MINISTÉRIO DA DEFESA

HOSPITAL DAS FORÇAS ARMADAS

To Prof. Kovy Arteaga-Livias, MSc
Editor in Chief of Microbes, Infection and Chemotherapy
Universidad Nacional Hermilio Valdizán – Perú

Brasília-DF, September 18th, 2021

Dear Editor,

In accordance with your more recente instructions, I am sending to your analysis the amendments performed in the original version of the manuscript **Hospital microbiota vectored by ants** (**1199).** Please, consider the folllowing amendments herein presented in red font and highlighted in yellow.

Page 1.

Word count: Text: **862** words; References: **8**

Key words: Ants; Hospital; Infection; Microbes, Symbionts

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Lines 5 and6: The objective of this Letter is contributing to higher awareness about the role of ants, commonly neglected insects as vectors of hospital infections by multi-resistant bacteria.

Lines 11 to 13: Besides the usual concerns in this setting, one should consider unsuspected interactions of insects with diverse pathogenic microorganisms in the hospital environment (2-8).

Ants are dispersers of opportunistic microorganisms in places where forage (4).

Lines 27 to 34: Another study about ant species composition and bacterial contamination in a public Brazilian hospital of Amapá evaluated ants from 15 sites of the Emergency Hospital (4). A total of 9,687 ants were captured and 9 species were identified from 3 subfamilies: *Monomorium pharaonis* was the most common (39.2%) of the total specimens; 92 bacteria isolates included 12 species, and Pseudomonas aeruginosa was the pathogenic bacteria most frequent (10.9%) of the positive samples. The most contaminated ant (38.3%) was *M. pharaonis*, the dominant ant species in this hospital environment (4). The authors focused the presence of bacteria on ants and associated with dissemination

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Lines 1 to 9: of pathogens that cause hospital infections, making mandatory this pest control (4). Susceptibility to antibiotics of multi-resistant bacteria carried by 132 “workers” belonging to 3 ant species was evaluated in two public hospitals of Bahia, Brazil (5). Twenty four species of bacteria were isolated (57.3% and 84.2% of collected ants were associated with bacteria), and respectively 26.7% and 61.4% of them were opportunist. Gram-positive bacilli, Gram-positive cocci, and Gram-negative bacilli were found (5). The authors highlighted the same bacterial resistant isolates taken from the hospital ant “workers” that associate them with bacteria dissemination and proliferation, and suggested that the risk of contamination by ants is similar to any mechanical vector (5).

Lines 28 to 34: Additional research for new antimicrobials also involve insects and microbiota, mainly insect symbionts and their metabolites to search the role in drug production (8). Such studies allowed the discovery of new biomolecules as peptides and polyketides. Worthy of note, Cyphomycin, from a Streptomyces symbiont of a Cyphomyrmex fungus-growing ant, is the most promising insect symbiont-derived antimicrobial (8). The antibiotic resistance has grown and a potential source of novel antimicrobials is insects, as indicated by literature covering insect-derived antimicrobial compounds.

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Lines 1 and 2: Lowering of drug resistance can reduce the yearly estimated 700.000 global deaths (8). The promising expectations seem to justify the purpose of the items herein commented.

References: (3 references were added)

4. do Nascimento LE, Amaral RR, Ferreira RMDA, Trindade DVS, do Nascimento RE, da Costa TS, et al. Ants (Hymenoptera: Formicidae) as potential mechanical vectors of pathogenic bacteria in a public hospital in the Eastern Amazon, Brazil. J Med Entomol. 2020;57(5):1619-1626. doi: 10.1093/jme/tjaa062.

5. Fontana R, Wetler RM, Aquino RS, Andrioli JL, Queiroz GR, Ferreira SL, et al. [Pathogenic bacteria dissemination by ants (Hymenoptera: Formicidae) in two hospitals in northeast Brazil]. Neotrop Entomol. 2010;39(4):655-663. doi: 10.1590/s1519-566x2010000400029.

8. Van Moll L, De Smet J, Cos P, Van Campenhout L. Microbial symbionts of insects as a source of new antimicrobials: a review. Crit Rev Microbiol. 2021;47(5):562-579. doi: 10.1080/1040841X.2021.1907302.

Waiting to hear from you soon,

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