

Clinical Letters

What have caterpillar dermatitis and jellyfish dermatitis in common?

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Dear Editors,

Caterpillar dermatitis is observed after contact with setae on Lepidoptera, mainly processionary caterpillars during the summer in central Europe. Jellyfish dermatitis is much less well-known in our latitudes.

Case 1

A 43-year-old man presented with an acute pruritic rash. Two days previously he worked in the forest, stacking oak wood. On clinical examination his trunk and arms showed disseminated erythematous papulovesicles and urticarial erythema (Figure 1). Enlarged lymph nodes up to 2 cm size



Figure 1 Multiple erythematous papulovesicles and crusted urticarial erythematous macules on the trunk.

were found in the right groin. C-reactive protein was increased to 42 mg/l (normal <5 mg/l). He was treated with doxycycline 200 mg/day. Histologic examination showed massive spongiosis with intraepidermal vesicles as well as a severe edema in the papillary dermis with subepidermal blistering. In the dermis there was a compact superficial as well as deep perivascular and periadnexal lymphocytic infiltrate with abundant interstitial eosinophils (Figure 2a, b).

We treated with antiseptics and topical corticosteroids achieving an obvious improvement within 2 weeks.

Case 2

A 41-year-old man presented two weeks after his vacation on Tenerife. While swimming in the ocean, he had developed red

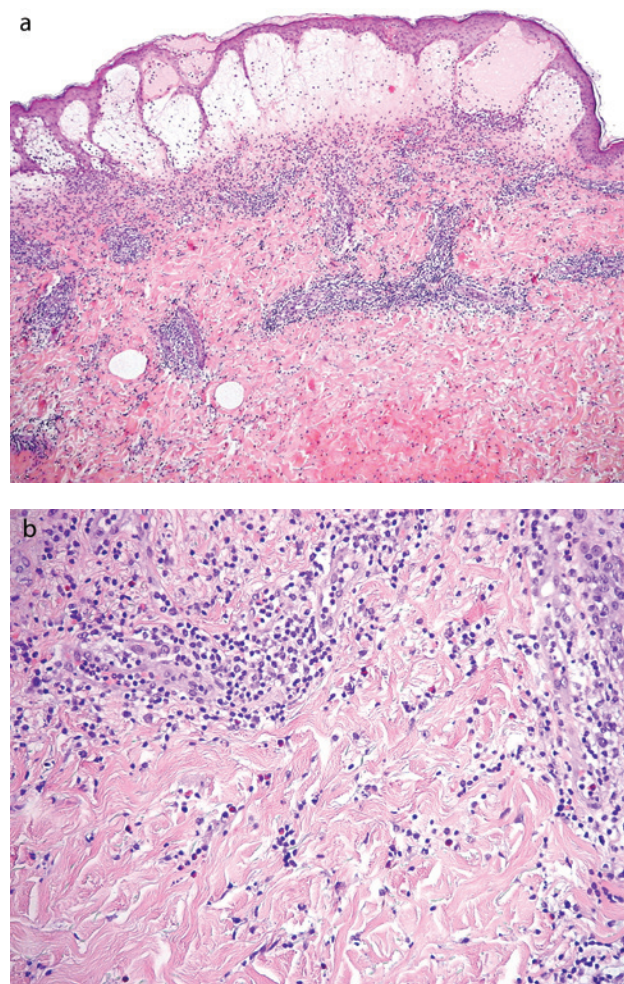


Figure 2 Superficial and deep perivascular and periadnexal lymphocytic infiltrates with numerous eosinophils, which are also distributed interstitially. Intraepidermal spongiotic vesicles (a). Marked edema in papillary dermis (b) (H&E a x 40, b x 200).



Figure 3 Linearly arranged coalescing erythematous papules on the neck.

patches and burning as well as dizziness after contact with a blue-gray jellyfish, presumably *Physalia physalis*. After therapy with prednisolone, his symptoms temporarily became better,

but they exacerbated a few days later when he ate clams. He presented with multiple erythematous-squamous papules, papulovesicles and serous crusts (Figure 3). Axillary and cervical lymph nodes were enlarged to 2 cm size. Blood analysis showed slight eosinophilia ($0.58 \times 10^9/l$, normal up to $0.5 \times 10^9/l$), C-reactive protein was not increased. Total IgE was 388 IU/ml (normal <113 IU/ml), specific IgE was increased for shrimps (0.81 IU/ml, CAP class 2), but negative for clams, codfish, rPen a1 and rDerp10. Histologic examination showed spongiosis, parakeratosis and crusts as well as a subepidermal edema with blistering (Table 4a, b). A superficial and deep perivascular and periadnexal lymphocytic infiltrate with interstitial eosinophils was found. The dermis showed degenerated collagen fibers and flame figures. Topical and systemic corticosteroids as well as antihistamines led to complete resolution after one month.

Discussion

Setae are hair-like structures with little barbs and / or special substances which cause burning when touched. They are best known in stinging nettle plants. However, setae can also be found on processionary caterpillars, and on several jellyfish species. The stinging hairs on the caterpillar surface can be spread by the wind over kilometers. In jellyfish, the tentacles contain cnidocytes which have an organelle known as a cnida or nematocyst containing a coiled setae-like structure. When touched, they shoot out these arrow-like structures at speeds up to 18.6 m/s [1].

The natural habitat of the oak processionary caterpillar (*Thaumetopoea processionea*) in Germany has expanded over the last decades (www.eichenprozessionsspinner.org) and every incident with these animals should be reported to

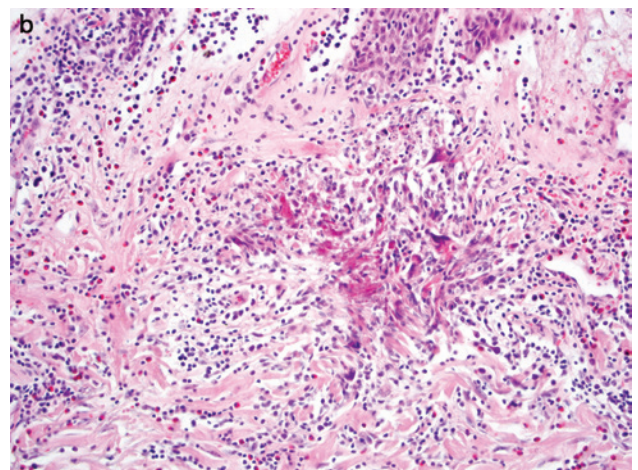
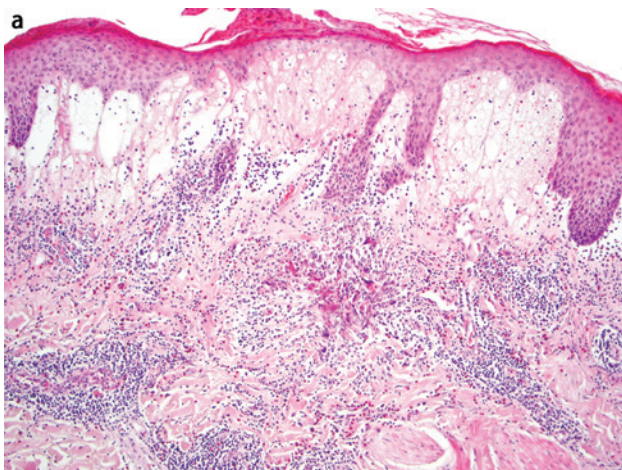


Figure 4 Superficial and deep, perivascular and periadnexal lymphocytic infiltrate with interstitial eosinophils. Spongiotic epidermis with parakeratosis and serous crust. Subepidermal edema (H&E x 100) (a). Degenerated collagen fibers and eosinophilic granular debris ("flame figures") in dermis (H&E x 200) (b).

Table 1 Synopsis of toxin components in *Physalia physalis* (according to [1, 9–13]).

Substance	Composition	Effect
Physalitoxin	240 kD	
Glycoprotein with 10,6 % carbohydrates	Makes up 28 % of the total toxin	Mast cell degranulation, lysis of mast cells, histamine release; vasodilatation within skeleton muscle, cardiac arrhythmia, depolarization by inhibition of the Na ⁺ /K ⁺ ATPase activity, influx of Ca ⁺⁺ , cell lysis, hemolysis
Not further specified proteins	50–65 kD, 69 kD, 82 kD, 150 kD	See physalitoxin
Phospholipases	Not specified	Skin irritation; systemic symptoms of intoxication, hemolysis
Elastases	Not specified	Proteases which break up peptide bonds (such as elastin, collagen, deoxyribonucleic acid or ribonucleic acid etc.)
Collagenase	25 kD	
Endonuclease	75 kD	
DNAse	Not specified	

local authorities. In case of contact, toxic histamine releasing proteins, especially thaumetopoein [2] cause pruritic erythematous, macules, urticarial papules or vesicles. Sometimes systemic reactions such as fever, headache or even anaphylactic shock can occur [3, 4].

The Atlantic Portuguese man-of-war is considered to be one of the most toxic jellyfish in the world. Their long tentacles (up to 50 m) are covered with numerous cnidocytes containing a complex toxic mixture of heat-labile proteins (Table 1). These toxins both cause histamine release and directly stimulate nerve cells. The skin (usually urticarial, partly linearly arranged papules and papulovesicles), eyes (conjunctivitis) and respiratory system (angioedema, pharyngitis, bronchial asthma) can be affected [5]. Occasionally contact with cnidae can lead to anaphylactic shock or respiratory and cardiac arrest due to neurotoxicity and cardiotoxicity [6].

Pathogenetically pruritus from setae is based on both IgE and non-IgE mediated reactions [6]. As in case 2, late reactions at the contact point have been described and attributed to persisting glycosylated proteins in the skin [1, 2]. Tropomyosins (for example Pen a 1 in shrimps) are ubiquitously occurring allergenic proteins in invertebrate animals [7]. Cross-reactions are described with Der p 10 of house dust mites which have a structurally related tropomyosin. In jellyfish 2 different genes for tropomyosin have been identified [8], so that cross-reactions seem to be possible. However, it could not be fully resolved if the flare-up of the skin rash described in case 2 was due to cross-allergens found in the clams she ate. Histopathological findings in both patients were almost identical and the pattern with a superficial and deep perivascular and interstitial lymphocytic dermatitis with eosinophils was compatible with an arthropod reaction.

Conflict of interest

None

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