

## Is the Head Louse, *Pediculus humanus capitis* Vector of Human Diseases?

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Head lice are hematophagous ectoparasitic insects, specific to humans and spending their entire life on their host. Humans are parasitized by two species of lice: The human louse, *Pediculus humanus*, which appears in two ecotypes, the head louse, *Pediculus humanus capitis* and the body louse, *Pediculus humanus humanus*. The second species is the pubic louse, *Phthirus pubis*. Infestation with lice can cause dermatitis and pruritus and sometimes secondary infections and lymphadenopathy.

Since the early years of the 20<sup>th</sup> century, it has been known that body lice are vectors of three pathogenic bacteria: a) *Rickettsia prowazekii*, the agent of epidemic typhus; b) *Borrelia recurrentis*, the agent of louse-borne relapsing fever; and c) *Bartonella quintana*, the agent of trench fever. Lately, body lice were also shown to be vectors of *Acinobacter baumannii*, an aerobic Gram-negative bacterium, which is resistant to most antibiotics [1].

As opposed to body lice, the vectorial ability of head lice remains quite controversial. 39 head lice were fed on a rabbit that had been injected intravenously with a virulent strain of *R. prowazekii* [2]. Five days after infection, 16 of them were still alive and were allowed to feed on a human volunteer. Between days 5 and 9, 13 head lice were dead or moribund and all of them were positive by IF for *R. prowazekii*. The three surviving head lice were also positive.

Head and body lice collected from homeless people in San Francisco, California (USA) were tested for *B. quintana*. It was found that 33.3% of body lice-infested persons and 25% of head lice-infested persons had lice infected with *B. quintana* strain Fuller [3]. *B. quintana* was found in 7% of head lice and in 18% of body lice isolated from naturally infested individuals in Ethiopia [4]. In head and body lice collected from 30 Nepalese children (including 11 cases of double infestation), *B. quintana* DNA sequences were detected in both head and body lice from two children as well as in body lice derived from two additional children [5]. In addition, the DNA of this pathogen was also detected in head louse eggs collected from a homeless man in Ethiopia [6].

Although head lice can be readily infected with *R. prowazekii* and *B. quintana* and later disseminate these virulent organisms in their feces, thus having the potential to be vectors of these pathogens under optimal epidemiologic conditions, e.g. during outbreaks of epidemic typhus, no reports can be found that in the absence of body lice, head lice could act as vectors under field conditions. In experimental work conducted with head and body lice, the humoral immune response of both lice, following bacterial challenge was examined and it was shown that both exhibited an increased immune response to *Staphylococcus aureus* but little to *Escherichia coli*. However, head lice exhibited a significantly higher phagocytotic activity against *E. coli* than body lice, suggesting that the reduced phagocytotic activity in body lice could be responsible, in part, for their increased vector competence [7].

It is concluded that head lice are poor biological vectors of human diseases and accordingly of little relevance from the epidemiologic point of view of these diseases.

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