

MOSQUITO BITES AND BEE STINGS

Symptoms, Pathology, and Remedies

—

as seen through the wisdom of
WESTERN MEDICINE, HOMEOPATHY, AND AYURVEDA

KATRINA A JOHNSON

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— INTRODUCTION —

This research paper was born of two impulses: the first, a general interest in assembling a personal first aid kit for travel within the United States; the second, a history of multiple bee stings and the question of how best to treat them.

My desire for the first aid kit was fueled by personal reasons. When I travel I carry a rudimentary assortment of things such as band-aids, ibuprofen, skin salve, peppermint tea, and saline wash. This is a decent start, but I wanted to round it out to include remedies for the commonplace travel complaints that I occasionally experience (nausea, diarrhea, bug bites/bee stings, insomnia, and constipation), and I wanted to be more knowledge-base grounded in the choices of what I included in my travel first aid kit.

As far as the bee sting/mosquito bite component of a first aid goes, I have always been allergic to mosquito bites. As a child it seemed that I received more mosquito bites than anyone else in my proximity. Fortunately, I receive fewer mosquitoes bites the older I get, and the ones I do get elicit less of a response. As an adult I experience rather severe tissue-based allergic responses to bee stings. My left hand once swelled up for two weeks after a bee sting. The entire hand and wrist was hot, itchy, painful, and tight-feeling. Each successive time I am stung by a bee, the symptoms increase in intensity.

From time to time I entertained thoughts of carrying an EpiPen with me: I experienced anaphylactic shock once (complete with hospital emergency room epinephrine treatment to keep my heart rate up and pseudoephedrine to mediate the inflammatory response). However, EpiPens expire, they require a prescription, their dose is calibrated for your body weight (so I could not have used my EpiPen on, say, a young child), and you have to carry them with you everywhere or what's the point. That's a hassle and not necessarily a helpful solution in all situations.

A year or so ago we had a summertime party at our house. There were a bunch of young children playing outside. One of the children, unfortunately, stumbled into a newly-arrived swarm of bees. He was stung a half-dozen times and was a bit traumatized. Fortunately, all of the children immediately let the adults know what had occurred. I remembered what my parents did when I was stung by bees as a child and made a paste of baking soda, which I applied to the sting sites. This helped to mediate many of the physical symptoms and got me thinking about what else I could have done to help, if

anything, using items commonly found in my pantry. I pulled out a few books, and the research began in earnest.

For considerations of this research project I widened my research to include Western Homeopathy, essential oils, and my newly begun studies in Ayurveda. Further, I decided to steer clear of conventional Western-based pharmaceutical/ pharmacological treatments except for a brief discussion for comparison's sake. This is reflective of a personal trend in my life away from using Western medicine as a first-line of defense when other, more nature-based, and equally effective remedies are available and to save the Western medicine as a later line of treatment.

For this research paper I incorporate elements of that research and add gleanings from the Ayurvedic classical texts as well as from current Western peer-reviewed journal publishings. From both knowledge bases there is an astonishing amount of material on the topic of mosquito bites/bee stings. For the sake of simplicity I have chosen to stay with my personal arthropod foes, the mosquito and bee. The classical Ayurvedic texts include mosquitoes, bees, mosquito bites, and bee stings within broad discussions of “poisoning.” I have omitted references to other poisoning agents: spiders, ticks, bed bugs, ants, centipedes, caterpillars, scorpions, moths, flies, fleas, lizards, fish, and even humans. I have also narrowed the focus of this paper to exclude discussions regarding effective methods of insect repellency. I am lumping wasps, yellow jackets, and hornets in with my discussion of bees; they are related species,²⁸ and the effects of their stings are typically similar*.

This paper assumes a reader who is of the Western world and, by extension, who is familiar with the modern allopathic Western medical model. I will not explain the tenets or workings of this system except to contrast it to Homeopathy and Ayurveda. I came across a great many herbal references in my research of the Ayurvedic literature, both ancient and modern. I have made every attempt to find current information about and the Latin names of these plants; I have not always succeeded. Spellings differ vastly and transliterations from Sanskrit are not always consistent. Also, sadly, many of these plants no longer exist.

* Honeybees, yellow jackets, hornets, and wasps all belong to the order Hymenoptera. This order splits into two families: Apidae, of which honeybees are a species, and Vespidae. The family of Vespidae splits into two genera: Polistes, which includes wasps, and Vespula, which again branches into two groups of species, one of which is the yellow jacket and one of which is the hornet. The various subspecies of the Hymenoptera occur with different frequencies in different parts of the world.²⁸

— MORPHOLOGY AND PHYSIOLOGY OF MOSQUITOES AND BEES —

I will begin my treatise with a brief discussion on the mechanics of how mosquito bites and bee stings happen and how they affect their victims.

Mosquito Bites —

The mosquito has been called the world's most dangerous creature because it transmits lethal diseases such as malaria, dengue, and West Nile virus. Mosquitoes weigh about two milligrams and fly at speeds of one mile per hour.³³ More than 3,500 species of mosquitoes have been identified from around the world.⁴⁷ Additionally, according to the World Health Organization, global climate change is expanding the range of the mosquito, heightening the risk of infection among human populations. Dengue and West Nile virus are moving from developing nations to the United States, according to the Centers for Disease Control.³³

Why—and how—do mosquitoes find and bite their prey?

How do mosquitoes find the blood vessels they feed upon when less than five percent of skin is occupied by blood vessels?⁶¹ There is some controversy on this topic. The long-held belief is that mosquitoes use a sense of smell to both find and accurately target their victims. Another theory holds that mosquitoes locate by temperature.

Apparently the olfactory sense in mosquitoes is species-specific, so some mosquitoes may, in fact, smell their targets. These mosquitoes are able to target which creature is optimal for them. For example, “you could be in a room full of cows, and the *An. gambiae* mosquito will find you and bite you,” leaving the cows blissfully unmolested, according to Laurence Zwiebel of Vanderbilt University.³³ All creatures give off specific odorants, pheromones, et cetera. Once these odorants reach a mosquito that just happens to be lurking nearby, odorant-binding proteins, which are located on the mosquito's antennae, bind to the odorant molecules and transport them to receptors located on the surfaces of the olfactory neurons. This chemical linkage activates a response in the mosquito's nervous system, alerting the mosquito to your presence and directing it towards you.³³

Attraction by heat is effective over relatively short distances. Some claim that heat is, in fact, the *only* trigger both

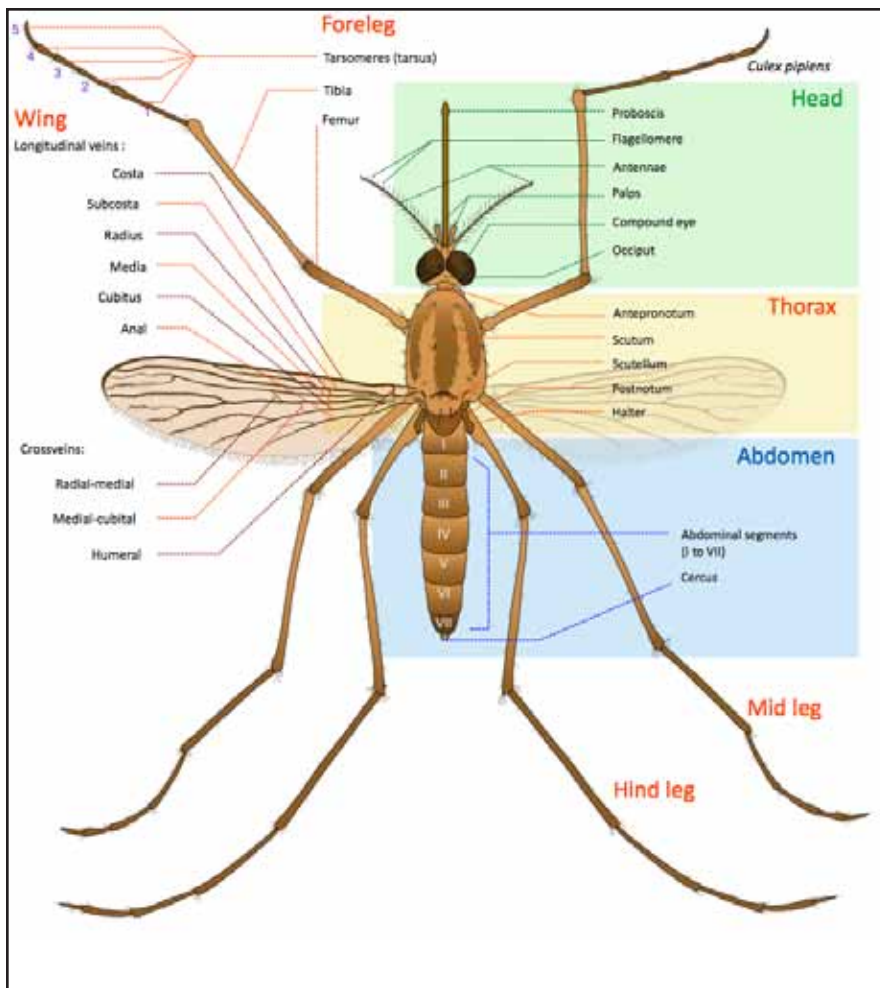
necessary and sufficient to bring about biting behavior in mosquitoes. The antennae also contain thermoreceptors which are able to distinguish between different heat sources and to fix the mosquito's position in space. Seventy-seven percent of mosquitoes' first bites orient towards and within two millimeters of a major blood vessel.⁶¹ According to Ferreira, even though the majority of studies relating to mosquitoes' cues have focused on chemical and olfactory sources, "heat appears as the main cue for aiding insects... Even though other signals, as odors, humidity and vibrations cannot be excluded, heat alone seems to be sufficient... and more relevant than believed to date as a cue for food finding in mosquitoes."⁶¹

Debate and research will most likely continue, and it may well be that a combination of cues are used or that various species prefer one cue to another.

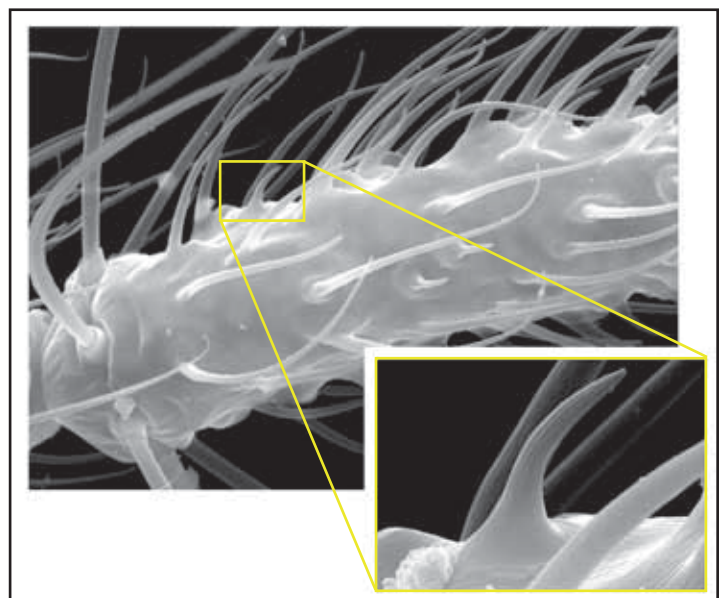
Generally, only female mosquitoes have mouthparts adapted for piercing skin of animals. Female mosquitoes are attracted to blood sources because they require the lipids and proteins found in blood for egg production.^{*, 33 & 47} Most mosquito species feed only at dawn and dusk; they rest in a cool location during the heat of the day.⁴⁷ As solenophagus creatures[†], mosquitoes need to pierce their victim's skin in order to reach the underlying blood vessels to feed.⁶¹ After piercing the skin of their prey, mosquitoes move their mouthparts around underneath the epidermis until they locate an arteriole or venule, and then they pierce it. This only takes six percent of the time of total contact with the victim. If this were to take any longer, the mosquito would risk tissue damage to the host which would elicit the host's immune response, which works against the interests of the feeding mosquito.⁶⁰ The host's inflammation response includes platelet aggregation, vasoconstriction, and blood clotting.⁶⁰ In order to feed as long as possible, mosquitoes secrete a "magic potion" that contains several pharmacologically potent substances aimed specifically at disarming the human body's attempt to prevent the loss of blood. At least one platelet aggregation inhibitor, one vasodilatory substance, and one anti-clotting agent are found in mosquitoes' saliva.³²

* Mosquitoes' nutrition intake typically comes from plant nectar sources.

† solenophagus creature: a creature that eats through a channel, such as a proboscis



anatomy of a mosquito
source: <http://en.wikipedia.org/wiki/Mosquito>



close-up of mosquito antennae
source: Schmidt

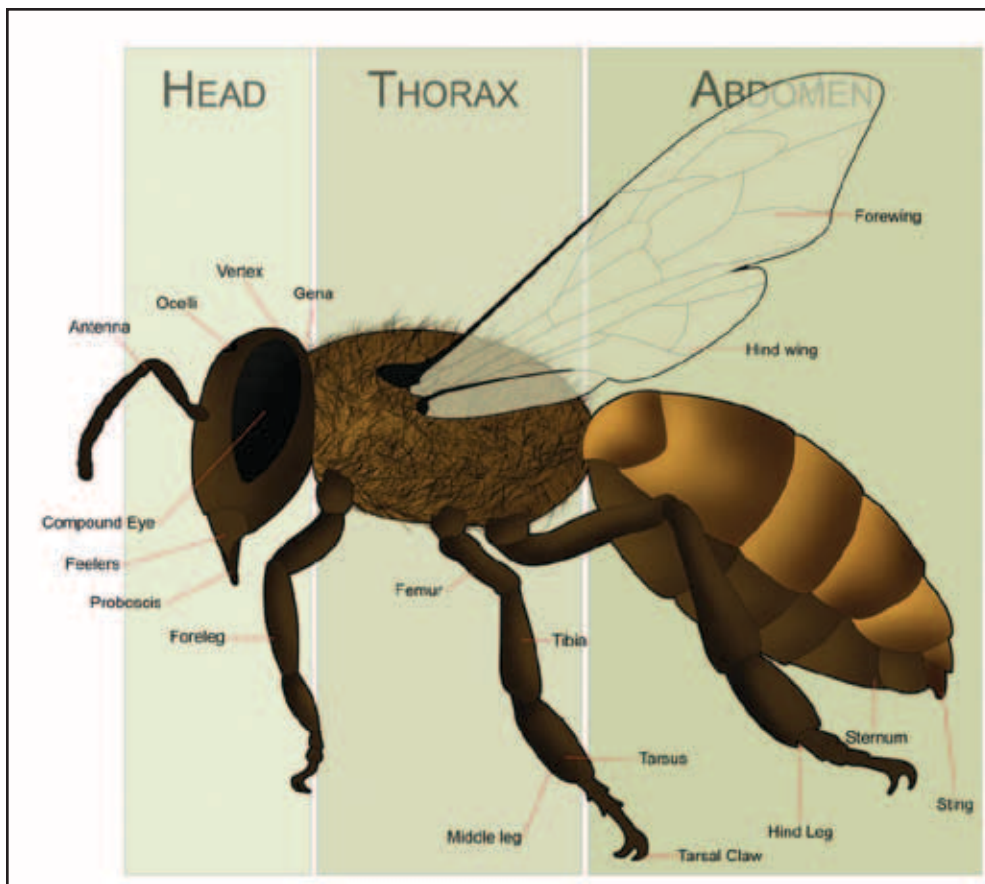
Bee Stings —

Bees only sting as a defense mechanism when they feel directly threatened. Bees give it their all, injecting the entire contents of their venom sac into the skin of their victim, 50µg* of venom.²⁸ This is enough to cause anaphylaxis in some individuals *and* in some instances—but not necessarily in all individuals *and* in all instances; there is no consistent pattern of reaction from sting to sting and from victim to victim.²⁸ The barbed stinger is normally left in the skin as a result of the confrontation, resulting in the evisceration of and death to the bee. (Wasps are able to sting several times in succession, but it is not clear how much venom per sting is injected.²⁸) Bee venom contains three main allergic constituents: phospholipase A (to which most victims are allergic), hyaluronidase (to which a smaller number of victims are allergic), and mellitin (which is an allergic factor for only a few victims).²⁸ Bee venom also contains amines, peptides, and enzymes, which are capable of disrupting a wide array of cell functions, along with histamine, acetylcholine, serotonin, and kinins, which affect the rate of venom absorption and can thus modify the rate of immune response.⁶²

Reactions to bee stings may present with local or systemic allergic responses—or both. The severity of allergic response varies from small, localized, discomforting, and edematous to death via anaphylaxis. Some 40–100 deaths per year in the United States are attributed to bee stings.⁶⁶ Systemic allergic reactions to bee sting are very similar to those from other immediate hypersensitivity reactions, although there are some distinguishing characteristics to bee stings: gastrointestinal symptoms (diarrhea, abdominal pain, and incontinence), visual problems (including transient amblyopia), as well as tachycardia, sweating, fainting, hypotension, and loss of consciousness.²⁸

Interestingly, bee venom also contains constituents that have anti-inflammatory properties. Bee venom is used in Oriental medicine to treat pain, and it is being researched in the United States as a possible treatment for multiple sclerosis and arthritis.⁵⁹ Additionally, preparations made from bees (the entire creature) are used in Western Homeopathic medicine to treat the victims of bee stings and mosquito bites (named, appropriately, a).

* One µg (microgram) is equivalent to one millionth (1/1,000,000) of a gram.



anatomy of a female honey bee
 source: <http://en.wikipedia.org/wiki/Bee>



bee stinger, resting on a bandage
 source: http://en.wikipedia.org/wiki/Bee_sting

Mosquito Bite Reactions vs. Bee Sting Reactions —

The typical host reaction to a mosquito bite results from an immune response to the binding of IgG and IgE antibodies (found in all hosts) to antigens in the mosquito's saliva. Some antigens are universal to the mosquito; some are species-specific. Both immediate hypersensitivity reactions* and delayed hypersensitivity reactions† occur. Both produce cutaneous reaction symptoms: itching, redness, and swelling.

The usual reactions following a bee sting are localized pain, erythema, and swelling. Bee stings always cause pain. This reaction typically subsides in one to two hours.⁶³ More extensive localized reactions include swelling over a larger area, often peaking at 48 hours post incident and lasting as long as a week. Severe reactions occurring with bee stings can include the above symptoms and be accompanied by nausea and fatigue. The most serious bee sting reaction is anaphylaxis, which may cause death.⁶³

Anaphylaxis —

Of mosquitoes and bees only bee stings are capable of producing anaphylactic shock in their victims.

Anaphylaxis (or anaphylactic shock) is defined as a life-threatening reaction with respiratory, cardiovascular, cutaneous, or gastrointestinal manifestations resulting from exposure to an offending agent.⁶⁶ The most common symptoms are dermal in nature: generalized urticaria, flushing, and angioedema. More serious symptoms are respiratory and cardiovascular: upper airway edema involving the pharynx and epiglottis along with circulatory collapse associated with shock and hypotension. Other less common symptoms include diarrhea and uterine contractions. Clinical observations suggest that the sooner the symptoms occur, the more severe the reaction is. Interestingly, in those adult patients who die due to bee sting anaphylaxis, the presence of cardiovascular disease may have predisposed them to death.⁶³ Prompt treatment is critical.⁶⁶

* developing within a few minutes of the bite and lasting for a few hours

† developing within a day or so and lasting for up to a week

— WESTERN MEDICAL TREATMENT OF MOSQUITO BITES AND BEE STINGS —

Basic mosquito bite and bee sting first-aid protocol calls for washing the site of bite/sting with soap and water to prevent infection. Most mosquito bites and bee stings require no treatment other than localized applications of cold compresses and removing the bee stinger if it is present. If the stinger was left behind, the recommendation is to gently flick or scrape the stinger out with a fingernail; avoid squeezing it between tweezers as this could release more venom.

There are several pharmaceuticals in the Western materia medica that are commonly used to address mosquito bites and stings. While effective at managing the symptomatology of mosquito bites and bee stings, these pharmaceuticals exhibit side effects that are worth considering. These are related to dose, duration of ingestion, and each patient's unique response.²³ Epsom salts (magnesium sulfate) are also useful in reducing inflammation and itching.

Western Medical Treatments for Mosquito Bites and Bee Stings — 23

Pharmaceutical	Examples	Notes	Side Effects
analgesics	aspirin, acetaminophen, ibuprofen, naproxen	Analgesics are used to reduce the pain and (except for aspirin) to help reduce inflammation.	Aspirin's side effects may include heartburn, indigestion, stomach irritation, mild nausea, and vomiting. Acetaminophen's side effects can include damage to the liver and kidneys if used at a higher than recommended doses. Ibuprofen and naproxen side effects can include dizziness, nausea, stomachache, and headache.
antihistamines	Benadryl, diphenhydramine	Benadryl is used to relieve symptoms of itching and hives.	Side effects of antihistamines include drowsiness and dryness of mouth, nose, and throat.
corticosteroids	hydrocortisone cream; oral prednisone	Corticosteroids are used to prevent further inflammation and to alleviate severe allergic reactions.	Side effects of topical corticosteroids are rare. Side effects of oral prednisone types of corticosteroids can include increased appetite, indigestion, nausea, headache, insomnia, dizziness, weight gain, and fluid retention.
topical calamine lotion products		Topical calamine products are used to dry oozing sores and to relieve itching.	Side effects of calamine products include allergic reactions to calamine (rare).
epinephrine	aka adrenaline	Epinephrine is used to decrease vasoconstriction and to maintain a normal blood pressure.	Adverse reactions to adrenaline include palpitations, tachycardia, arrhythmia, anxiety, headache, tremor, hypertension, and acute pulmonary edema. ⁴³

Pharmaceutical	Examples	Notes	Side Effects
muscle relaxants		Muscle relaxants are used to relax muscle spasms after a mosquito bite.	Side effects of muscle relaxants include clumsiness, drowsiness, and dizziness.

The conventional Western allopathic medical model for treating anaphylaxis is to transport the victim to a hospital emergency department as quickly as possible and to administer pharmaceuticals whose aim it is to stop the anaphylactic response and to sustain the life of the individual. For instance, the anti-inflammatory response of corticosteroids is harnessed to treat massive edema.^{* 66} Antihistamines may be used to treat urticaria and pruritis, and adrenaline may be used in particularly severe cases to address more serious generalized reactions such as laryngeal edema, severe asthma, and shock or loss of consciousness.²⁸ Intravenous fluids may also be administered. Interestingly, individuals taking beta-adrenergic blockers (“beta blockers”) (used for cardiac conditions such as hypertension and arrhythmia) are at a disadvantage against bee venom because beta blockers seemingly limit the effectiveness of epinephrine in mediating an allergic response.⁶⁶

* The effect of corticosteroids is not realized for six to twelve hours after administration; they are administered to prevent a potential late-phase reaction such as with two-phase anaphylaxis.⁶⁶

— WESTERN HERBAL TREATMENT OF MOSQUITO BITES AND BEE STINGS —

While Western allopathic medicine uses pharmaceutical agents to relieve the symptoms of mosquito bites and bee stings, Western herbalism focuses on using nature-based agents, in part due to the side-effects of Western pharmaceuticals, which can cause additional pathologies and can complicate treatment.

Basic mosquito bite and bee sting first-aid mimics that of Western allopathic medicine, as stated earlier. Additionally, bee stings are acidic and can be neutralized with a substance such as baking soda; wasp stings are alkaline and may be addressed by the application of vinegar or lemon juice to neutralize the venom.

The Western herbal materia medica for treating mosquito bites and bee stings is quite extensive. Remedies are used topically, largely as a means of alleviating cutaneous reactions by opposing the symptoms of heat, itching, swelling, and pain. To that end cooling, astringent (drying), and soothing remedies are employed. In the extreme case of anaphylaxis, the Western allopathic medical model is still the most effective treatment available.

Western Herbal Remedies for Mosquito Bites and Bee Stings — 23, 14, 17

Herb Common Name	Herb Latin Name	Notes
Aloe vera	Aloe barbadensis	Aloe hastens healing, is soothing and antibacterial. Simply slice a leaf, scoop out the gel, and apply it to the bite or sting. Aloe vera gel is available commercially.
Calendula	Calendula officinalis	Also known as marigold, calendula is anti-inflammatory, mildly analgesic, antiseptic, and vulnerary. The crushed fresh flowers may be rubbed on a bite or sting. One can also steep 1 teaspoon of dried petals in 1 cup of hot water for five minutes. Then strain, cool, and apply with a clean cloth as a compress.
Comfrey	Symphytum officinale	Comfrey contains a compound called allantoin, which is antiseptic and accelerates wound healing. To use, crush fresh or dried leaves or root, add enough water to moisten, and apply to the bite or sting. One can also steep 1 heaping teaspoon of the dried plant in 1 cup of just-boiled water for ten minutes; strain, cool, and apply to the mosquito bite or bee sting with a clean cloth. (Comfrey can be toxic if taken internally.)
Echinacea	Echinacea angustifolia, Echinacea purpurea	Echinacea is an immune-boosting herb which can be applied in tincture form to a bite or sting to numb the pain. It also helps to disinfect the site. Echinacea root contains caffeic acid glycoside, which facilitates the wound-healing process. It acts as a blood purifier and as such is particularly helpful with bee stings.

Herb Common Name	Herb Latin Name	Notes
European Goldenrod	<i>Solidago virgaurea</i>	The crushed leaves of European Goldenrod are astringent and useful in treating mosquito bites.
Lavender	<i>Lavandula angustifolia</i>	Lavender essential oil is anti-inflammatory. It can be applied to the skin undiluted.
Mint	<i>Mentha x</i>	Crushed mint leaves may be placed on a mosquito bite or bee sting. Their cooling nature relieves the discomfort associated with mosquito bites and bee stings.
Onion	<i>Allium cepa</i>	Onion can be sliced and placed on a mosquito bite or bee sting for rapid pain relief and to counter inflammation.
Plantain	<i>Plantago major</i> , <i>Plantago lanceolata</i>	Plantain contains mucilage, which is gooey and soothing. It is readily available in the United States. Mash the fresh leaves and apply to a mosquito bite or bee sting as needed to stop itching.
Tea	<i>Camellia sinensis</i>	Black tea contains antioxidants, which help shrink swollen tissue. Moisten a tea bag and apply it to the skin.
Tea Tree	<i>Melaleuca alternifolia</i>	Antiseptic tea tree oil may be applied undiluted to the site of a mosquito bite or bee sting as needed.
Witch Hazel	<i>Hamamelis virginiana</i>	Witch Hazel is the extract of the bark of the witch hazel tree. It is soothing and helps shrink swollen tissue. The fluid concentrate is available at drugstores.

— HOMEOPATHIC UNDERSTANDING OF MOSQUITO BITES AND BEE STINGS —

Western Homeopathy developed in the late 1700s and early 1800s as part of a response to what was seen at the time as the irrational and inadvisable practicing of medicine. German physician Samuel Hahnemann is credited as the founder of Homeopathy. He favored the use of single drugs used at lower doses over the brutal and overly aggressive methods commonly used at the time. Hahnemann's basic principle was termed the “law of similars” which became known as “like cures like.” In Homeopathy practitioners treat patients with preparations that are believed to cause particular symptoms in healthy individuals similar to the pathological symptoms of the patient. Homeopathic remedies are highly diluted substances believed to be more potent the more diluted they are. These remedies are taken sublingually. There remains much controversy and scientific inconclusivity as to whether Homeopathy is a viable form of medical treatment or not.⁴³ Regardless, Homeopathy is widely practiced in many countries of the world and is gaining ground in the United States.

Since Homeopathy prescribes its remedies based on the symptoms that are present in a particular individual, remedies for the same pathology (ie: “bee sting”) may—and often do—vary from individual to individual and even from incidence to incidence within the same individual. It is thus important to understand both the presenting pathology and its particular characteristics as well as the healing nature of the various Homeopathic remedies themselves.

For instance, in cases of a bee sting that is swollen, bruised, and painful, a suggested Homeopathic prescription recommends taking 30c Arnica every five minutes for up to ten doses, followed by 6c Ledum every eight hours for up to 3 days. In contrast, for a bee sting that is hot, red, itchy or burning, sensitive to the touch, and swollen, taking 30c Apis every fifteen minutes for up to six doses is recommended.¹¹

Although the side effects and risks of homeopathic treatments are not well researched outside of observational studies, some general points can be made about the safety of these treatments. As stated on the website for the National Center for Complementary and Alternative Medicine, “a systematic review found that homeopathic remedies in high dilution, taken under the supervision of trained professionals, are generally considered safe and unlikely to cause severe adverse reactions. Liquid homeopathic remedies may contain alcohol. The FDA allows higher levels of alcohol in these remedies than it allows in conventional drugs. However, no adverse effects from alcohol levels have been reported to the FDA. Homeopaths

expect some of their patients to experience... a temporary worsening of existing symptoms after taking a homeopathic prescription... Homeopathic remedies are not known to interfere with conventional drugs; however, if you are considering using homeopathic remedies, you should discuss this with your health care provider first.”³⁶

Homeopathic Remedies for Mosquito Bites and Bee Stings — 3

Homeopathic Remedy	Remedy Latin Name	Notes
Apis	Apis mellifica	The remedy Apis mellifica, which is itself derived from honeybees, is useful in treating symptoms of itching, burning pain, stinging pain, redness, and swelling. It helps pathology that is relieved by cold and that is worsened by heat.
Arnica	Arnica Montana	Arnica is an effective remedy for wasp stings. The homeopathic remedy derived from this plant is a hemostat and a vulnerary. Dab the wound with neat (undiluted) arnica tincture immediately after being stung. This herb is also used extensively in Western Herbalism to treat inflammatory conditions.
Hypericum	Hypericum perforatum	Hypericum (also known as St. John's Wort) tincture, neat (undiluted), can be used on any mosquito bite. Hypericum perforatum alleviates symptoms of inflammation, shooting pain, and tearing pain. If swelling persists, Hypericum lotion can be applied as a compress and kept in place until the swelling subsides.
Lachesis	Lachesis muta	Lachesis treats mosquito bites and bee stings that are worsened by heat and relieved by cold. Lachesis is derived from the venom of a South American snake commonly known as the bushmaster or Surukuku. This snake is seven feet long and possesses one inch fangs. It kills its prey both by constriction and by injecting venom into its prey. Its poison acts on the nervous mechanism of the heart, causing death. Nonlethal doses of the venom result in a decreased ability for blood coagulation and the destruction of red blood cells. Because of this direct effect on the blood, Lachesis is used for mosquito bites and bee stings that have taken on a bluish tinge, signaling deoxygenized blood or cyanosis.
Ledum	Ledum palustre	Ledum palustre is also known as wild rosemary. It is antiseptic. Ledum tincture, used neat, can prevent swelling and itching of mosquito bites and stings. Ledum palustre aids in relieving symptomatology that is worsened by heat.
Urtica	Urtica urens	Urtica urens, also known as common or stinging nettle, relieves itching, biting pains, burning pains, and stinging pains.

— AYURVEDIC UNDERSTANDING OF MOSQUITO BITES AND BEE STINGS —

Ayurveda as a modality of health and wellness has been in use in the Indian subcontinent for 4,000+ years. It is a holarchical system that aims both to treat symptomatic pathologies and to describe a framework for living in optimal health and wellness*. Translated as the “Science of Life,” Ayurveda is classically comprised of eight sub-specialties: internal medicine; pediatrics; surgery; eye, ear, nose, and throat medicine; psychiatry; toxicology; immune optimization; and practices of improving health and reproductive capacity.

Ayurveda views all physical imbalance (ie: disease or pathology) as a disruption of one of more of the five elements (ether, air, fire, water, and earth) and the three doshas—or bodily humors—that they combine to form. Each person is comprised of a unique combination of the doshas in the physical body and mental body, giving each of us a unique energetic state of balance and health. No two people have the same doshic combination/balance, and no two people go out of balance in quite the same way.

We will see in both the classical and modern understandings of Ayurveda that disease is discussed from its energetic standpoint. This is what distinguishes Ayurveda from Western allopathic medicine and Western herbal medicine. Ayurveda describes all physical substances as possessing ten pairs of two qualities (hard and soft; cold and hot; gross and subtle; cloudy and clear; smooth and rough; flowing and fixed; stable and mobile; and light and heavy). If one knows the qualities of the pathology, one can devise a remedy that opposes those qualities to bring about balance and to restore health and well-being. In contrast to Homeopathy's tenet of “like cures like,” Ayurveda contends that “like increases like” and that, by extension, “opposites balance each other.” Thus, according to Ayurveda, the worst thing one could do to reverse a feverish condition would be to administer a heating substance, no matter how diluted that substance was (as is done in Homeopathy). The application of the opposite energetic, cool, would be undertaken. Substances that are used to address a pathology can take many guises: herbs, foods, spices, minerals, lifestyle practices, et cetera. The principle is that as long as one understands the energetics of the pathology, the patient, and of the healing substance, one can successfully address disease.

* In the Ayurvedic model of health and wellness if the digestive system is well taken care of, pathology never has to be addressed, apart from exogenous causes.

Ayurveda holds that the origin of all disease begins prodromally with the improper digestion of food. This sets up a dynamic that can either be quickly and easily corrected with no further negative impact (by restoring proper food digestion) or that can continue unchecked and will eventually create the opportunity for a disease state to manifest. Thus, one of Ayurveda's first lines of defense is to work with the proper digestion of foods. Beyond that herbal remedies and lifestyle practices are employed. In keeping with the understanding of individual energetics, most remedies are individually tailored. Homeopathy, by contrast, uses simple, standardized, single item, nature-derived remedies to address the presenting symptoms. Contemporary Western allopathic medicine prescribes chemically-based, standardized, pharmaceutical medication that also only treats the symptoms of disease. Neither Homeopathy nor Western allopathic medicine work with the concept of treating a deeper, root-cause level of disease, be it digestively-oriented, lifestyle-based, et cetera as Ayurveda does.

We will see that Ayurveda can have some pretty strange things to offer in terms of treatment—when viewed through Western eyes. The safety of some remedies has been called into question. However, if we keep in mind that the origins of these treatments have been in use for thousands of years, originate from a very different culture, and are based on an understanding of the energetics of an imbalance, the Ayurvedic viewpoint merits consideration, at the very least. Since there are many remedies for a particular pathology to choose from, a successful—and safe—treatment can be found.

Ayurveda views the skin as being closely related to the immune system and the *rasa dhatu* (the watery fluids of the body, such as lymph, synovial fluids, mucous, saliva). Skin has an ability to either protect us and our bodies from the external forces of cold, heat, wind, and dryness or to allow these forces to enter into the body. Good, healthy, lustrous, slightly oily skin indicates a good, healthy immune system along with good resistance to disease. Skin that is discolored, too dry, too oily, or inflamed suggests poor resistance to disease and, possibly, compromised health.⁵ When treating skin disease, herbs should be applied topically as well as internally. Supporting the digestive tract (the origin of all disease) while helping to ease the presenting symptomatology makes sense in the framework of Ayurveda. Topically, herbal decoctions and infusions can be used as a wash for the skin, herbal poultices or plasters may be applied to inflamed skin, and herbal oils may be massaged onto the skin. Internally, doshically-appropriate herbs may be taken.^{5,8}

Ayurveda also views the skin as related to the outer disease pathway.* An aspect of the outer disease pathway is the rakta, or blood; we see the tracings of veins on our arms. In its connection to the blood, skin disease is further related to the lungs (blood–gas exchange) and the liver (the purifier of blood). Thus, it is important from an Ayurvedic perspective to consider the use of expectorants and diaphoretics to cleanse the lungs and the use of alteratives and bitter tonics to cleanse the liver when treating skin disease. Ayurvedic herbal formulas can become complex.⁵

Classically, Ayurveda recognizes three types of skin disorders, which align with the doshas: pitta, vata, and kapha. Pitta skin diseases are characterized by swelling, redness, fever, infection, and irritability. In line with the “like increases like” theory, pitta conditions are worsened by exposure to heat and sun, and the application of most oils will exacerbate them. In accordance with the “opposites decrease each other” theory, the application of cooling treatments ameliorates pitta conditions. Vata skin types present with dry or scaly skin, itching, and gastrointestinal distention or constipation. They are aggravated by wind and dryness and are countered with the application of heavy oils, particularly sesame oil. Kapha skin types are characterized by oozing or weeping sores along with congestion, edema, and itching. They are alleviated with warming, drying, astringent treatments.⁵

With their symptoms of redness, swelling, irritation, inflammation, heat, itching, and irritability, mosquito bites and bee stings fall into the pitta type of skin disorder. Thus, exposure to heat and the sun should be avoided. Taking in cooling substances will help clear the system while the external application of cooling agents is highly beneficial.⁵

It is worth remembering that due to their inflammatory nature, skin conditions sometimes worsen before they improve and resolve as heat and toxins are driven out of the body. The patient should be encouraged to continue treatment through this phase.⁵

Ancient Wisdom from the Ashtanga Hridayam^{†13} —

The sage Atreya addressed mosquito bites and bee stings within a larger context of “insects.” He termed the treatment

* The inner disease pathway is the digestive tract; everything else that is in between the inner and outer pathways—glands, organs, tissues—comprise the central disease pathway. This concept is central to Traditional Chinese medicine as well.

† The *Ashtāṅga Hridayam* is a classical book of Ayurveda and is regarded as highly among Ayurvedic physicians alongside the Charaka Samhita and Sushruta Samhita. The Ashtanga Hridayam was compiled by Vagbhata I. The period of the compilation is said to be between 250 and 500 B.C. The Ashtanga Hridayam is a combination of Surgery and Medicine. Source: en.wikipedia.org/wiki/Ashtanga_Hridaya

of insect poisoning “Kitalutadi Visa Pratishedha.” Insect bites are termed “Kita Damhsa.” Atreya did not have much good to say about insects: “Kita (insects) are born from the putrefied urine, feces, semen, egg, and cadavers of snakes.” He divided insects into four types based on doshic characteristics: vata, pitta, kapha, and sannipattika^{*}. Ch. 37:1

As with people, insects (including mosquitoes and bees) can be divided into categories based on their doshic-predominant constitutions of vata, pitta, and kapha. “When one is bitten by an insect of vata predominance, the sensation of prickling pain is greatly increased. When one is bitten by an insect with a pitta predominance, there is less exudation but a greater burning sensation, redness, spreading of symptoms, and the appearance like a ripe pilu fruit[†] or kharjūra fruit[‡]. When the bite is precipitated by an insect with a kaphic predominance, there is mild pain, and the swelling appears like a ripe udumbara fruit[§]. When the bite is of a sannipattika nature, there is copious exudate, presence of all of the previous symptoms, and this is so difficult to treat that the practitioner should reject the patient.” Ch. 37:2–4a

“The stages of poisoning progress according to the following pattern: swelling occurs; the blood becomes foul-smelling; a feeling of heaviness comes to the head and eyes; fainting, dizziness, dyspnea, and severe pain occur. A ring-like swelling at the site of the bite/sting appears along with fever, itching, and a loss of appetite.” Ch. 37:46–5

For the vata, pitta, and kapha types of insect poisoning Atreya recommends the three “usual kinds of doshic treatments: fomentation, the application of medicines, and washing the lesion—except in the instances of loss of consciousness, ulceration of the wounds, or infection.” Ch. 37:6–7a “Ghee mixed with equal amounts of trivrt[¶] and tanduliyaka^{**} should be consumed.” Ch. 37:25–26a “Human hair may be used to fumigate all types of bite/sting.” Ch. 37:23b–24a “After undergoing purification therapy, the patient should apply a paste made of the milky sap of tree bark to the lesion.” Ch. 37:26b “Also, the application of a paste of mukta (pearls) is the best cure for swelling, pricking pain, burning, and fever.” Ch. 37:27a Atreya notes that the sage

* sannipattika: also termed tri-doshic; comprised of all three doshas

† pilu fruit: Pilu (from Sanskrit) is the common name of two species of tree (Careya arborea or Salvadora persica); the name may refer to the fruit of Pilu tree, or to the blossoms of Saccharum sara. Source: Sanskrit-English Dictionary by Monier-Williams, (c) 1899 via en.wikipedia.org. Today, commonly written “peelu”.

‡ kharjūra fruit: (from Sanskrit) Phoenix dactylifera plant. Source: en.wikipedia.org

§ udumbara fruit: Sanskrit, aka: Ficus racemosa is a species of plant in the Moraceae family. Popularly known as the Cluster Fig Tree or Goolar (Gular) Fig, this is native to Australasia, South-East Asia and the Indian Subcontinent. Source: en.wikipedia.org

¶ trivrt: Operculina turpethum Silva Manso (Indian Jalap) is a genus member of the morning-glory family of plants which contains 15 species that are located throughout the world. Source: Indian Materia Medica & http://en.wikipedia.org/wiki/Operculina.

**Tanduliyaka: is the Sanskrit term for Amaranthus spinosus, commonly known as the spiny amaranth, prickly amaranth or thorny amaranth. Source: en.wikipedia.org

Kashyapa listed the herbal formula Dasanga agada as being beneficial for insect bites: a combination of the herbs vaca, hingu, vidanga*, saindhava, gajapippali, patha, prativaisha, and vyosa, which are formed into a paste and rolled into pills. “This cures all kinds of insect poisons.” Ch. 37:27b–28 “Also, the seeds of sirisa† soaked and macerated for three times in the milky sap of arka and then mixed with pippali‡ powder is the agada (antidote) that destroys the poison of insects.” Ch. 37:43 1

Ancient Wisdom from the Sushruta Samhita^{S1} —

The Sushrut Samhita expounds at great length about the topic of insect bites and bee stings, which it calls Kita Kalpa. Again, as with the Ashtanga Hrdayam, mosquitoes and bees themselves are largely undistinguished from other insects. As in the Ashtanga Hrdayam, various kinds of insects (Kita) are said to germinate from the semen, fecal matter, urine, putrid eggs, and putrid carcasses of serpents, and are variously characterized by vata, pitta, and kapha temperaments. Again, four groups can be discerned: vata, pitta, kapha, and sannipattika. There are eighteen classes of vatagenic insects; their poison tends to “aggravate and derange the bodily Vayu[¶].” There are twenty-four pitta types of insect; they are of a fiery temperament, and their poison has the effect of aggravating the bodily pitta. The thirteen Kaphic insects aggravate and derange kapha dosha. Ch 8:3-5 There are twelve kinds of insects whose bites are fatal. These are the sannipattika insects. A person or animal bitten by any of these “dangerous” insects exhibits symptoms similar to those of a snake bite. All three doshas become deranged. Ch 8:6a

Sushrut made distinctions between the sets of symptoms produced by “sharp-poisoned” insects and “mild-poisoned” insects. In the case of sannipattika bites (from the “sharp-poisoned” insects) (ie: insects that possesses strong poison),

* **Vidanga:** (*Embelia ribes*) is a scandent shrub belonging to the family Myrsinaceae. It is widely distributed throughout India. In Ayurveda, it is considered widely beneficial in variety of diseases and is also used in Homeopathy. Source: <http://en.wikipedia.org/wiki/Vidanga>.

† **Sirisa:** Sanskrit name for *Albizia lebbek*, a large, erect, unarmed deciduous, spreading tree common throughout roadsides in India. Source: en.Wikipedia.org

‡ **Pippali:** Long pepper (*Piper longum*) is a flowering vine in the family Piperaceae, cultivated for its fruit, which is usually dried and used as a spice and seasoning. Long pepper has a similar, but hotter, taste to its close relative *Piper nigrum* - from which black, green and white pepper are obtained. Source: <http://en.wikipedia.org/wiki/Pippali>.

§ The **Sushruta Samhita** is a Sanskrit text, attributed to Sushruta, foundational to Ayurvedic medicine, with innovative chapters on surgery. The Sushruta Samhita contains descriptions of 1120 illnesses, 700 medicinal plants, a detailed study on Anatomy, 64 preparations from mineral sources and 57 preparations based on animal sources. It is the main reference book for ayurvedic surgeons. The text dates to the 3rd or 4th century AD. Source: en.wikipedia.org/wiki/Sushruta_Samhita

¶ **vayu:** another term for vata

the area of injury will seem to be on fire and will be characterized by a red, yellow, white, or vermillion color. The most prominent symptoms that will develop over the course of poisoning include: fever, aching pain in the limbs, goose bumps, vomiting, thirst, loss of consciousness, a burning sensation in the body, yawning, shaking of the limbs, dyspnea, hiccups, the eruption of pustules, the appearance of nodular glands, circular erythematous patches on the skin, ringworm, erysipelas, keloid tumors, swelling of the site of injury, a burning or cold sensation at the site of injury, and any other doshic-specific symptoms. ^{Ch 8:6} These pathologies were considered incurable. By contrast, the symptoms induced from “mild-poisoned” insects include: salivation, an aversion to food, vomiting, heaviness in the head, a slight sensation of cold, the appearance of pustules, and urticaria. ^{Ch 8:8}

Further, Sushrut distinguished several different types of insects based on their characteristic bite or sting. ^{Ch 8:9–18} Mosquitoes (Masakas) are named and described in this section— five types of them. A mosquito bite is characterized by a severe itching and swelling of the affected locality. A bite by a Parvatiya mosquito is similar to those of a bite by fatally venomous insects, and a sting of the points of their antennae is followed by the appearance of pustules (Pidaka) accompanied by a burning sensation and an accumulation of pus when scratched by the fingernails. ^{Ch 8:18} A bite by one of the Suka-vrinta species is characterized with itching and urticaria (Kotha), and the bristles of the insects are found to be adhering to the affected locality. ^{Ch 8:15}

On the subject of treatment for mosquito bite, Sushrut recommends a plaster prepared with the earth of a black ant-hill and the urine of a cow.

For a bee sting, a remedy consisting of Chakra, Kushtha and Apamarga* is efficacious. ^{Ch 8:27–36}

It is recommended that all cases of mosquito bites and bee stings should be carefully treated as long as the stage of inflammation and infection last. The growths (if any) of papillae around the seat of the bite should be removed after the swelling has subsided by the application of a poultice consisting of Nimba† leaves, Trivrit, Danti‡, Kusumbha

* **Apamarga**: (*Achyranthes aspera*) is a species of plant in the Amaranthaceae family. It is distributed throughout the tropical world. Source: en.wikipedia.org/wiki/Apamarga.

† **Nimba**: is another name for Neem (*Azadirachta indica*), which is a tree in the mahogany family Meliaceae. It is native to India and is said to treat 40 different diseases. source: en.wikipedia.org/wiki/Neem.

‡ **Danti**: (*Jatropha curcas*) is a species of flowering plant in the spurge family, Euphorbiaceae, that is cultivated in tropical and subtropical regions around the world. Source: en.wikipedia.org/wiki/Jatropha_curcas.

flower, Rajani, honey, Guggulu*, Saindhava salt, Kinva, and the dung of a pigeon. A dosha-pacifying diet should also be prescribed. Any overgrowth of localized skin tissue should be removed with a proper surgical instrument and should then be plastered with a paste of purifying (Sodhaniya) drugs (such as Nimba leaves, et cetera.) mixed with honey. ^{Ch 8:66}

Ancient Wisdom from the Charaka Samhita^{†22} —

Charaka covers mosquito bites and bee stings in a treatise on Poisoning (Visa). “Poison has a noted pedigree. It emerged from the churning of the ocean in ancient times, ahead of nectar[‡] to scare the living world.”

Charaka postulates that poison exists in two forms: fixed and mobile. “The fixed type exists in the roots of plants such as mustaka, pauskara, krauncha and balahaka. The mobile form is seen among creatures with fangs, such as snakes, insects, rats, scorpions et cetera. The poison from animal sources causes drowsiness, tiredness, thirst, inflammation, goose-flesh, swelling and diarrhea. The vegetable poison, on the other hand, gives rise to fever, hiccup, sensitivity of teeth, salivation, tight feeling in the throat, nausea and vomiting, shortness of breath, and fainting. As animal and plant poisons are located in the lower and upper parts of the body, respectively, they tend to neutralise each other.” ^{Ch 57:1} We will see this line of thinking in the sometimes odd-seeming remedies outlined below.

In typical Ayurvedic form, Charaka attributes ten qualities to poisons: lightness, roughness, rapid action, non-slipperiness, quick absorption, intensity, prostration, subtleness, heat, and uncertain taste. The qualities determine the actions of the poisons. For example, roughness, heat, and subtleness vitiate vata, pitta, and blood; indefinite taste vitiates kapha and rasa. Quick absorption ensures rapid action and a generalized effect on the entire organism. Sharpness undermines the vital organs, and prostration interferes with the breath of life. Lightness makes it difficult to manage the poison, and non-slipperiness loosens the poison's effect upon the doshas while simultaneously vitiating them. ^{Ch 57:2}

* **Guggulu**: (Commiphora wightii) (also Guggal, Guggl or Mukul myrrh tree) is a flowering plant in the family Burseraceae. The guggul plant is most common in northern India. The resinous sap of the tree Guggul has been a key component in the Ayurvedic system of medicine for nearly 3,000 years but has become scarce because of its overuse. Source: en.wikipedia.org/wiki/Guggulu.

† The **Charaka Samhita** is an early Ayurvedic text on internal medicine attributed to Charaka, born circa 300 BC. It is believed to be the oldest of the three ancient treatises of Ayurveda and is central to the modern-day practice of Ayurvedic medicine. Source: en.wikipedia.org/wiki/Charaka_Samhita.

‡ **nectar** here refers to the myth of the Churning of the Ocean in which the Devas (gods) and Asuras (demons) each tried to gain control of the universe. The Asuras grabbed the head end of a serpent, and the Devas grabbed the tail end of the same serpent. The serpent was wrapped around Mount Mandarachala, and the two teams alternated pulling the serpent, creating a churning of the ocean. Out of this churning came several items, one of which was poison (Kalakuta) and the other of which was the sacred nectar of immortality (Amrit).⁷

Eight sequential stages of poisoning were proposed by Charaka. The first stage is the derangement of chyle/rasa as marked by the symptoms of thirst, hallucination, tooth sensitivity, salivation, vomiting, and fatigue. The second stage is the derangement of blood: tremors, dizziness, yawning, fainting, itching, and seeing darkness and color changes. The third stage concerns the derangement of muscle (and its related tissue, skin) with attendant itching, swelling, eruptions, and rounded patches (hives, perhaps) on the body. The fourth stage is the derangement of dosha: burning sensations, vomiting, body ache, and fainting. The fifth stage's hallmark is seeing darkness along with seeing things appearing blue. Hiccup marks the sixth stage, and drooping of the shoulder marks the seventh stage. The eighth and final stage is death. ^{Ch 57:3–4}

The individual's constitution was believed to influence the clinical manifestations of the poison. General doshic symptoms may be noted along with distinctive doshic signs [of the poisoning]. The vata person will tend to experience thirst, hallucination, restlessness, fainting, vomiting, constriction of the throat, et cetera. This patient will have pain in the heart region, vitiation of udana vayu* (as exhibited by yawning, et cetera.), congestion, body stiffness, bone and joint pain, giddiness, and duskiness of the skin. The pitta person will exhibit thirst, fever, burning sensation, vomiting, diarrhea, and seeing darkness—but to a lesser extent than the vata person. The features of pitta poisoning include heartburn, hot breath, a pungent taste in the mouth, reddish or yellow swelling of the site, a feeling of muscles being torn apart, and a loss of consciousness. The kapha person will present with fewer symptoms than both vata and pitta: shortness of breath, throat constriction, salivation, vomiting, and itching. Additionally, nausea, vomiting, salivation, excitement, a feeling of coldness and heaviness, and a sweet taste in the mouth will be observed. ^{Ch 57:5–6}

Poison that remains “subdued” in the body presents as blood disorders such as eruptions and boils. The ultimate result of poisoning is death due to the vitiation of all three doshas and the blocking of the channels of the body. Ingested poison reaches the heart and goes systemically through the body while poison transmitted through skin bites tends to remain localized. ^{Ch 57:5–6}

The general signs and symptoms of poisoning include blue lip and teeth coloration, severe fatigue, falling out of hair, loss of movement, and abnormal limb positioning. The signs of death include the absence of a response of gooseflesh to sudden cold, the lack of bruising upon blunt injury or trauma, and no bleeding when the skin is broken. ^{Ch 57:5–6}

More specifically, mosquito bites are accompanied by itching, mild swelling, and slight pain. Bee sting sites have

* **udana vayu**: the upward and outward moving impulse of the body; one of the five sub-doshas of vata

eruptions which turn blackish and ooze. The patient develops fever, burning sensation, and fainting. Hornet stings effect tissue changes beyond the site of the sting and include swelling, pain, and the breakdown of the tissue at the bite site. Systemic signs include fever and vomiting. ^{Ch 57:9}

PROCEDURES FOR TREATING POISON

Twenty-four procedures are listed by Charaka for use in the treatment of poisoning by insects and otherwise. General treatments include: mantra, bathing, bloodletting, emesis, purgation, heart care/treatment, eye treatment, nasal treatment by inhalation, nasal treatment by exhalation, inhalation treatment, medications applied to a scalp incision, medications applied to the tongue, other medications, antidotes, resuscitation, and revival. Local treatments may include: tourniquet, incision, pressure, sucking, heating, irrigation, local medicinal application, and the application of medicinal pastes. ^{Ch 57:10–11}

Charaka directs practitioners to pick from the above lists to find the most appropriate treatment(s) for a given patient. For example, if the poison is localized, as with a mosquito bite or bee sting, the practitioner could apply a tourniquet, apply pressure to expel the poison, remove the stinger, or suck out the poison. Charaka advocates the use of, but cautions against excessive, bloodletting. Swallowed poison maybe removed from the system by vamana* or by virechana†. Additionally, physical treatments appropriate for each dosha may be employed. Vataja poisoning is to be addressed by oil massage, fomentation, and a nourishing diet. Pittaja poisoning can be treated with oil massage and cold irrigations. Kaphaja poisoning may be treated with fomentation, scraping, vamana, and the removal of dead tissue. ^{Ch 57:10–11}

Charaka reminds us that poisoning proceeds in stages, and so should the treatments used to counter poisoning. For example: ^{Ch 57:12}

Stage	Procedures
I and II	During these initial stages, protection of the heart is the main focus. This is achieved by any of the following preparations that may be available. • Honey, ghee, marrow, milk and ochre • Cow dung juice • Juice of cooked sugarcane or crow • Blood of goat • Ash or earth

* vamana: vomiting

† virechana: purgation (of the small intestines)

Stage	Procedures
III	Various alkalis (ksaras) and swelling-reducing drugs with honey
IV	Cow dung juice mixed with kapittha, honey, and ghee
V	Applying medicated eye paint or eye drops; nose drops with juice of kakanda and sirisa
VI	Haridra with cow's bile; or manjiga, marica and pippali and measures to resuscitate
VII	Vegetable poison to counter animal poison, animal poison to counter vegetable poison
VIII	This is a moribund stage. The formulations recommended for this stage are listed separately.

Poisoning lodges in the areas where the doshas are located. Thus, it is important to address the vitiated dosha first yet remain effective in treatment. In the case of poison lodging in a vata location, fomentation and administering a paste of tagara and kustha with curd are called-for. In the case of pitta the use of cold water bath and irrigations along with drinking ghee, honey, milk, and water are the protocol. With kapha fomentation, bloodletting, vamana, virechana, and basti* are all to be used. ^{Ch 57:13}

Charaka's Remedies for Mosquito Bites and Bee Stings —

Charaka lists many herbal formulas that may be employed in cases of poisoning. The ones that are relevant for mosquito bites and bee stings are summarized below. ^{Ch 57:14–16}

Formula	Action(s)	Comment(s)
palasa seeds, peacock's bile	counteracts poison and revives the patient	extract of seeds with half the quantity of bile
vartaku, phanita, soot, etc., ending in nimba	counteracts poison and revives the patient	
surasa, granthi, harida etc., ending in kustha	counteracts poison and revives the patient	mixed with cow's bile; or juice of sirisa flowers and kakanda
kakanda, surasa, indrayana, etc., ending in madanaphala	effective for revival in near death in poisoning, drowning, hanging	mixed as a paste and applied over an incised wound on the scalp; also used for nasal application
sprkka, plava, sthauneya, etc., ending in vidanga (44 items) (mrtasanjivana agada)	destroys poisons, all manner of evils and imparts good health and wealth	collected in pusya astral combination; ground in equal quantity and made into pills; used as a paste, snuff, amulet, or smoke

* **basti**: enema (of the colon)

Formula	Action(s)	Comment(s)
rsabhaka, jivaka, bhargi, etc., ending in fruit pulp of jujube	relieves fever, shortness of breath	mixed juice
hingu, pippali, kapittha juice, rock salt	relieves fever, shortness of breath, and also relieves hiccup	consumed with honey
jujube seeds, anjana, parched paddy, water lily	overcomes vomiting	consumed with honey and ghee
brhati, adhaki	relieves hiccup	leaves used for smoking
peacock feathers, bones of cranes, mustard and sandal	subdues poison in the house, on cloth and furniture	mixed with ghee and used for fumigation
tagara, kustha	destroys all sorts of poisons	mixed with ghee, head of snake leader, sirisa flowers and used for fumigation (dhumagada)
ochre, haridra, daruharidra, etc., ending in kunkuma (ksaragada)	counters poisons and a variety of ailments	powders of equal quantity cooked with alkali from palasa tree; made into pills, and dried in shade
pippali, sunthi, yavaksara	appropriate in perturbed kapha	mixed with fresh butter and applied over the bite
mamsi, kunkuma, patra, etc., ending in tulasi	subdues all poisons	ground in water; used orally, or for application in the nose, eye, etc.
candana, tagara, kustha, etc., ending in vyaghranakra	subdues all poisons	ground with rice gruel water
bark of latex bearing trees, especially mukta	effective against insect poisoning	
kusumbha flowers, teeth of cows, svanaksiri, etc., ending in rock salt	applied to rid the tissue growth at the site of insect bite	made into a paste
barks of katabhi, arjuna, sirisa, etc., ending in bark of latex bearing trees	effective against injuries caused by insects and spiders	used as a decoction or powder
vaca, bark of vamsa, patha, etc., ending in realgar	effective against insect bites	all ground together in the bile of rohitaka fish; used for eye, nasal, or external applications
tanduliyaka, juice of kakanda	antidote to all poisons	
fruit, root, bark, flower, and leaf of sirisa (pancasirisa agada)	effective against all poisons	consumed together in the same quantities
nagadanti, trivrt, danti, etc., ending in madanaphala and cow's urine	effective against venoms of snakes, insects, and toxic agents	cooked in buffalo's ghee

Formula	Action(s)	Comment(s)
sirisa bark, trikatu, triphala, etc., ending in lodhra (45 plant products) (amrta ghrta)	effective against numerous ailments of the body and mind; revives the near-dead	ground into a paste and cooked with ghee with equal quantity of water, and urine or cow and goat; used orally and externally
paste of carmankasa	effective in moribund patients in whom poison has invaded kapha passage, and breathing is obstructed	applied over an incision on the scalp
flesh of goat, cow, buffalo, or cock	absorbs the poison; effect as above	
vartaku, bijapura, jyotishmati	effective for obstruction in nose, ears, throat, eyes	paste used for nasal application
devadaru, trikatu, haridra, etc., ending in tulasi	relieves pain and discomfort in the eyes	ground in goat's urine and applied to the eyes
sveta, vaca, asvagandha, etc., ending in vamsa locana (gandha hasti)	counters poison quickly; has many other therapeutic effects in a variety of situations	ground in equal parts goat's urine; added cow's and horse's bile alternately for a week; applied over a scalp incision
patra, aguru, musta, etc., ending in tagara (60 items) (mahagandha hasti yoga)	in pusya constellation they are collected and ground in cow's bile, made into pills, paste, etc.	used for oral intake and external application including the eye

OTHER WAYS TO MANAGE POISONS BASED ON LOCATION

In addition to listing treatments based on the energetic characteristics of the lesion, Charaka also detailed methods of treatment based on the location of the injury. ^{Ch 57:17}

Location of Injury	Notes
Head	Snuff made from the roots of bandhujiva, bhargi, and black tulasi may be inhaled. The bloody flesh of rooster, crow, and peacock may be applied to an incision on the scalp if the bite is in the lower part of the body and over an incision on the feet if the bite happens to be on the upper part of the body.
Eye	An eye wash prepared from pippali, marica, yavaksara, vaca, rock salt, and sigru in the bile of rohita fish should be applied to the eyes.
Throat	Raw kapittha fruit may be eaten with sugar and honey.
Stomach	Tagara powder mixed with sugar and honey should be given. However, when the location is the lower gut (pakvasaya), a preparation of pippali, haridra, daruharidra, and manjista in cow's bile is to be given.
Rasa	Dried and powdered blood and flesh of alligator should be mixed with katabhi and given.

Location of Injury	Notes
Blood	The root bark of sleshmataka along with the stems of badara, udumbara, and katabhi should be prepared and taken.
Flesh	Roots of khadira, nimba, and kutaja should be prepared in honey and water for administration. In all locations, bala, atibala, madhuka, and tagara are appropriate.

OTHER CONSIDERATIONS

In the event of poisoning, the main components of the patient's diet should be sali or sastika rice, priyangu, and rock salt. Vegetables such as tanduliyaka, Jivanti, vartaka, mandukaparni, et cetera, are also desirable. To accentuate the sour taste, amalaki and dadima should be used with soups of greengram and peas or that of bird or deer meat. Antidotes to poisons could also be added to the diet. The diet should be simple and doshically appropriate for a period of time even after the poisoning has been successfully overcome, as is done with the practice of samsarjana krama. ^{Ch 57:18}

In the case of suspected (but unconfirmed) bites and stings, the most important step in treatment is to reassure the patient and to offer him a drink of jaggery*, lotus flowers, draksa, madhuka, payasya, and honey. The body should be sponged with clean water, and incantations should be recited. All efforts towards uplifting morale should be made. ^{Ch 57:19}

Additional Ayurvedic Remedies for Mosquito Bites and Bee Stings —

Ayurveda is currently enjoying a resurgence of popularity as a therapeutic model, particularly in the United States. Many Indian Ayurvedic doctors and Western students have brought this ancient wisdom to the present day. It is now relatively easy to find information about Ayurveda in printed form and on the internet. The classical texts have been modernized for ease of understanding the ancient content. Modern scientific research is validating many of the claims of the ancients, and new treatments are coming to light.

During my research I uncovered more remedies for mosquito bites and bee stings, which I now list. Both the Charaka Samhita ²² and the noted Chinese herbalist Peter Holmes ⁸ recommend accompanying any external treatments for mosquito bites and bee stings with internal treatments for complete support.

* jaggery: a form of unrefined sugar

Ayurvedic Remedy	Latin Name	Notes
Apamarga	Achyranthes aspera	Apamarga leaves can be combined with jaggery or black pepper and formed into a paste for treating insect bites and bee stings. ²¹
Blackberries	Rubus fruticosus	Eating unripe blackberries is beneficial for mosquito bites and bee stings. The bark of the blackberry plant may be used topically to treat inflammation. ²¹
Blessed Thistle	Carduus benedictus	Blessed Thistle promotes tissue repair and antidotes poison, particularly stings & bites. Apply washes and compresses. ⁸
Cedar	Cedrus spp.	Mixed in a doshic-appropriate base oil (ie: sesame oil for vatas, olive oil for pittas, and mustard oil for kaphas), cedar essential oil is effective for the treatment of insect bites. ²¹
Cilantro	Coriandrum sativum	Cilantro is an antihistamine. As soon as possible after receiving a sting or bite, take some cilantro juice internally. Place a handful of cilantro in a blender with approximately 1/3 cup water, blend thoroughly, and strain. Drink the juice (approximately 2 teaspoons 3 times a day), and apply the pulp locally to the affected area. It will instantly pacify the itching, burning, and hives or rash at the site. ¹⁰
Coconut Water	Cocos nucifera	Coconut is a good source of antihistamines and natural steroids. Drink 1/3 cup coconut water with about 1/8 teaspoon kama dudha added. Do this 2-3 times as needed. ¹⁰
Coconut Charcoal	Cocos nucifera	Take a piece of dried coconut and set fire to it. Let it burn for about half an inch and then blow it out. When the smoke disappears, a tarry black residue will remain. Apply this residue to the bite for instant relief. ¹⁰
Epsom Salt	magnesium sulphate	Epsom salt baths reduce the inflammations in the body caused by pitta-aggravating influences, general itching, and insect bites/stings. Four cups of epsom salts added to a full tub of water and soaked in for twenty minutes is sufficient. ¹⁸
Eucalyptus	Eucalyptus spp.	Mixed in a doshic-appropriate base oil (ie: sesame oil for vatas, olive oil for pittas, and mustard oil for kaphas), eucalyptus essential oil is effective at treating insect bites. ²¹
Ghee		Ghee (clarified butter) is a powerful antihistamine. It is excellent when used internally for inflamed skin conditions, rashes, and burns. Take one tablespoon immediately upon being stung by bees. ^{18, 5}
Neem	Azadirachta indica	Apply neem oil or paste to the site of the bite. Neem antidotes most poisonous insect venoms. To make a paste, take a little neem powder and mix it with a little water. Apply this to the skin and leave it for 10–20 minutes, then rinse it off. Do not use pure neem extract; rather, use an herbalized sesame oil. ¹⁰
Sarpagandha	Rauvolfia serpentina (aka Serpentwood)	Sarpagandha root is useful in treating insect stings, but is lethal in high doses. ²¹ Sarpagandha has been used in India as a treatment for insect bites for over 4000 years. ¹⁷
Shatavari	Asparagus racemosus	The soothing herb shatavari is also useful. ⁵

Ayurvedic Remedy	Latin Name	Notes
Tulsi	Ocimum sanctum (aka Holy Basil)	Tulsi reduces swellings and is useful with parasitic infections and poisons. ²¹
Turmeric	Curcuma longa	Turmeric is a wound healer, an anti-inflammatory, and a natural antibiotic. It is particularly useful, externally, to treat insect bites. ²¹
Sandalwood + Turmeric		A paste made from ½ teaspoon sandalwood powder plus ½ teaspoon turmeric with enough water added to make a paste and applied topically. Sandalwood is cooling, and turmeric is anti-inflammatory. ¹⁰
Neem + Tea Tree		A mixture of equal parts neem oil and tea tree essential oil is helpful. ¹⁰

— CONCLUSIONS —

Now that the research has been done, the question arises: “What will I be putting into my travel first aid kit to treat mosquito bites and bee stings—and how will I treat mosquito bites and bee stings?”

With the bounty of natural remedies that is readily and affordably available to me, I feel no need to obtain an prescription for an EpiPen or work with other Western medical pharmaceuticals unless I experience the extreme situation of anaphylactic shock, which is where Western medicine excels. Practicality and ease of use are key considerations: I must be able to pack this first aid kit into a relatively small space, and I must be able to get it through airport security. The constituents must not be perishable, and they must be easy to acquire / be widely commercially available in the United States. Also, I should not count on having heat, equipment, utensils, et cetera available to me, so whatever I carry with me has to work as-is. Essential oils emerge strongly through these constraints, as do powders that I could mix with a liquid such as water to form a paste. Essential oils have the added advantage of penetrating deeply into the layers of the skin, affecting not only the surface of the skin but also absorbing directly into the capillaries. Of course, not all essential oils can be applied neat (directly to the skin). Lavender, tea tree, sandalwood, and neem seed oils may be applied neat; other essential oils must be diluted in a carrier oil before application.¹² Likewise, phototoxicity must be taken into account; as it is unwise to apply some essential oils (particularly citrus oils) prior to sun exposure. Safety testing on essential oils has shown minimal adverse effects. Several oils have even been approved for use as food additives and are classified as GRAS (“generally recognized as safe”) by the U.S. Food and Drug Administration, although ingestion of large amounts of essential oils is not recommended. A few cases of contact dermatitis have been reported, mostly in those who have had prolonged skin contact with oils.³⁵

I will compose a kit that contains aloe gel and powder, eucalyptus essential oil, ghee, lavender essential oil, neem seed oil, peppermint essential oil, sandalwood powder and essential oil, tea tree essential oil, tulsi essential oil, and turmeric powder. I have redundancy of action with many of these herbs, and a couple of the herbs are available in more than one form. This gives me flexibility in choosing what feels most appropriate in each instance of use. Many of these items will also have the added benefit of doing double-duty in other instances of travel first aid and symptoms of distress.

Compared to mosquito bites, bee stings elicit a more severe and generalized reaction. Thus, my plans for treating each type of injury will be different. I tend to favor combining herbs for the synergistic effect they produce over using one single herb, although both approaches are appropriate.

I find that all medical approaches offer something of value in the treatment of mosquito bites and bee stings—and further that they can even work well together. The Ayurvedic remedies sit nicely next to the Western Herbal remedies, provided one knows the elemental qualities of the pathology and of the remedies. I think they can even work together synergistically, as do individual herbs in a compound formula. In the case of mosquito bites and bee stings, I find myself shying away from using the Homeopathic *Apis Mellifica* remedy. I have had more efficacy with Ayurveda's tenet of "opposites balance each other" than with Homeopathy's "like cures like" concept. Mosquito bites and bee stings are injuries whose symptomatology is best described as having pitta characteristics (ie: hot, mobile, gross, cloudy, dispersing). Thus, any remedy that counters these qualities with (primarily) cool and stabilizing ones will be effective. The Ayurvedic and Western herbal approaches outlined in this paper offer something that fits the bill. My first aid kit for bites/stings combines components of these two models, allowing me to offer treatments that will both address the injury locally or topically and that will support overall wellness via internal application—and to find resolution for the injury.

A summary of the herbs I have chosen :

Herb	Latin Name	Sanskrit Name	Form Used	Actions	Notes	Source(s)
Aloe Vera	Aloe barbadensis	Kumari "young woman", "virgin", "maiden"	powder; gel or juice	antibacterial; anti-inflammatory; alterative; anesthetic; astringent; emollient; immune stimulating; refrigerant; tissue restorative vulnery	Aloe is one of the best Ayurvedic herbs for healing wounds. It contains polysaccharides that are specifically healing for the skin. Aloe enhances the quality of the skin and is very beneficial for treating hot, inflamed pitta conditions. Aloe stimulates collagen synthesis and maturation during granulation in the wound-healing process. The fresh gel is particularly beneficial for skin wounds as it soothes itching and burning.	Frawley & Lad; Khalsa & Tierra; Miller & Miller; Pole; Premila; Rodale; Tirtha
Eucalyptus	Eucalyptus globulus		essential oil	analgesic; antibacterial; antibiotic; antifungal; anti-inflammatory; antipyretic; powerful antiseptic; astringent; disinfectant; insect repellent	Rubbed on the skin, Eucalyptus stimulates circulation and relieves pain and blood congestion.	Holmes; Miller & Miller; Rodale; Sachs; Tierra; Tirtha; Williamson; Worwood
Ghee			clarified butter	strongly anti-inflammatory		Sachs; Frawley; Frawley & Lad; Tirtha
Lavender	Lavandula angustifolia		essential oil	antibacterial; antibiotic; anti-inflammatory; antipyretic; antiseptic; balancing; detoxifier; mild nerve sedative; nervine tonic	Lavender promotes healing and prevents scarring. It also stimulates the immune system and contributes to the healing process by stimulating the cells of a wound to regenerate more quickly. Lavender oil seems to allay the effects of clinical shock.	Frawley & Lad; Holmes; Miller & Miller; Rodale; Smith; Tirtha; Winston & Maimes; Worwood pp. 20

Herb	Latin Name	Sanskrit Name	Form Used	Actions	Notes	Source(s)
Neem	<i>Azadirachta indica</i>	Nimba "bestower of health"	seed oil	alterative; anthelmintic; antibacterial; broad-spectrum antimicrobial; antipyretic; antiseptic; blood purifier; blood detoxifier; insecticide; poison antidote	Neem is one of the most powerful blood purifiers and detoxifiers in the Ayurvedic collection of herbs. It cools the fever and clears the toxins involved in most inflammatory skin conditions. Neem also clears away all foreign and excess tissue and possesses a supplementary astringent action that promotes healing. Neem is a potent support for the immune system.	Caldecott; Frawley & Lad; Khalsa & Tierra; Lad; Tirtha; Williamson
Peppermint	<i>Mentha piperita</i>	Phudina	externally essential oil; internally, infusion of leaves	mild alterative; analgesic (externally); anodyne; anti-inflammatory; antipruritic; antiseptic; astringent; clarifying; cooling; mild nervine sedative; soothing	The menthol constituent of peppermint is effective for acute inflammation.	Frawley & Lad; Holmes; Miller & Miller; Khalsa & Tierra; Pole; Rodale; Sachs; Smith; Tierra
Sandalwood	<i>Santalum album</i> , <i>Santalum spp.</i>	Chandana "gladdening"	powder, made into a paste with water, or rose water, or milk	alterative; antibacterial; anti-inflammatory; antiseptic; antipyretic; disinfectant; hemostatic; refrigerant; sedative; tissue regenerative	Sandalwood relieves burning sensation, reduces fever, and is beneficial for almost any inflammatory condition. Sandalwood cleanses the blood. Externally, the paste can be used for most infectious sores.	Caldecott; Frawley & Lad; Holmes; Khalsa & Tierra; Lad; Miller & Miller; Tierra; Tirtha

Herb	Latin Name	Sanskrit Name	Form Used	Actions	Notes	Source(s)
Tea Tree	<i>Melaleuca alternifolia</i>		essential oil	antibacterial; antibiotic; antifungal; anti-infection; antipyretic; antiseptic; antiviral; vulnery		Lad; Miller & Miller
Tulsi (Holy Basil)	<i>Ocimum sanctum</i>	Tulsi, Tulasi	essential oil	adaptogen; analgesic; anthelmintic; antibacterial; antihistamine; anti-inflammatory; antimicrobial; antiseptic; antiviral insecticide; nervine; reduces swelling	Perhaps the most sacred plant to India after the lotus, Tulsi stimulates immune system function.	Frawley & Lad; Holmes; Khalsa & Tierra; Pole; Premila; Sachs; Smith; Tierra; Tirtha; Winston & Maimes; Williamson
Turmeric	<i>Curcuma longa</i>	Harida "yellowing"	rhizome powder, mixed with water or honey to make a paste for topical application; powder, taken internally with water	adaptogen; alterative; analgesic; anthelmintic; antibacterial; antibiotic; antifungal; anti-inflammatory; antipyretic; antiseptic; astringent; detoxifying; hemostat; immune-enhancing; vulnery	Turmeric is an excellent natural antibiotic, and it purifies the blood. Turmeric is also a tonic for the skin, is beneficial in inflammatory skin conditions, and is helpful in the treatment of external skin lesions. Turmeric inhibits platelet aggregation, stabilizes collagen, reduces adhesions and scarring, and facilitates the production of new blood cells.	Caldecott; Frawley & Lad; Holmes; Khalsa & Tierra; Miller & Miller; Pole; Smith; Tierra; Tirtha; Williamson

Treatment plan for mosquito bites and bee stings:

Injury	Treatment Plan	Purpose
mosquito bite	1. Ingest the ghee. 2. Apply topical applications of (neat) essential oils of tea tree, eucalyptus, lavender, and peppermint—singly or in combination. 3. Secondly apply neem seed oil, leave in place, and cover with a band-aid. Reapply as needed.	Ghee stimulates a strong internal antihistamine response. The essential oils of tea tree, lavender, eucalyptus, and peppermint bring immediate relief to the symptoms of a mosquito bite. The neem seed oil works longer term to support the immune system and to address the symptoms of mosquito bite.
bee sting	1. Immediately ingest the ghee. 2. Apply tulsi essential oil, neat. 3. Make and apply a paste comprised equally of sandalwood powder and turmeric powder hydrated with aloe gel. Allow the paste to dry and clean it off. Repeat this two or three times, as needed.	Ghee begins an internal antihistamine action. Tulsi essential oil stimulates a general immune system response. The sandalwood & turmeric paste (hydrated with aloe vera) brings a cooling, anti-inflammatory, and antibiotic action, supporting immediate healing and relief of symptoms.

The kit:



complete travel first aid kit
for mosquito bites and bee stings



travel first aid kit with all components

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 The Geriatrics Institute, University of Miami Miller School of Medicine, Miami, FL, USA. evan.cherniack@va.gov
 Insects and insect-derived products have been widely used in folk healing in many parts of the world since ancient times. Promising treatments have at least preliminarily been studied experimentally. Maggots and honey have been used to heal chronic and post-surgical wounds and have been shown to be comparable to conventional dressings in numerous settings. Honey has also been applied to treat burns. Honey has been combined with beeswax in the care of several dermatologic disorders, including psoriasis, atopic dermatitis, tinea, pityriasis versicolor, and diaper dermatitis. Royal jelly has been used to treat postmenopausal symptoms. Bee and ant venom have reduced the number of swollen joints in patients with rheumatoid arthritis. Propolis, a hive sealant made by bees, has been utilized to cure aphthous stomatitis. Cantharidin, a derivative of the bodies of blister beetles, has been applied to treat warts and molluscum contagiosum. Combining insects with conventional treatments may provide further benefit.
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 Do haematophagous bugs assess skin surface temperature to detect blood vessels?
 Ferreira RA, Lazzari CR, Lorenzo MG, Pereira MH.

Laboratório de Triatomíneos e Epidemiologia da Doença de Chagas, Centro de Pesquisas René Rachou, Belo Horizonte, Brazil.
BACKGROUND: It is known that some blood-sucking insects have the ability to reach vessels under the host skin with their mouthparts to feed blood from inside them. However, the process by which they locate these vessels remains largely unknown. Less than 5% of the skin is occupied by blood vessels and thus, it is not likely that insects rely on a “random search strategy”, since it would increase the probability of being killed by their hosts. Indeed, heterogeneities along the skin surface might offer exploitable information for guiding insect’s bites.

METHODOLOGY/PRINCIPAL FINDINGS: We tested whether the bug *Rhodnius prolixus* can evaluate temperature discontinuities along the body surface in order to locate vessels before piercing the host skin. When placed over a rabbit ear, the bug’s first bites were mostly directed towards the main vessels. When insects were confronted to artificial linear heat sources presenting a temperature gradient against the background, most bites were directly addressed to the warmer linear source, notwithstanding the temperature of both, the source and the background. Finally, tests performed using uni- and bilaterally antennectomized insects revealed that the bilateral integration of thermal inputs from both antennae is necessary for precisely directing bites.

CONCLUSIONS/SIGNIFICANCE: *R. prolixus* may be able to exploit the temperature differences observed over the skin surface to locate blood vessels. Bugs bite the warmest targets regardless of the target/background temperatures, suggesting that they do not bite choosing a preferred temperature, but select temperature discontinuities along the skin. This strategy seems to be an efficient one for finding blood vessels within a wide temperature range, allowing finding them on different hosts, as well as on different areas of the host body. Our study also adds new insight about the use of antennal thermal inputs by blood sucking bugs.
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Tang AW.

University of California, Los Angeles, UCLA School of Medicine, USA. atang@medicity.com

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Anaphylaxis is a life-threatening reaction with respiratory, cardiovascular, cutaneous, or gastrointestinal manifestations resulting from exposure to an offending agent, usually a food, insect sting, medication, or physical factor. It causes approximately 1,500

deaths in the United States annually. Occasionally, anaphylaxis can be confused with septic or other forms of shock, asthma, airway foreign body, panic attack, or other entities. Urinary and serum histamine levels and plasma tryptase levels drawn after onset of symptoms may assist in diagnosis. Prompt treatment of anaphylaxis is critical, with subcutaneous or intramuscular epinephrine and intravenous fluids remaining the mainstay of management. Adjunctive measures include airway protection, antihistamines, steroids, and beta agonists. Patients taking beta blockers may require additional measures. Patients should be observed for delayed or protracted anaphylaxis and instructed on how to initiate urgent treatment for future episodes.

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