

Not as Bland as You May Think: Celery (*Apium graveolens*) Commonly Induces Phytophotodermatitis

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PRACTICE POINTS

- Clinicians should consider phytophotodermatitis (PPD) in the differential diagnosis for erythematous eruptions with bullae and vesicles manifesting in sun-exposed distributions.
- A clinical history that includes the patient's occupation, diet, and history of treatment with psoralen plus UVA and use of tanning beds may help diagnose PPD.
- It is important to educate patients who regularly handle celery and other plants containing furocoumarins and psoralens on how to prevent PPD and utilize effective photoprotection.

Often consumed for its nutritious benefits, celery (*Apium graveolens*) contains furocoumarins and psoralens that have photosensitizing properties and can induce phytophotodermatitis (PPD) when exposed to UV light. Clinical manifestations of PPD include an eruption of vesicles in sun-exposed areas. When consumed as part of a typical diet, the amount of furocoumarins in celery generally is insufficient to induce PPD; however, individuals who regularly handle celery or consume produce that is infected with fungus as well as those who use tanning beds are at increased risk for this painful reaction. In this article, we detail the possible consequences of celery exposure, an unsuspecting plant, and the cutaneous reactions that can follow with photosensitization.

Celery (*Apium graveolens*)—that lowly vegetable that often languishes in the refrigerator crisper and apparently supplies fewer calories than are

required to consume it—contains a myriad of photosensitizing chemicals known as furocoumarins and psoralens that can cause phytophotodermatitis (PPD) when handled prior to exposure to UV light.¹ Individuals who are most likely to develop PPD caused by repeated contact with celery include food industry workers (eg, grocery store workers, farmers) who pick, handle, or prepare celery for consumption. While eating celery as part of a standard diet is highly unlikely to cause PPD, celery infected with *Sclerotinia sclerotiorum* (known as pink rot) causes more severe generalized sun sensitivity due to an increased amount of furocoumarins produced in response to the fungus.² Contact with celery also can induce cutaneous manifestations unrelated to sun exposure in some individuals, including urticaria, allergic contact dermatitis, and anaphylaxis.³ In this article, we provide an overview of the life cycle and origin of celery as well as its irritant and allergic properties. We also describe cutaneous rashes associated with PPD caused by exposure to celery and highlight treatment options.

Morphology and Distribution

The Apiaceae family features aromatic flowering plants that comprise more than 3500 species, including many economically important vegetables, herbs, and spices.⁴ It also includes many alkaloid-containing species that are known to be poisonous to humans, such as poison hemlock (*Conium maculatum*) and water hemlock (*Cicuta maculate*). Most Apiaceae plants that are consumed by humans originate from the Mediterranean region.⁵ While known for their diversity of flavor and aroma, most of the plants from this family have low caloric value and provide minimal amounts of energy.

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Members of the Apiaceae family have flowers that create a classic umbel shape mimicking the appearance of an upside-down umbrella (thus the former name for this family, Umbelliferae). The pedicles—the small stems attached to the base of each flower—spread from a common center to form the umbel.⁵ The Apiaceae family also includes the greatest number of plants that cause PPD due to their high concentration of furocoumarins, which deter fungus from harming the plants.⁶

A biennial plant, celery completes its life cycle in 2 years. During the first season, the stems, roots, and leaves sprout; in the second and final year, the flowers, fruits, and seeds proliferate, followed by decomposition. *Apium graveolens* approaches heights of 2 to 3 ft, growing upright and displaying grooved stems. Each stem terminates in a basal rosette of leaves. The second season brings white flower blooms in terminal or axillary umbels.⁷

Celery originated in the temperate Mediterranean regions of Europe, but farmers now cultivate it globally.⁸ It grows best in rich moist soil with full exposure to sunlight. Plants multiply their numbers through self-seeding. Celery commonly is found in suburban and rural homes, both in refrigerators for consumption as well as in medicine cabinets in capsule form for the treatment of arthritis.⁴

Irritant and Allergenic Properties

Despite the potential health benefits of celery, the Apiaceae family, which includes hogweed, dill, and fennel, prevails as the most common culprit for phototoxic reactions. The Rutaceae family, including citrus plants and rue, remains runner-up for causes of PPD.⁹ Phytophotodermatitis is not an immunologic reaction, making anyone susceptible to formation of the cutaneous lesions when exposed to UV light after handling celery. Pruritis rarely occurs, unlike in allergic phyto dermatitis.¹⁰ Upon photoexcitation from exposure to UVA light, individual psoralen molecules covalently bind to pyrimidine bases, causing interstrand cross-linking that prevents DNA replication and triggering a cascade leading to apoptosis of the cell. Apoptosis induces cell membrane edema, which manifests as cutaneous vesicles and bullae on the skin.¹⁰ Regardless of plant species, PPD reactions have similar appearance.

Celery roots contain the greatest concentration of psoralens, making it the most likely part of the plant to induce PPD.⁶ Phytophotodermatitis caused by celery can occur at any time of the year, but most eruptions occur during the summer months due to increased sunlight exposure and intensity. Among 320 randomly selected Michigan celery harvesters, 163 (51%) displayed evidence of vesicular and bullous dermatitis on the fingers, hands, and forearms.¹¹ In this study, celery infected with pink rot fungus induced an erythematous eruption with vesicles and bullae within 48 hours of contact after just 30 seconds of summer sunlight exposure; however, eruptions are not limited to summer months, as the cutaneous presentation depends solely on exposure to UVA light, which can occur year-round.

Use of tanning beds is a major risk factor for PPD.¹² Tanning beds utilize fluorescent bulbs that primarily emit UVA light, with UVB light emitted to a lesser degree. The UVA radiation produced by tanning beds is more than 3 times as intense as natural sunlight.¹² Among grocery store employees, the combination of these 2 risk factors—regular contact with celery and tanning bed use—resulted in a prevalence ratio for PPD more than 40 times greater than that of individuals with neither risk factor.¹³

Cutaneous Manifestations of PPD

Phytophotodermatitis is a nonimmunologic dermatitis that forms via the interaction between UV light exposure and the photosensitizing chemicals inherent to some plant species. Development of PPD following contact with celery may be caused by the photoactive substances in celery, including the psoralens 8-methoxypsoralen and 5-methoxypsoralen.¹⁴ The psoralens must become activated by UV light with wavelengths between 320 nm and 400 nm (UVA) to initiate biologic effects.¹⁵

Once chemically activated, the photoactive mediators cause an erythematous and edematous sunburnlike reaction. Current hypotheses state that psoralen plus UVA generates reactive oxygen species, which damage the DNA within cells and alter receptors on cell membranes within the epidermis.¹⁴ The cutaneous eruption usually appears between 12 and 36 hours after sun exposure. Although they generally are not pruritic, the eruptions may induce pain. Within 7 to 10 days following development of the rash, hyperpigmentation occurs in the affected area and often persists for months to years.¹⁶ Ingestion of large amounts of celery has been cited to cause generalized phototoxic reactions; however, PPD rarely arises solely after ingestion, unless excessive amounts are consumed with concomitant exposure to psoralen plus UVA or tanning beds.¹⁷ In these cases, patients develop diffuse redness with superficial scaling, pain, and blistering if severe.

Treatment of PPD

Prevention remains the best form of treatment for PPD caused by exposure to celery. Postcontact management includes washing the affected area with soap and water and changing clothes promptly. Topical corticosteroids have mild utility in treatment of PPD.¹⁸ Oral steroid tapers, which reduce acute inflammation, also are an option for treatment. Alternatively, intramuscular triamcinolone acetonide 1 mg/kg mixed with budesonide 0.1 mg/kg is an option and is associated with a reduced risk for adverse effects compared to oral steroids. The resulting hyperpigmentation develops 1 to 2 weeks postepithelialization.¹⁹ Hyperpigmentation often fades slowly over several months in lighter-skinned individuals but may last for years or indefinitely in darker-skinned patients.

Final Thoughts

Dermatologists should be knowledgeable about the various plant culprits that can induce PPD. Understanding the mechanism and pathophysiology can help guide

both therapeutic interventions and preventive counseling. Understanding that even readily available vegetables such as celery can induce cutaneous eruptions should put PPD in the differential diagnosis more commonly when unspecified dermatitides are present.

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