

THE SEARCH FOR AN IDEAL MOSQUITO-AVOIDANT ©

“Ultimately, the best cure for malaria is not to get bitten.”
History Channel (US) Documentary, July 26, 2007

The World Health Organization advocates protection against mosquito bites as the first line of defence against malaria. David N Durrheim, Peter A Leggat. *Prophylaxis against malaria*. BMJ 1999;318:1139 (24 April).

The difficult part has been finding the means for achieving that protection. Numerous authors argue that there has been an over-emphasis on insecticides as an insect avoidant noting that various species of mosquitoes in several locales have developed resistance to the widely-used insecticides. They also address the human toxicity and environmental concerns linked to insecticides:

The researchers hope that these kinds of discoveries will eventually suggest new and effective ways to keep mosquitoes from preying on people that will be less poisonous than the insecticide and repellent sprays now in common use. For example, a compound might be found that reduces the mosquitoes' response to human odors. Laurence J. Zwiebel *et al*, *Proceedings of the National Academy of Sciences* online Nov. 27, 2006.

As a result many authors endorse alternative methods of “vector” control. They argue that the potential opportunities inherent in the use of attractants [or repellants] in the control of the mosquito vector have not been fully utilized and that the search for the ideal insect repellent to the present has been disappointing:

Use of personal protection measures may have been compromised by widely publicised reports of encephalopathic reactions in children associated with the most widely used insect repellent, diethyltoluamide (DEET), and the nonchalance of many travellers. David N Durrheim, Peter A Leggat. *Prophylaxis against malaria*. BMJ 1999;318:1139 (24 April)

Insect repellents must cover *all* exposed skin; mosquitoes will attack just a few centimeters beyond the area coated with repellent. Swimming, sweating, and hot weather require frequent reapplication. J Scott. *Mosquitoes Bite*. Journal Watch Emergency Medicine. August 1, 1998

...the search for the perfect topical insect repellent continues. This ideal agent would repel multiple species of biting arthropods, remain effective for at least 8 hours, cause no irritation to the skin or mucous membranes, cause no systemic toxicity, be resistant to abrasion and rub-off, and be greaseless and odorless. No available insect repellent meets all of these criteria. To be effective, a repellent must show an optimal degree of volatility, making it possible for an effective repellent vapor concentration to be maintained at the skin surface without evaporating so quickly that it loses its effectiveness. Abrasion from clothing, evaporation and absorption from the skin surface, wash-off from sweat or rain, higher temperatures, or a windy environment all decrease repellent effectiveness [17, 34-37]. The repellents currently available must be applied to all exposed areas of skin; unprotected skin a few centimeters away from a treated area can be attacked by hungry mosquitoes [33, 35]. Mark S. Fradin MD. *Mosquitoes and Mosquito Repellents: A Clinician's Guide*. Annals of Internal Medicine 1998; Vol 128; Issue 11: pp 931-940.

The B-1 thiamin-based TPI transdermal patches address these issues:

- They are greaseless and odorless. Application is easy.
- They are resistant to abrasion and rub off and will not wash off the skin as a result of sweat, rain, bathing or even swimming.
- Their uniquely long (36 hour) efficacy period permits protection all day and night without re-application.
- They have no toxicity or dosage-sensitive issues.
- There is no problem maintaining B-1 vapor concentration at the skin as the B-1 supply is continually being replenished from the stores in the patch.
- They are effective against multiple species of mosquitoes and other biting arthropods.

The repellent methodology employed by the patches responds directly to Dr. Zwiebel's call for an approach "that reduces the mosquitoes' response to human odors".

The freedom of the patches and their active agent from any toxicity or dosage-sensitive issues addresses the central concern expressed by all of the authors about insect repellent toxicity and neurotoxicity.

In response to the issues raised by Dr. Scott, the patches will not wash off the skin as a result of sweat, rain, bathing or even swimming.

In response to the numerous issues raised by Dr. Fradin in his summary paragraph, the patches are effective against multiple species of mosquitoes and other biting arthropods. They exhibit a uniquely long (36 hour) efficacy period, permitting round-the-clock protection without re-application. They are resistant to abrasion and rub off, wash off from sweat and rain and are greaseless and odorless. Application is easy. Further, there is no difficulty maintaining B-1 vapor concentration at the skin as it is continuously replenished from the stores in the patch.

Clearly, the concerns expressed about topical applications and sprays do not apply to the patches. However, eliminating negatives alone does not establish viability. In addition to avoiding the problems endemic to applications and sprays, the TPI patches have demonstrated their ability to protect users against biting in a series of efficacy studies in mosquito-rich environments in West Africa. In accomplishing these things, the patches appear to have met the requirements set forth by the various authors for an ideal mosquito-avoidant.