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Insect Stings and Spider Bites

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Newspaper article on spread of the African origin “killer bees” into California

Killer bees head for L.A.

Los Angeles Daily News

LOS ANGELES — A top agricultural official said Africanized “killer bees” are expected to reach Los Angeles County this year and he urged the public to use common sense in dealing with the invasion.

Stay away from swarms and don't try to deal with them yourself, county Agricultural Commissioner Leon Spaugy said Tuesday.

Agricultural officials have said they expect Africanized bees to take over all wild hives in California eventually. Commercial beekeepers plan to protect their hives by introducing new European queen bees frequently.

Spaugy told county supervisors that the Africanized bees are no more dangerous than more peaceful domestic bees — unless their hives are threatened.

Then, he said, they attack more vigorously and for longer distances.

He said that a major “killer bee” invasion is not expected, although there probably will be some small swarms.

'Killer bees' buzz into California

By Gary Fields
USA TODAY

Southern California has an unwelcome resident — Africanized "killer bees."

Lane Therrell, of the California Department of Food and Agriculture, said Monday that a swarm was found Oct. 24 at the Chuckawalla State Prison near Blythe. It was destroyed by the prison fire department.

The bees "have a tendency to get up and move around a lot more" than European honeybees, said Tom Eichlin, a state insect biosystematist.

"We've been expecting them," he said.

Since their accidental release from a research lab in Brazil in 1957, "killer bees" have gradually migrated north. They arrived in Texas in 1990 and Arizona in 1993.

Though the sting of the Africanized bees is no worse than that of the European bee, they attack in greater numbers and with greater tenacity.

As many as 80,000 or more bees have been known to pursue people and animals for distances up to a quarter-mile.

Authorities believe the swarm crossed the desert from Arizona and was probably seeking water and shelter.

Newspaper article on “killer bee” attack in Texas

12 cats killed by bees in Texas

■ **Floresville, Texas** — A Floresville, Texas, farm woman's 12 cats were killed Thursday by what she believes were Africanized bees, commonly called “killer bees.” “They covered the cats' whole face and body,” Tillie Dziuk said. She and her husband, Leonard, also were stung but not seriously.

Commonest Insect Stings in the U.S.

- Hymenoptera (bees, wasps, ants) :
 - 30 to 50 deaths in U.S. per year from allergic reactions
- Diptera (flies)
- Bed bugs, kissing bugs, lice, fleas, midges (“no-see-ums”)



Wasps

Phalinn Ooi (flickr [1](#), [2](#))



Honeybees

John (flickr), Brent Myers (flickr)



Fire Ants

EOL Group (flickr [1](#), [2](#))



Hornets

beckymaldonado (flickr), William Warby (flickr)



Yellowjackets

Bob Peterson (flickr [1](#), [2](#))

Honeybee leaving imbedded stinger

Honey bees are the only hymenoptera with a strongly barbed sting. When a honey bee stings a person, it cannot pull the barbed stinger back out. The stinger should be removed as quickly as possible; a delay of a few seconds leads to more venom being injected.

- Adapted from [Wikipedia](#)



 Waugsberg ([Wikimedia Commons](#))

Kissing Bug



 Fernando Otalora Luna ([Wikimedia Commons](#))



 Centers for Disease Control and Prevention ([Wikimedia Commons](#))

Other Biting Land Arthropods

- **Mites (chiggers, scabies)**
- **Ticks**
- **Spiders**
- **Scorpions**
- **Centipedes**

Chigger Bites



After crawling onto their hosts, they inject digestive enzymes into the skin that break down skin cells. They do not actually “bite”, but instead form a hole in the skin called a stylostome, and chew up tiny parts of the inner skin, thus causing severe irritation and swelling.

- Adapted from [Wikipedia](#)



 Matt Reinbold (flickr)

Desert scorpion



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Musides ([Wikimedia Commons](#))

Bark Scorpion

The Arizona bark scorpion (Centruroides sculpturatus) is a small light brown scorpion common to the southwest United States and Northern Mexico. It is the most venomous scorpion in North America, and its venom can cause severe pain in adult humans. Temporary dysfunction in the area stung is common; e.g. a hand or possibly arm can be immobilized or experience convulsions. It also may cause the loss of breath for a short period of time. Due to the extreme pain induced, many victims describe sensations of electrical jolts after envenomation.

- Adapted from [Wikipedia](#)

Deathstalker

The deathstalker (Leiurus quinquestriatus) can be found in desert and scrubland habitats ranging from North Africa through to the Middle East. It is regarded as a highly dangerous species because its venom is a powerful mixture of neurotoxins, with a low lethal dose.

- Adapted from [Wikipedia](#)



Skin reaction from contact with “Puss caterpillar”



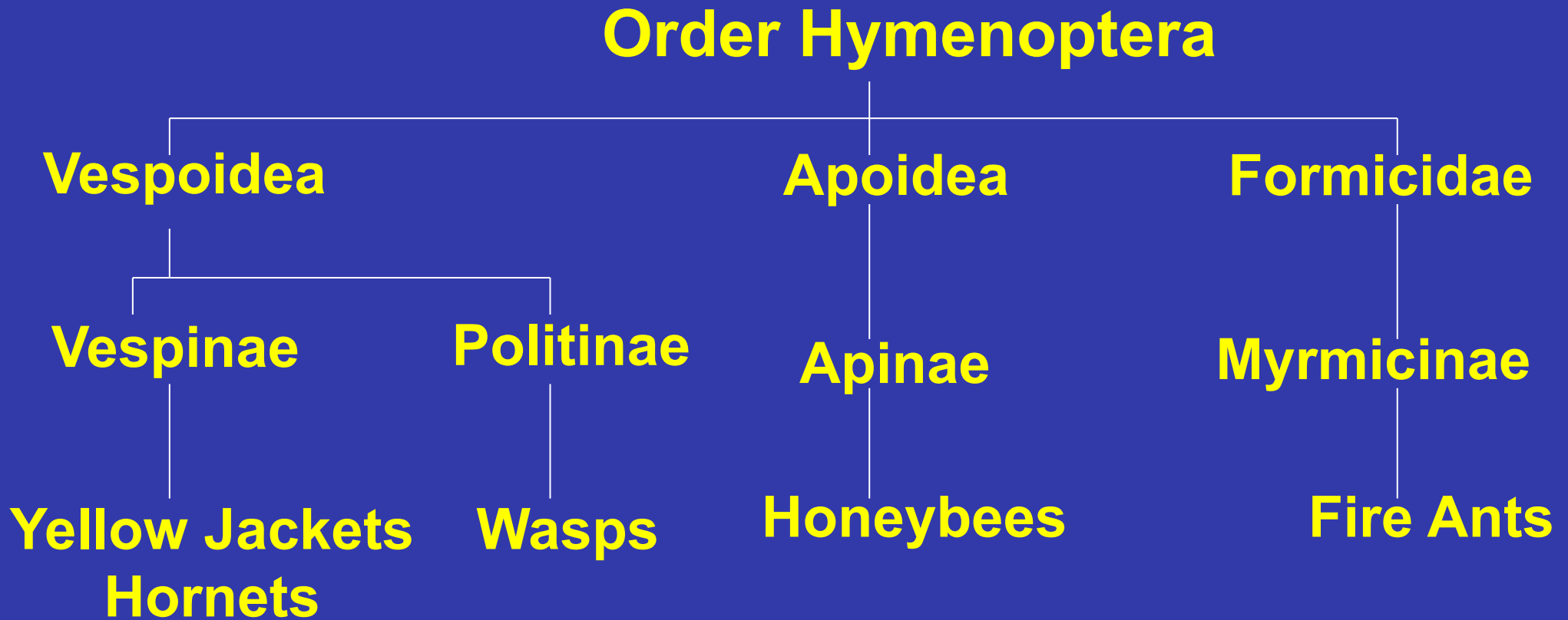
  ClockworkSoul, [Wikimedia Commons](#)



  jeffdelonge, [Wikimedia Commons](#)

“Puss caterpillar”

Taxonomy of Hymenoptera



Composition of Hymenoptera Venom

- **Vespid (wasps, hornets, yellow jackets) :**
 - **Proteins :**
 - Phospholipase A
 - Hyaluronidase, Antigen 5
 - Acid phosphatase
 - **Peptides :**
 - Mast cell degranulating peptide, kinins
- **Formicids (fire ants) :**
 - **Proteins :**
 - Phospholipase
 - Hyaluronidase
 - Unidentified third protein
 - **Alkaloids :**
 - Piperidiones
- **Apids (honeybees) :**
 - **Proteins :**
 - Phospholipase A
 - Hyaluronidase
 - Acid phosphatase
 - **Peptides :**
 - Mellitin
 - Apamin
 - Mast cell degranulating peptide

Types of Reactions to Insect Stings

- **Local allergic (most common)**
- **Exaggerated local reaction (entire limb may swell)**
- **Generalized allergic → anaphylaxis**
- **Toxic reaction (usually from at least 50 to several hundred stings) : mostly GI symptoms (nausea, vomiting, weakness)**
- **Delayed : resembles serum sickness**
- **Local infection : more common from yellow jacket stings than from other species**
- **Psychiatric reactions**



Bee sting. Urticaria, or hives, is the telltale sign of a grade 2 allergic response following a bee sting, shown here, or the sting of any hymenoptera, such as a wasp or ant.

Fire Ant Stings

The venom of fire ants is composed of alkaloids derived from piperidine. The sting swells into a bump, which can cause much pain and irritation. The bump often forms into a white pustule, which can become infected if scratched, but if left alone will usually flatten within a few days.

- Adapted from [Wikipedia](#)





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ZeWrestler, [Wikimedia Commons](#)

Closeup of pustules from fire ant stings

Dangerous Local Reactions from Insect Stings

- **Direct eyeball sting : may cause atrophy of iris, abscess of lens, perforation of globe**
- **Pharyngeal sting : local edema may cause airway compromise**

Treatment of Local Reactions

- Remove imbedded stinger (honeybees) by scraping ; not by squeezing (because this may inject more venom)
- Ice
- Antihistamines
- Tetanus prophylaxis
- Topical steroid cream (optional and questionably effective)

Treatment of Anaphylactic (Severe) Reactions to Insect Stings

Airway management : high flow O₂

- **IV access : lactated ringers (LR) bolus if hypotensive**
- **SQ epinephrine 0.01 mg / kg (0.3 mg in adults) ; IV epinephrine 0.1 mg if severe shock**
- **IV diphenhydramine 1 mg / kg (50 mg in adults)**
- **IV steroids (100 to 250 mg hydrocortisone or methylprednisolone, etc.)**
- **Consider IV dopamine or epinephrine drip if hypotensive despite fluids**
- **Inhaled beta aerosol if wheezing (metaproterenol 0.3 cc or albuterol 2.5 cc in 3 cc NS)**

Treatment of Severe Allergic Reactions (cont.)

- Remove stinger
- Ice to sting site
- Tetanus prophylaxis
- Observe at least 4 to 6 hours
- Discharge on at least 3 day course of diphenhydramine and 3 to 7 days course of steroids (weaning dose is optional)
- Referral for desensitization to an allergist
- Consider discharge prescription for epinephrine injection (“Epi-Pen” or “Ana-Kit”)

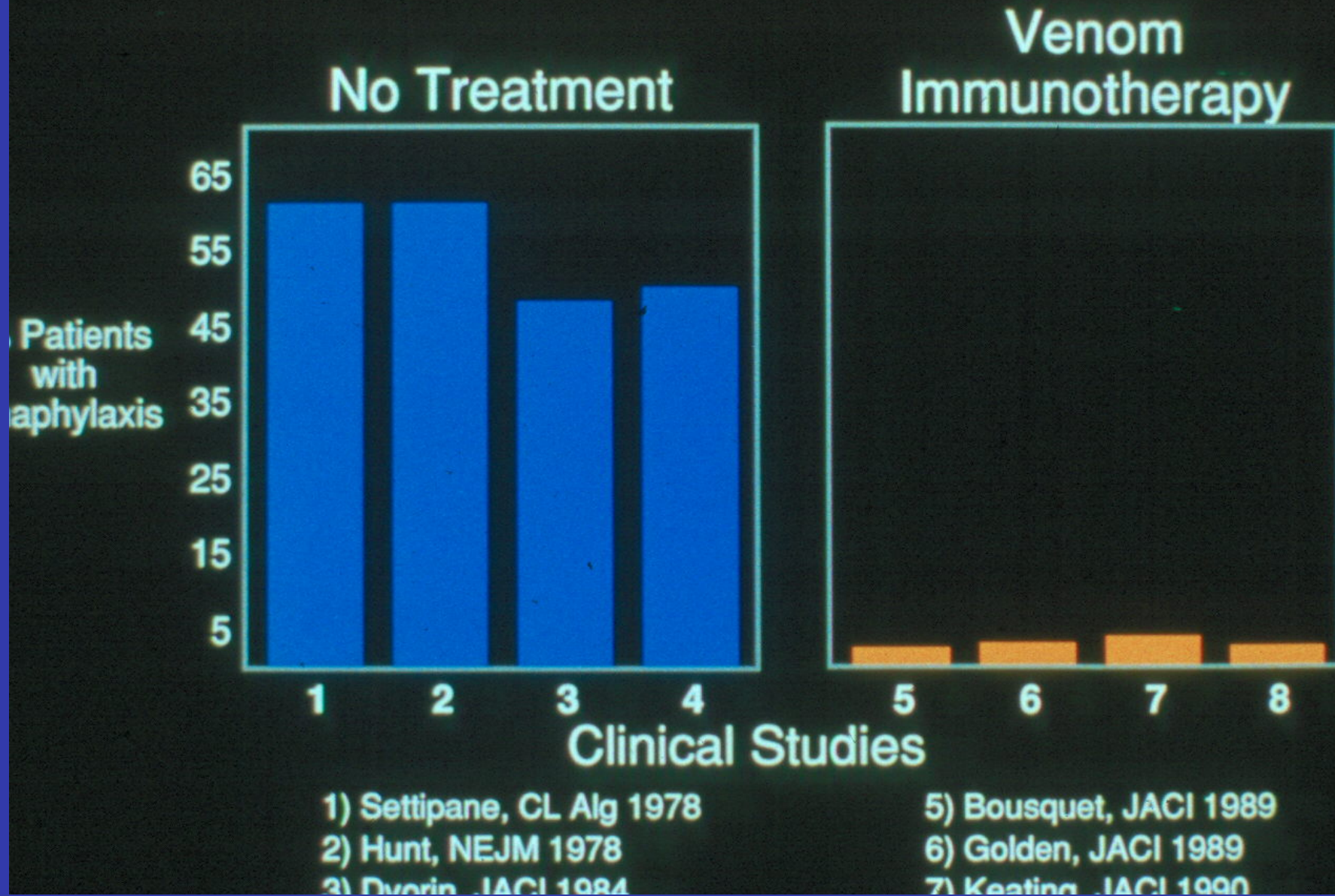
Guidelines for Selecting Adult Patients for Venom Immunotherapy

Reaction	Skin Test / RAST	Immunotherapy
Systemic	Positive	Yes
Systemic	Negative	No
Large Local *	Positive or negative	No
Minimal Local *	Positive or negative	No
None **	Positive or negative	No

* Patients with these types of reactions rarely need skin testing or RAST.

** Patients with no reactions to stings never need skin testing or RAST.

ANAPHYLAXIS UPON RE-STING



Discharge and Referral Procedure



Bee avoidance information
Epinephrine prescription
Evaluation by allergist

 Waugsberg ([Wikimedia Commons](#))

Constituents of Emergency Self-Treatment Kits

EpiPen Auto-Injector

- Spring-loaded automatic injector with
- 0.3 ml (0.3 mg) of (1:1,000) aqueous epinephrine

EpiPen Jr. Auto-Injector

- Spring-loaded automatic injector with
- 0.3 ml (0.15 mg) of (1:2,000) aqueous epinephrine

Ana-Kit

- Manually operated syringe with
 - 0.6 ml (0.6 mg) of (1:1,000) aqueous epinephrine
 - -- delivered as 0.3 ml to a locking point, with the ability to deliver a second identical dose if necessary
- Chlorpheniramine: 2 mg chewable tablets (#4) ³⁰

Infections from Insect Stings

- **No good studies on infection incidence from different species**
- **Infections that do occur are usually due to Strep**
- **Best rules to follow :**
 - **If sting site red & swollen but mainly pruritic : treat with PO antihistamines**
 - **If sting site red & swollen but mainly painful : treat with PO antibiotics**
 - **If sting site red & swollen & pruritic & painful : treat with both antibiotics & antihistamines**



 RafaelLopez, [Wikimedia Commons](#)

Cellulitis from insect sting

Brown Recluse Spider Bites

- Often misdiagnosed
- Usually just cause local tissue necrosis → slowly healing ulcer
- May have systemic symptoms : fever, chills, malaise, weakness, nausea, emesis, rash : rarely hemolytic anemia, thrombocytopenia

Rx : Consider local excision ; routine wound care (oral antibiotics not helpful).

Dapsone (proposed in past as Rx) never actually shown to be effective.



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Jeffdelonge, [Wikimedia Commons](#)

Brown Recluse spider (*Loxosceles reclusa*)



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CDC, [Wikimedia Commons](#)

Brown Recluse spider bite, scarring remains



 Jeffrey Rowland, [Wikimedia Commons](#)

Brown Recluse spider bite, necrosis

Black Widow Spider Bites

- **Toxin is neurotropic : causes acetylcholine and norepinephrine release**

Symptoms :

- **Causes bite site pain which soon resolves, then progressive muscular cramps**
- **Boardlike abdominal wall cramps, no abdominal tenderness**
- **Burning abdomen → extremity pain**
- **Hypersalivation, increased bronchial secretions**
- **Headache, sweating, nausea**



© PD-GOV CDC, [Wikimedia Commons](#)

Black Widow spider (*Latrodectus mactans*)



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Pollinator, [Wikimedia Commons](#)

Lactrodectus mactans: hourglass-shaped marking on ventral surface of abdomen



 David~O, [flickr](#)

Target lesion of the black widow spider: faint erythematous halo around tiny puncture holes

Black Widow Spider Bites (cont.)

Rx :

- **IV fluids if hypotensive**
- **Narcotics IV**
- **IV calcium gluconate (10 ml of 10% solution over 5 minutes)**
- **Methocarbamol (Robaxin) 1 gram IV over 5 minutes (optional and less effective)**
- **Tetanus immunization**
- **Antivenin : only very rarely indicated for an extremely compromised patient. (Use one vial, reconstitute and dilute in 100 to 250 cc of D₅W and give over ½ to 1 hour IV ; similar to use of snake antivenin)**

Other Dangerous Spiders

Funnel back spiders from Australia

- Bites can be fatal
- Australian antivenin used

Tarantulas

- Usually just cause local tissue reactions

Note that all spiders can inject toxins, but most have jaws too small to penetrate effectively into human skin



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Sascha Grabow, Wikimedia Commons

Underside of tarantula showing biting jaws

Spider Bite Infections

- **As for insects, no good studies reported on infection incidence rates**
- **Infections are uncommon with black widow bites**
- **Infections after brown recluse bites are usually due to secondary infection (Staph or Strep) after local tissue necrosis**

Insect Stings and Spider Bites Summary

- **Assess likely species causing the bite or sting**
- **Observe patient for allergic or progressive symptoms and signs if short time frame from time of injury**
- **Treat systemic allergic reactions aggressively and assure proper follow-up care**