

## Honey Bee Allergies and What Can be Done About Them

Puget Sound BeeKeepers Association  
May 27 2014

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(informational only and not specific medical advice)*



Honey bee.

The honeybee ( insect order **Hymenoptera** family **apidae**) stinger is a modified egg-laying apparatus (ovipositor). Only females can sting. Honey bees have dedicated ladies to defend their nest and they will do so vigorously. Foraging members of the colony also will sting if disturbed or injured.

### SINGLE STINGS



(Photo credit to  
animalseatinganimals.com)

(Photo credit to

Stingers deliver a venom that causes acute pain when injected into the skin as the venom comprises vasoactive amines such as histamine and dopamine and norepineprine and kinins and

protein enzymes. One chemical responsible for this is **melittin**, which causes pain by stimulating the nerve endings in the skin which begins as a sharp pain that becomes achy.

The honey bee stinger is attached to a poison sack that is ripped out of the bee when she pulls away after stinging-and this act also releases pheromones that attract other bees to the site of her sting.

The body responds to stings by liberating fluid from the blood to flush the venom out from the area. This causes redness and swelling at the sting site or the classical "inflammatory response" via a sudden IgE mediated hypersensitivity reaction. This can lead to very large swelling around the sting site or in a whole portion of the body or even a systemic response (*anaphylaxis*). The honey bee stinger remains in the skin when the insect leaves because the stinger is barbed. Remove the stinger as quickly as possible because venom continues to enter the skin from the stinger for 45 to 60 seconds following a sting. Fingernails or the edge of a credit card are both effective tools. If a stinger is removed within 15 seconds of the sting, the severity of the sting and the immune reaction may be reduced.



<http://cs-vancouver.sun.s3.amazonaws.com/CommunityServer.Blogs.Components.WeblogFiles/honeybee-zen/1464.bee%20hands.JPG>

Above is picture of an amateur Vancouver bee keeper with a swollen left hand following a gloveless hive inspection. The risk of developing a systemic reaction in future with another sting is approx..10%

If a person has a systemic reaction-eg anaphylaxis-there is 30-60% risk of subsequent systemic reaction.



<http://www.beekeepingadvice.co.uk/2012/07/am-i-allergic-to-bee-stings/>

### **Anaphylaxis-IgE Hypersensitivity Reaction**

- A small percentage of the population is allergic to bee stings (3% have allergies and <1% have anaphylaxis as per webmd; 3% of adults have anaphylaxis as per N Eng J Med 2014). (There is a 10-fold increase from kids to adults showing increased sensitization)
- 50 persons per year in US die from bee stings and the resulting severe allergy known as anaphylaxis.
- Most persons destined to get anaphylaxis to a honey bee sting develop an increasing reaction over time such that they have been "warned" that their immune system is "primed" via a IgE hypersensitivity reaction
- the venom specific to the honey bee binds to IgE molecules attached to mast cells which triggers the mast cells to release all sorts of inflammatory substances causing the reaction

- A small number of individuals develop anaphylaxis with a first sting.
- Carrying an epipen/other form of epinephrine autoinjector and Benadryl/antihistamine in a pocket of bee suit could potentially be lifesaving as **“acute systemic reactions typically occur very rapidly after a hymenoptera sting”** (N Engl J Med 2014)
- consider a trip to a physician or allergist for testing if you have developed any type of reaction to a honey bee sting. Specifically ask for venom specific Ig E testing and possible subcutaneous venom immunotherapy
- Allergic reactions can develop anywhere on the body and may include non-life-threatening reactions such as hives, local or regional swelling, nausea, vomiting, abdominal cramps, or headaches (see table 1 below).
- Life-threatening reactions such as shock, dizziness, unconsciousness, difficulty breathing, and laryngeal blockage resulting from swelling in the throat require immediate medical care. Symptoms can begin immediately following the sting or up to 30 minutes later and may last for hours. Honey bee hymenoptera stings are particularly likely in a minority of cases to cause a biphasic reaction defined as another severe response 8hours or less later
- REMEMBER THE ABCs (**AIRWAY; BREATHING; CIRCULATION**) of emergency care. If trouble with the ABCs develops call 911 and have your own ER kit with antihistamines and epipen in your bee suit under your physician’s guidance.
- A severe response to a bee sting should always be assessed by ER services and a person with anaphylaxis even if stabilized with epipen injection needs to be observed in ER as the response can be prolonged; require multiple injections; fluid support; steroids and observation of kidney function.
- Emergency measures that may be considered:
  - **Inject epinephrine if the person is unable to.**
  - **If the person has a history of anaphylaxis, don't wait for signs of a severe reaction to inject epinephrine**
  - **Read and follow patient instructions carefully.**
  - **Inject epinephrine into outer muscle of the thigh. Avoid injecting into a vein or buttock muscles; hands or feet.**
  - **Do CPR if the Person Stops Breathing**
  - **laryngeal distress/wheezing will not be resolved with CPR and requires an epipen immediately**
  - **Consider taking BLS or CPR training to feel more comfortable assessing the ABCs.**



New England Journal Of Medicine 365:2, July 14, 2011

<http://jeffreysterlingmd.com/tag/anaphylaxis/>



Reviews & Opinions in Emergency Medicine April 14, 2014 Accessed May 20, 2013 @ <http://adanatriham.blogspot.com/>

- o **Venom immunotherapy:** After ER treatment for systemic reactions to honeybee sting and for patients with venom specific Ig E antibodies. Local reactions (in future stings) are reduced in size and duration and persons with frequent or unavoidable exposures such as beekeepers who have even a large local reaction may want to request this of their physician.

**Table 1: Clinical Features of Anaphylaxis**

<b>Organ system</b>	<b>Signs and Symptoms</b>
Nervous system	feeling of doom, weakness, headache, dizziness, seizure
Eyes, nose,mouth	pruritis, angioedema, rhinitis, lacrimation,metallic taste
Respiratory	hoarse, swallowing problems,asthma, asphyxia, cyanosis
Cardiac	heart racing and/or irregular, hypotension,heart attack or arrest
Cutaneous	itching, flushing, hives or angioedema

(adapted from Casale et al, N Engl J Med 2014)

(Definition: anaphylaxis

Type: Term

Pronunciation: an'ă-fi-lak'sis

Definitions:

1. An induced systemic or generalized sensitivity; at times the term anaphylaxis is used for anaphylactic shock. The term is commonly used to denote the clinical reaction seen with system IgE-mediated hypersensitivity reaction. Multivalent antigen crosslinks IgE on the surface of tissues mast cells, causing degranulation with release of preformed mediators (histamine). Generation of newly synthesized mediators occurs rapidly. The physiologic manifestations reflect the biologic effects of these mediators. Cutaneous symptoms include pruritus, erythema, urticaria, and angioedema. Respiratory compromise can come from laryngeal obstruction or bronchospasm. Cardiac effects include arrhythmia, hypotension, and shock. The reaction may be fatal if asphyxiation or cardiovascular collapse occurs. (Stedman's Medical Dictionary))

## **AVOIDING STINGS**

Bees can be attracted to, or may react to, odors such as perfumes or scented soaps. Avoid going barefoot in gardens and lawns with vegetation, especially clover and blooming ground covers. Also avoid wearing brightly colored or patterned clothing (try to not look like a flower).

Stinging incidents often occur when nesting areas of social insects are disturbed. If you are going to be in an area where disturbing a nest is likely, wear long pants and a long-sleeved shirt. If you

know you will disturb a hive than make sure you are properly suited up in bee gear. **AVOIDING STINGS IS THE ONLY WAY TO AVOID PRIMING YOUR IgE IMMUNE SYSTEM!**

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