

Do Bed Bugs (*Cimex Spp.*) Can Transmit Viruses to Human?

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Abstract

Bed bugs are human ectoparasites that include two species *Cimex lectularius* and *Cimex hemipterus*. The aim of this paper is to answer a main question: Do bed bugs (*Cimex spp.*) can transmit viruses to human? In total, five experimental studies included in this paper have focused on viruses that bed bugs can transmit after artificial feeding. Human bed bugs cannot transmit viruses as mechanical or biological transmission to humans in the field, and presently there is no evidence on this aspect. In conclusion, further research is needed to better find the transmission ways of new virus by bed bugs.

Keywords: Bed bugs; *Cimex spp.*; Viruses; Transmit; Human

Abbreviations: HIV: Human Immunodeficiency Virus; HBV: Hepatitis B Virus; HCV: Hepatitis C Virus

Introduction

There are many different diseases transmitted by arthropods all over the world [1]. These diseases transmitted by arthropods are called vector-borne diseases. In general vector-borne diseases are human illnesses caused by some pathogens such as viruses, parasites, bacteria and protozoa. Some arthropods including mosquitoes, ticks, sandflies, blackflies, mites, fleas, tsetse flies, lice and triatomine bugs can transmit diseases to humans and animals [2]. Blood-feeding arthropods serve as biological and mechanical vectors for human pathogens. Bed bugs are human ectoparasites that include two species *Cimex lectularius* and *Cimex hemipterus* [3]. Recently, bed bugs infestation has been increased globally [4] and it has become a major concern to public health [5] and economic importance [6]. Hence, some pest professionals in the U.S. have reported these pests as the most challenging pest to control [5,7]. There are reports of anemia in children [6], skin allergic reactions [8] including stress, anxiety, insomnia and nightmares [9,10] due to the bed bugs feeding. The aim of this paper is to answer a main question: Do bed bugs (*Cimex spp.*) can transmit viruses to human?

Results

In a laboratory study, Jupp & Lyons [11] found that human immunodeficiency virus (HIV) can survive for several hours in bed bugs (*Cimex spp.*) [11]. In another experimental study, Weeb et al. [12] detected HIV in tropical bed bugs up to 8 days after oral exposure [12]. Some research examined the probable potential of bed bugs to transmit Hepatitis B Virus (HBV). Jupp et al. [13] and Blow et al. [14] demonstrated that there isn't HBV after a 10-13 day interval between feedings in common bed bugs [13] and HBV virus may be mechanically transmitted in feces [14]. In another experimental study, the results of Silverman et al. [15] show that HBV DNA was detected in bed bugs and excrement up to 6 weeks after feeding on an infectious meal, but Hepatitis C Virus (HCV) RNA was not detected in bed bugs at any time after feeding [15].

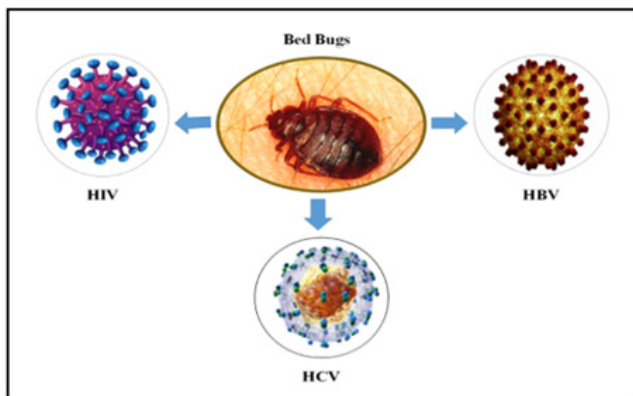


Figure 1: Virus in bed bugs as vector competency.

Note: Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), Hepatitis C Virus (HCV).

Conclusion

In summary, human bed bugs cannot transmit viruses as mechanical or biological transmission to humans in the field, and presently there is no evidence on this aspect. In conclusion, further research is needed to better find the transmission ways of new virus by bed bugs.

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