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Biomagnetic Fields Detection in Mosquito Larvae and Adults - It is Time to Develop Non-Toxic Magnetic Fields in Controlling Mosquito Bites in Cancer Prevention

Abrahám A Embí*

Citizen Scientist, Miami, Florida, USA.

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ABSTRACT

Introduction: It has been reported that the possible activation of cancer pathogens by mosquito feeding insects is not rare. The purpose of this manuscript is to re-introduce the recording of bio electromagnetic forces (BMFs) emitted by a holometabolous living aquatic insect, i.e., mosquito larvae and adults. It is hypothesized that the intensity of the signals recorded in the distal part of the proboscis may play a role in the blood seeking feeding mechanism. Mosquito larvae of the Culex genus and adult mosquitos were studied utilizing a recently published and scientifically proven optical microscopy technique.

Materials and methods: Several references are appended where it is demonstrated that Prussian blue stain (PBS), combined with fine iron particles allowed for the microscopic visualization and recording of bio electromagnetic fields (BMFs).

Results: These BMFs are only detected in selected anatomical areas in the mosquito larvae and adults. Ancillary videos courtesy of the Pasteur Institute in Paris, supports an assumption of BMFs as a factor in the under skin blind blood seeking maneuver. Potential application of an antimagnetic material in skin protection from insect's bites is suggested.

Summary and conclusion: In both, the larvae stage and adult mosquito's bodies, a paramagnetic substance (attracted to a magnetic field) was documented adhering to mosquitoes and larvae living tissue. Reports of mosquito bites induced cancer in humans have had some researchers questioning: Are mosquito vectors and the spread of cancer an overlooked connection?

At present, the active ingredient in many insect repellents, DEET, has been found to be toxic to the central nervous system and a possible factor in testicular cancer genesis. Could an antimagnetic substance be effective as a mosquito repellent? This non-toxic alternative could potentially be used as barrier to insect disease transmission.

Keywords: Biomagnetism, Mosquito feeding, Aquatic larva signals, Proboscis, Mosquito bites, Cancer prevention

INTRODUCTION

The purpose of this manuscript is to emphasize the need to eliminate any cancer causing cause, whether rare or prevalent. In this manuscript re-introduced are recordings of bio electromagnetic forces (BMFs) emitted by mosquito larvae and adult. The detection of magnetic fields emitted by living tissue dates back to 1963, when magnetic emissions from the heart were first recorded. Subsequently, other techniques of improved resolution and noise reduction were introduced [1-4]. A recently introduced technique using a glass slide, in conjunction with a video-microscope and a specially mixed Prussian blue stain solution (PBS) mixed with fine iron particles has enabled for the documentation of BMFs found in living plants and animal tissue [5]. This approach has been validated in several papers listed in the literature, such as its presence in ex vivo human hair follicles [6,7] and a paper demonstrating the human hair follicle bio magnetism penetrating through a glass barrier [8]. A direct relationship between increased metabolism (energy) in selective anatomical areas in the mosquito larvae are herein re-introduced in the literature **(Figures 1 and 2)** [9,10].

Corresponding author: Abrahám A Embí, Citizen Scientist, 13442 SW 102 Lane, Miami, Florida 33186, USA Tel +305 505 4879; E-mail: embi21@att.net

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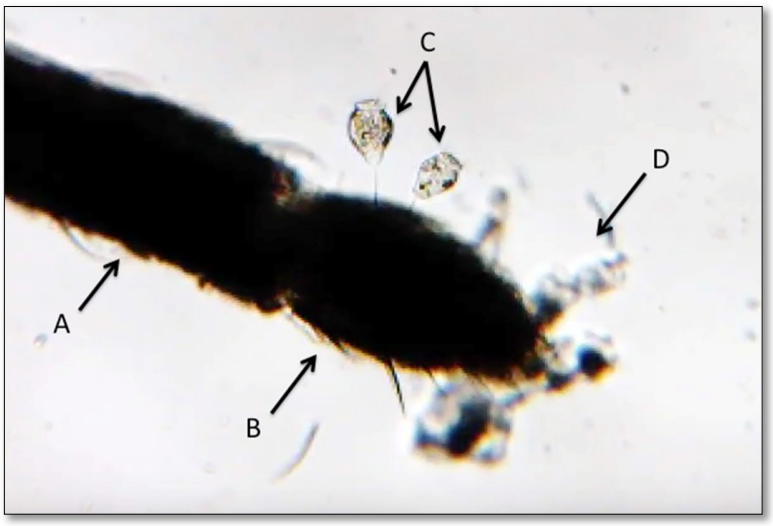

Figure 1. Magnified (x40) female mosquito proboscis showing magnetic attraction to particles and anchored living organisms (*Vorticella protis*). Demonstration of the distal part of proboscis magnetic property. Notice the absence of attraction by the shaft.
A: Shaft; B: Labium; C: Anchored living protozoan (Vorticella protis); D: Other unidentified particles

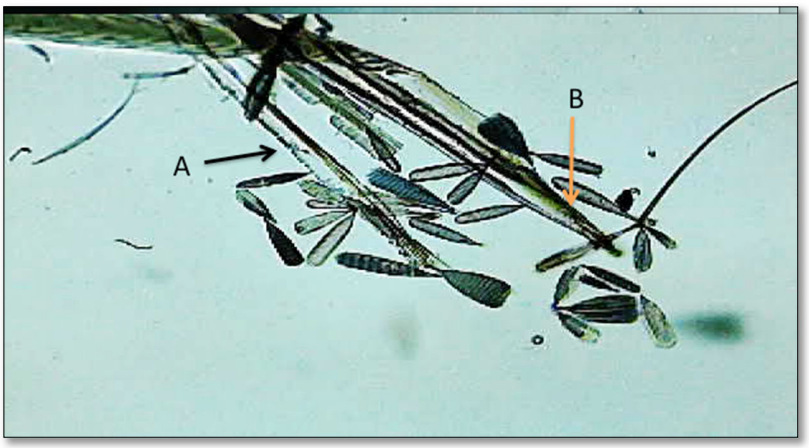

Figure 2. Photomicrograph from files. Female mosquito proboscis spontaneous deployment the maxilla extension of the fascicle bundle. These structures are used for blood seeking and blind vessel penetration.
A: Maxilla microsaw; B: Fascicle bundle

In the adult mosquito the intrinsic BMFs documented in the proboscis are hypothesized to play a role in detecting and finding under the skin unseen blood supply sources. The biophysical mechanism brings to mind similarities with a radar signal feedback process.

Figure 2 shows the deployed structures attracting loose scales present in the water drop. Hints at the presence of bio magnetic attraction.

BIO MAGNETISM PROPOSED AS AIDING IN BLOOD VESSELS CANNULATION

Background

Attraction of magnetic substance to a body part must be based upon electromagnetic interaction. Different body parts would exhibit different magnetic profiles, circadian rhythmicity and polarity to attract substance susceptible to said interaction. The basis is always piezoelectricity or electromechanical transduction secondary to photon/phonon conversion. This effect was discovered by Pierre Curie. Proving it to skeptics might require specific measurements with atomic magnetometer.

At this juncture, it is time to introduce some relevant comments as follows: As a former phlebotomist, as a rule if a blood vessel was properly cannulated blood seeping hematomas was avoided. Only recently it occurred to the author that mosquito bites are free of a side effect such as a small hematoma. Upon viewing a video-recording, courtesy to Valerie Choumet and the Pasteur Institute, Paris, it was

realized that a very sophisticated guiding system is needed for the proboscis successful cannulation of small hidden capillaries **(Figures 3 and 4)** which proposed that bio magnetism is an essential part of the mosquito blood seeking system.

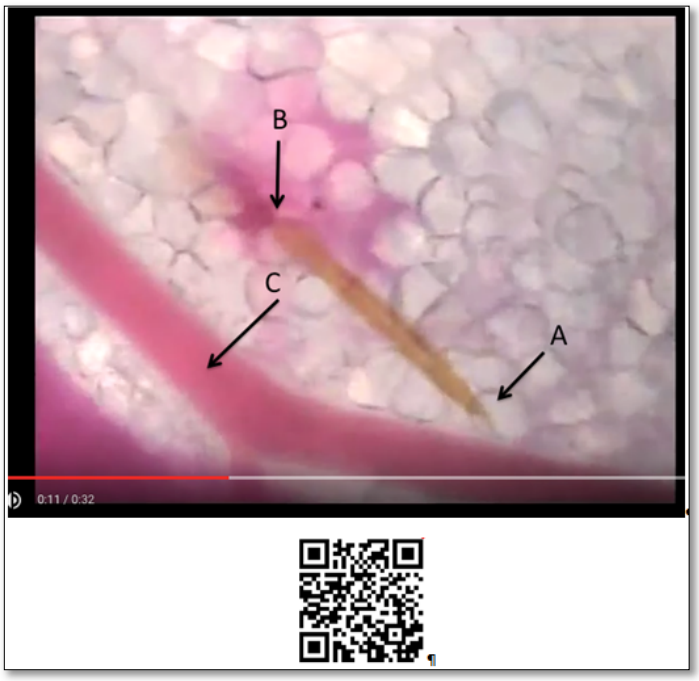

Figure 3. Frame 011"of video: Mosquito proboscis under skin moving towards capillary.
A: Proboscis tip; B: Skin entry point; C: Capillary full with circulating blood in lumen. To view complete video, please link to: *https://www.youtube.com/watch?v=6lpidRxVhx4 or scan the QR code*

Figure 4. Frame 019"of video: Mosquito proboscis under skin blindly cannulating capillary.
A: Proboscis tip; B: Skin entry point; C: Blood now suctioned into proboscis. To view complete video please link to: https://www.youtube.com/watch?v=6lpidRxVhx4 or scan the QR code

METHODOLOGY USED FOR THE DEMONSTRATION OF BODY PARTS ELECTROMAGNETIC INTERACTION

A solution was prepared by mixing one part of potassium ferricyanide one part of HCl 2.5% and two parts of a solution containing fine iron particles, mean diameter 2000 nm (2K). The combined solution will be referred to as ($PBSFe_3$) throughout the text, where PBS is Prussian blue stain and Fe_3 indicating potassium ferricyanide. Due to the apparent chronic current Zika virus presence in South Florida, mosquito larvae were obtained from a commercial breeder in Central Florida. The breeder certified that the majority of larvae were of the Culex genus.

The single slide preparation (SSP)

Live mosquito larvae (n=10) and adult mosquitos (n=5) were studied, all samples were placed on approximately the center of a 25 × 75 × 1 mm glass slide. One or two drops of the PBSFe3 solution were placed to cover the samples from the head to the terminal segment (n=10) in the larvae and all of the mosquito anatomy. After the liquid evaporated the SSP was then viewed in the normal mode at 10x and/or 40x magnification with a video microscope (Celestron. LCD Digital Microscope II model #44341 Torrance California USA).

A representative larva of the Culex genus was photographed at the end of the solution evaporation. A Nikon handheld digital Coolpix camera was used. The picture was downloaded and labeled as seen in by using an Apple computer Photo Application system **(Figure 5)**.

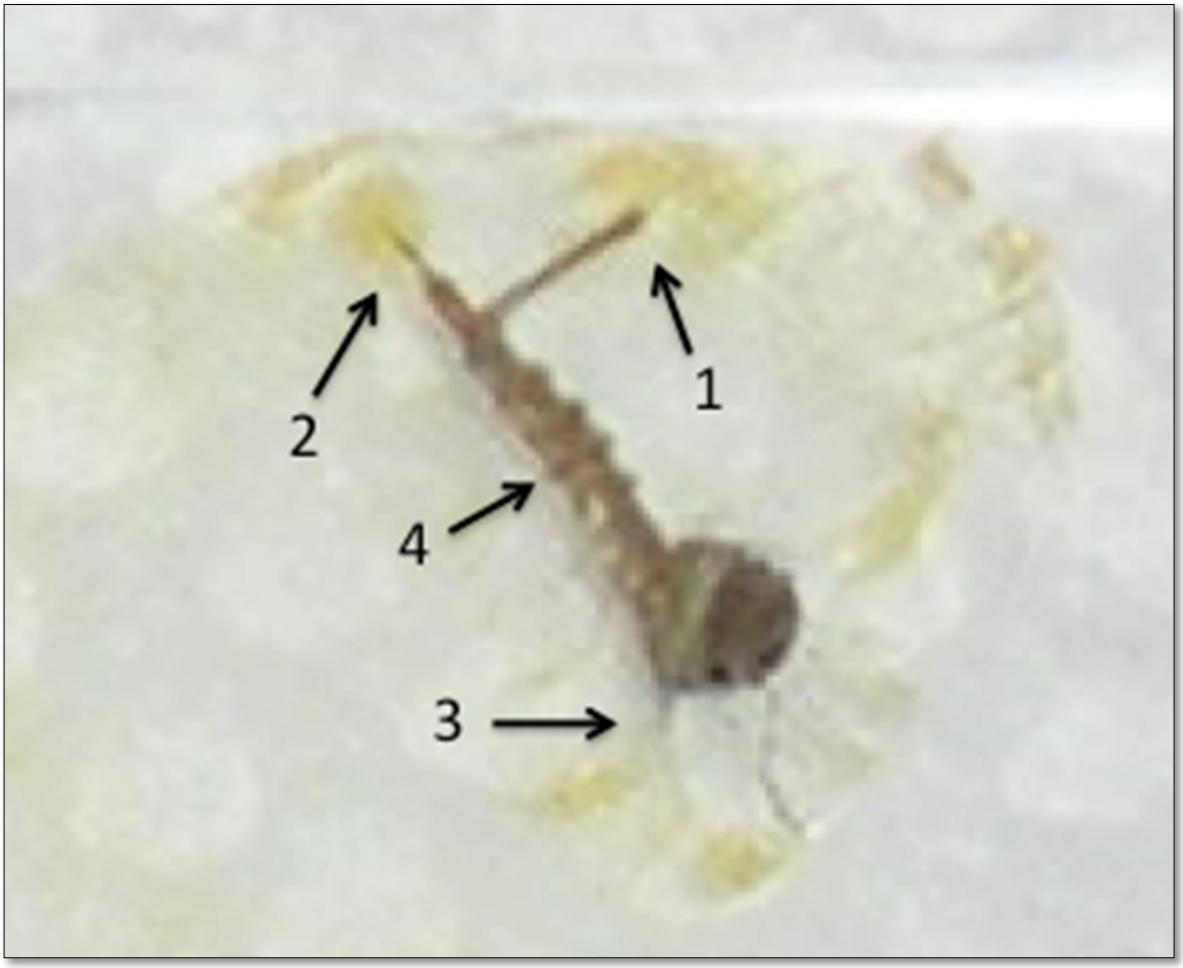

Figure 5. Sample size n=10. Experiment was replicated in all samples tested. Unedited close-up photograph using a Nikon Coolpix handheld digital camera. Culex mosquito larva mounted in a glass slide post SSP PBS Fe_3 evaporation showing 1=siphon; 2=anal segment; 3=head; 4=abdomen. Please notice areas of increased crystals deposits of $PBSFe_3$ at the end of the terminal segments such as, the siphon, anal segment and head. Refer to additional figures **(Figures 6-9)** showing further magnification via microscopic images of highlighted areas 1, 2 and 3 in **Figure 1**.

RESULTS

A visual inspection of the Culex larva mounted in a $SSPFe_3$ solution and allowed to evaporate **(Figure 5)** showed conspicuous crystals accretion of the paramagnetic preparation in selected anatomical places identified numerically as:

1. Distal Siphon end especially by the spiracle
2. Long paired caudal hairs protruding from the distal anal segment
3. Hair tufts attached to the head/thoracic area

All magnified areas shown above **(Figures 6-8)** show the typical pattern created by the presence of bio magnetic forces attracting the paramagnetic potassium ferricyanide crystals that are no longer in solution. Adult mosquitoes of different sexes are depicted in **Figure 9**. Notice the difference in crystals accretion intensity in the adult insect as compared with the rapidly growing larvae stages. In the adult mosquito the proboscis shows bio magnetic activity (B in **Figure 9**).

Figure 6. Sample size n=10. Experiment was replicated in all samples tested. Some individual qualitative variations observed. Culex mosquito larva. Optical microscopy magnification of area 1 in **Figure 1**. Post evaporation microphotograph image of distal Siphon in SSP $PBSFe_3$ solution. There is selective accumulation of the paramagnetic ferricyanide crystals attracted by the distal end of the siphon. It is hypothesized that this is an example of the siphon's bio electromagnetism attracting the paramagnetic Ferricyanide crystal previously mixed with iron particles.
A: Distal end of Siphon; B: Potassium ferricyanide paramagnetic crystals 4x magnification

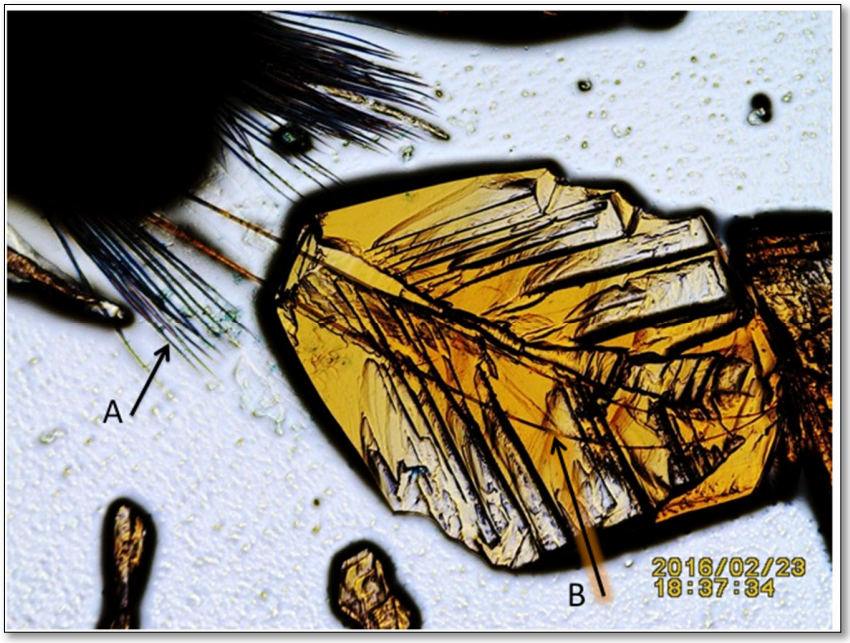

Figure 7. Sample size n=10. Experiment was replicated in all samples tested, albeit with different degrees of crystal accretion, Culex mosquito larva. Optical microscopy magnification of area 2 in **Figure 1**. Showing protruding long subsiphonal hairs from its terminal anal segment. The long caudal hairs are seen conspicuously engulfed inside a $PBSFe_3$ (potassium ferricyanide) large crystal. It is hypothesized that this is as result of the long hairs bio electromagnetism attracting the paramagnetic ferrocyanide crystal previously mixed with fine iron particles.
A: Dorsal brush; B: One of two caudal hairs 4x magnification

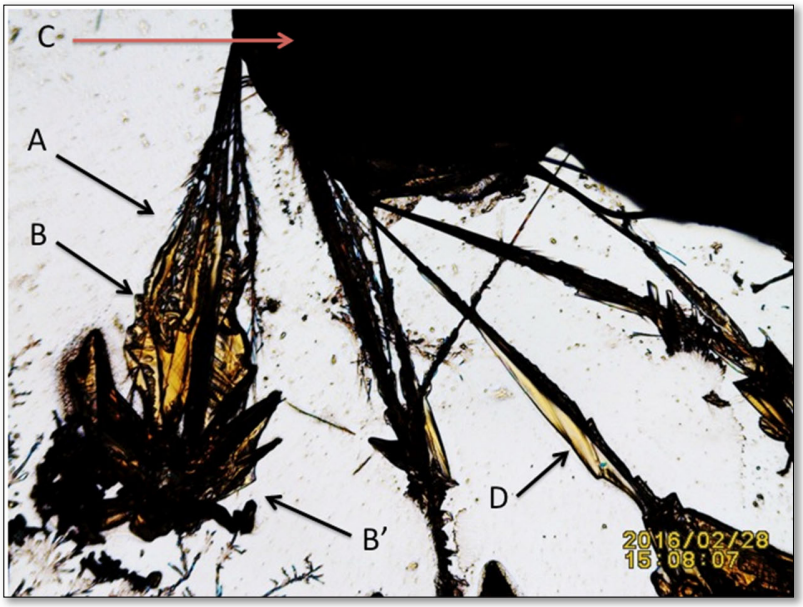

Figure 8. Sample size n=10. Experiment was replicated in all samples tested, albeit with some individual variations. Culex mosquito larva. Optical microscopy magnification of area 3 in **Figure 1**. Post evaporation microphotograph image of a thoracic hair tuft attracting potassium ferricyanide crystals. This SSP Fe_3 preparation demonstrates the presence of bio electromagnetic fields in the larva's hair tuft.
A: Hair tuft; B: Paramagentic ferricyanide crystals attracted to tuft; B': Please notice a larger deposition of crystal at the distal end of tuft structure; C: Arrow points at larva's thorax; D: Example of single hair bio magnetism (attracting paramagnetic crystal)

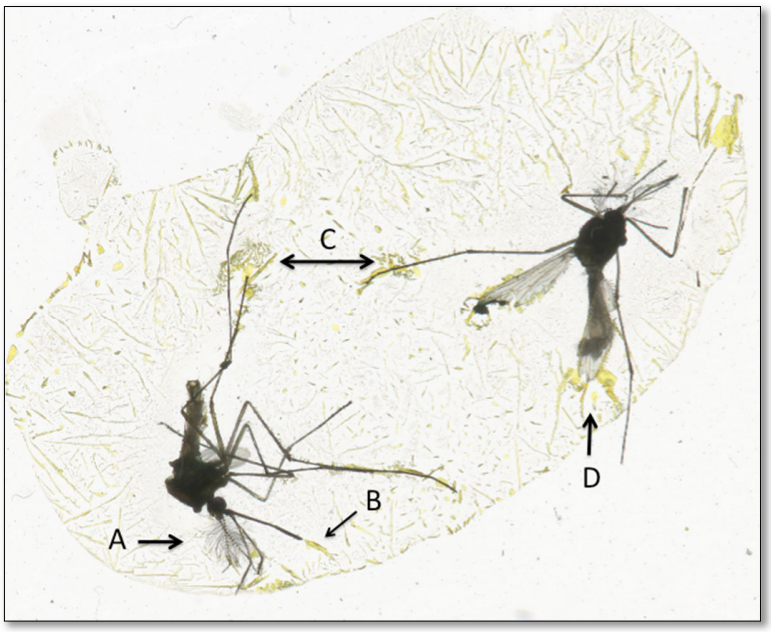

Figure 9. Photograph of glass slide showing *Cx. quinquefasciatus* mosquitoes mounted in $SSPFe_3$ (paramagnetic ferricyanide).
A: Antenna; B: Distal proboscis attracting crystals; C: Legs attracting crystals; D: Wing also attracting crystals. Unedited scanned as transparent glass slide image with Epson Perfection V700 system

DISCUSSION

It has been reported that insect storage proteins accumulate at high levels during larval development of holometabolous insects. During metamorphosis they are degraded, supplying energy and amino acids for the completion of adult development. The genome of *Culex quinquefasciatus* contains eleven storage protein-coding genes. Their transcripts are more abundant in larvae than in pupae and in adults [9]. This could account for the increased number of active bio magnetic areas found in the Culex larvae SSP preparations. Previously, a correlation between increased energy involving proteins and bio magnetism that was demonstrated in the distal papilla of the human hair follicle due to an increase of the S100 proteins found in the dermal papilla [10].

Adult mosquito feeding behavior and external stimuli

The female mosquito host seeking behavior has been extensively studied. Proposed were stimuli such as odors and neuropeptides [11-13].

Proposed physics behind the "blind" cannulation process

The prevalent paradigm is that olfactory receptor neurons (ORN) of the antennae, maxillary palp and proboscis play a role detecting host's location. That fails to explain the mechanism involved in the blind cannulation of under skin hidden capillaries. Proposed is that an additional feedback mechanism involving bio magnetism is also involved, not only in host's detection but also in aiding the proboscis in locating hidden circulating blood supplies.

Mosquito bites and cancer

Reports of mosquito bites induced cancer in humans [14] as well as in animals [15] have some researchers questioning: Are mosquito vectors and the spread of cancer an overlooked connection? [16]; or do the mosquitos have more of a role in certain cancers [17] that is currently appreciated? At present, the preferred active ingredient in many insect repellents, DEET, has been found to be toxic to the central nervous system [18]; and reported to be a causative factor in testicular cancer [19]. Could an antimagnetic non-toxic substance be effective as mosquito repellent?

The above-mentioned findings are in support of further research for the purpose of developing an electromagnetic barrier in mosquito feeding. This non-toxic alternative could potentially be used in the future as barrier to insect diseases transmission including cancer!

THE CHALLENGE AHEAD

Based on the above data, the challenge appears to be to find a non-toxic non-cancer inducing mechanism that would interfere with the "blind under the skin capillaries cannulation". As a note of interest, perhaps the bio magnetic activity documented in the proboscis in **Figures 1, 2 and 9** should be researched by using other than the optical microscopy technique. This is to determine the "correct energy frequency" to counteract mosquito bites [20].

MOST RECENT DEVELOPMENT USING GRAPHENE DIAMAGNETISM

The question arises: How could bio magnetic energy be used to manufacture mosquito repellants? The image and video-recording from an in vitro experiment below could shed some light on the question by showing the role of bio magnetism as an insect repellent. In a recent article in PNAS, mosquito bite prevention was accomplished by the incorporation of graphene layers to fabric, the author's state, "We coat this graphene little flakes, from a liquid suspension like an ink", "It dries and forms a graphene film which you can put on fabric or on some kind of backing" [21]. **Figure 10** demonstrates a bio magnetic mechanism when a graphite particle is in contact with fresh blood, repulsion of RBCs occurs. Eventually there is water evaporation and the RBCs are attracted to the particle.

Figure 10. Unpublished microphotograph demonstrating graphite/RBCs mutual repulsion. Both are diamagnetic, therefore repulsion occurs.
For details link to: https://youtu.be/VTQf2MPlEtI or scan the QR code

REFERENCES

1. Baule GM, McFee R (1963) Detection of the magnetic field of the heart. Am Heart J 66: 95-96.
2. Cohen D (1972) Magneto encephalography: Detection of the brain's electrical activity with a superconducting magnetometer. Science 175: 664-666.
3. Cohen D, Savard P, Rifkin RD, Lepeshkin E, Strauss WE (1983) Magnetic measurement of S-T and T-Q segment shifts in humans. Part II: Exercise-induced S-T segment depression. Circ Res 53: 274-279.
4. Corsini E, Acosta V, Baddour N, Higbe J, Lester B, et al. (2011) Search for plant bio magnetism with a sensitive atomic magnetometer. J Appl Phys 109: 07470-1-5.
5. Scherlag BJ, Sahoo K, Embi AA (2016) Novel and simplified method for imaging the electromagnetic energy in plant and animal tissue. J Nanosci Nanoeng 2: 6-9.
6. Embi AA, Jacobson JI, Sahoo K, Scherlag BJ (2015) Demonstration of inherent electromagnetic energy emanating from isolated human hairs. J Nat Sci 1: e55.
7. Embi AA, Scherlag BJ (2015) Human hair follicle bio magnetism: Potential biochemical correlates. J Mol Biochem 4: 32-35.
8. Embi AA, Scherlag BJ (2016) Demonstration of human hair follicle biomagnetic penetration through glass barriers. Int J Mate Chem Phy 2: 71-74.
9. Martins LA, Fogaça AC, Bijovsky AT, Lejarazú CR, Marinotti O, et al. (2013) Culex quinquefasciatus storage proteins. PLoS One 8: e77664.
10. Embi AA, Scherlag B (2015) Human hair Follicle bio magnetism: Potential biochemical correlates. J Mol Biochem 5: 32-35.

11. Syed Z, Leal WS (2009) Acute olfactory response of Culex mosquitoes to a human and bird-derived attractant. Proc Natl Acad Sci U S A 16: 18803-18808.
12. Tauxe GM, MacWilliam D, Boyle SM, Guda T, Ray A (2013) Targeting a dual receptor of skin and CO2 to modify mosquito host seeking cell 155: 1365-1379.
13. Marr BR, Klowden MJ, Crim JW, Young L, Shrouder LA, et al. (1994) Endogenous regulation of mosquito host-seeking behavior by a neuropeptide. J Insect Physio 40: 399-406.
14. Mo X, Guo W, Ye H (2015) Primary indeterminate dendritic cell tumor of skin correlated to mosquito bite. Medicine 94: e1443.
15. Banfield WG, Woke PA, Mackay CM, Cooper HL (1965) Mosquito transmission of a reticulum cell sarcoma of hamsters. Science 148: 1239-1240.
16. Benelli G, Iacono LA, Canale A, Mehlhorn H (2016) Mosquito vectors and the spread of cancer: An overlooked connection? Parasitol Res 115: 2131-2137.
17. Ward M, Ward A, Johansson O (2016) Does the mosquito have more of a role in certain cancers than is currently appreciated? The mosquito cocktail hypothesis. Med Hypotheses 86: 85-91.
18. Swale DR, Sun B, Tong F, Bloomquist JR (2014) Neurotoxicity and mode of action of N, N-diethyl-meta-toluamide (DEET). PLoS One 9: e103713.
19. Hardell L, Näsman A, Ohlson CG, Fredrikson M (1998). Case-control study on risk factors for testicular cancer. Int J Oncol 13: 299-1303.
20. Embi AA (2020) It is time for a new approach to cancer treatment. The modulating of biological events by the delivery of correct energy frequencies as innovation in medical practice. J Cancer Sci Treatment 2: 126-131.
21. Castilho CJ, Dong Li, Liu M, Liu Y, Gao H (2019) Mosquito bite prevention through graphene barrier layers. Proc Natl Acad Sci U S A 116: 18304-18309.