefit both species of Anolis and should be investigated.

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