

Watch Out For The Mosquitoes!

by HELEN C. GREENBLATT, PhD

Increasing temperatures related to the influence of the El Niño, may be putting Trinidad and Tobago citizens at greater risk of contracting dengue, and now, Trinidad and Tobago's Minister of Health, Dr. Fuad Khan, reports that there are more than 1600 suspected cases of dengue infection.

Dengue Fever

Dengue fever is caused by a virus that is transmitted when an infected female *Aedes* mosquito (called a vector) injects the virus into a human while drawing its blood meal.

Symptoms appear from a few days to two weeks after being bitten by an infected mosquito, and may be followed by a sudden onset of high fever, nausea, vomiting and a severe headache. Other symptoms may include joint and muscle pain, and pain behind the eyes which worsens with eye movements.

The Response of the Immune System to Dengue

There are four genetically similar types of Dengue viruses (subtypes). When a person is exposed to the virus, specialised immune cells produce large proteins called antibodies, also known as immunoglobulins (Ig), that attach to the virus particles and mark them for destruction by incoming inflammatory immune cells.

Unfortunately, exposure to one of the four subtypes does not confer immunity against the other three types. Even more troublesome, because of the peculiarities of the immune response, if one has been previously exposed to one type of Dengue virus, exposure to another subtype may result in Dengue Haemorrhagic Fever. Due to the significant amount of bleeding and shock that may occur after 3-5 days of fever, this disease is frequently fatal, especially in children or the elderly.

As in all immune responses, a controlled response is needed by the body when the body is exposed to a pathogen like Dengue. When the immune system has a balanced inflammatory response, the body is said to be in immune homeostasis (immune balance). To survive and fight an infection, the body has to generate enough of an inflammatory immune response to destroy the pathogen, but not so much of a response that it damages nearby healthy tissues.



Inflammatory Cytokine Storm

A too vigorous, inflammatory response to infection, for example to the Dengue virus, may result in destruction of the walls of blood vessels, bleeding, abnormal clotting and loss of fluids (which can lead to severe dehydration). This sort of extreme immune response is also reminiscent of what is seen in diseases such as SARS (severe acute respiratory syndrome), in which the body has an inflammatory or cytokine storm directed initially against the lungs, and goes on to destroy many different organs, resulting in death. (Cytokines are small immune molecules that trigger immune responses). An inflammatory cytokine storm may result in death due to the failure of many organs, such as is seen in Dengue Haemorrhagic Fever.

It Only Takes 15 Minutes

There is no treatment for Dengue Fever, nor has vaccine development been successful. Therefore, the best way to avoid infection is to lower the risk of being bitten by an infected mosquito. All mosquitoes need water to complete their life cycle, so eliminate any standing water around the home. Think like a mosquito that is looking to lay eggs—it can be in any container imaginable, or a puddle that will not dry out within a few days.

Keep plant saucers, tarps, coolers, tanks, barrels, drums, bottles, tins, coconut shells, tyres, buckets and trench, free of water. Empty, cover them, or turn containers over when not in use, so water does not accumulate. Keep containers of stored water covered at all times.

Empty refrigerator drip pans at least every other day. Environmental Health Officer of the Government of the British Virgin Islands Minchington Israel's mantra is: "It only takes 15 minutes to go around the yard, ... in search of stagnant bodies of water and doing something about it."

Decrease Mosquito Breeding Opportunities Israel also points out that since so many people have moved out of the countryside and crowded into urban areas, family and community-wide efforts are needed to slow mosquito population growth. In addition to the suggestions above, Israel strongly advocates:

- Maintaining properties free of rubbish, jun, and overgrown vegetation.
- Managing empty lots and abandoned properties.
- Becoming knowledgeable as to where mosquitoes breed and eliminate these breeding areas.

Personal Defenses:

- Dengue carrying mosquitoes bite during the day.
- Use mosquito repellents on your clothing and person.
- Screen windows and doors against mosquitoes or use bed nets, especially around ill individuals.
- Wear light-coloured long-sleeves and slacks with thick socks.
- A body in immune homeostasis, in immune balance, is better prepared to defend itself against infection.

To optimise one's immune system: walk or be physically active in other ways for at least 150 minutes a week, eat in a nutritious manner, control your weight, consume one-two servings/day of hyperimmune egg, eat darkly-pigmented fruits and vegetables on a daily basis, and consume fish or omega-3 supplements 2-3 times/week.

Taking the steps outlined above hopefully will decrease your chances of becoming infected, and if you are infected, in the success your body has in battling disease.

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