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

Maritza A. Middelkamp-Hup, MD,a Madhu A. Pathak, PhD,a Concepcion Parrado, MD, PhD,a,b David Goukassian, MD,c Francisca Rius-Díaz, PhD,a,b Martín C. Mihm, MD,d Thomas B. Fitzpatrick, MD, PhD,a and Salvador González, MD, PhDa

*Boston, Massachusetts, and Malaga, Spain*

**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 chemophotoprotective agent leading to significant protection of skin against UV radiation. (J Am Acad Dermatol 2004;51:910-8.)

---

**E**xposure 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 skin cancer.1 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.2 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.3 Attempts have been made to investigate the photoprotective effects