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# Oral *Polypodium leucotomos* extract decreases ultraviolet-induced damage of human skin

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**Background:** UV radiation induces damage to human skin. Protection of skin by an oral photoprotective agent would have substantial benefits.

**Objective:** We investigated the photoprotective effect of oral administration of an extract of the natural antioxidant *Polypodium leucotomos* (PL).

**Methods:** A total of 9 healthy participants of skin types II to III were exposed to varying doses of artificial UV radiation without and after oral administration of PL (7.5 mg/kg). At 24 hours after exposure the erythema reaction was assessed and paired biopsy specimens were obtained from PL-treated and untreated skin.

**Results:** A significant decrease in erythema was found in PL-treated skin ( $P < .01$ ). Histologically, PL-treated biopsy specimens showed less sunburn cells ( $P < .05$ ), cyclobutane pyrimidine dimers ( $P < .001$ ), proliferating epidermal cells ( $P < .001$ ), and dermal mast cell infiltration ( $P < .05$ ). A trend toward Langerhans cell preservation was seen.

**Conclusion:** Oral administration of PL is an effective systemic chemoprotective agent leading to significant protection of skin against UV radiation. (J Am Acad Dermatol 2004;51:910-8.)

Exposure of human skin to sunlight, containing UV radiation (UVR) A and B, leads to deleterious effects on skin such as sunburn, immune suppression, pigmentary changes, photoaging, and

#### Abbreviations used:

CPD: cyclobutane pyrimidine dimer  
MED: minimal erythema dose  
PL: *Polypodium leucotomos*  
UVR: ultraviolet radiation

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skin cancer.<sup>1</sup> The mechanism of such cutaneous damage induction is complex, but can be broadly divided in direct oxygen-independent damage through absorption of photons, and in oxidative damage, caused by formation of free radicals and reactive oxygen species.<sup>2</sup> This is why antioxidants have been increasingly studied as inhibitors or quenchers of UV-induced cutaneous damage. Currently the most widely used method of protection against UV-induced damage is the use of topical sunscreens enriched with UV-absorbing chemicals. A systemic photoprotective agent would obviously have an advantage over topical protection as this would provide uniform, total body surface protection without the variance in protection commonly observed with topical sunscreens.<sup>3</sup> Attempts have been made to investigate the photoprotective effects