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## Short Communication

## *Bartonella quintana* detection in Demodex from erythematotelangiectatic rosacea patients



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## SUMMARY

We report here the presence of *Bartonella quintana* in a demodex. Demodex are arthropods associated with acne. *Bartonella quintana* was found by broad Spectrum 16rDNA PCR amplification and sequencing, and confirmed by specific PCR. *Bartonella quintana* may parasite several arthropods and not only lice.

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### 1. Introduction

*Bartonella quintana* is known as the cause of trench fever, but it may also cause chronic bacteraemia and/or endocarditis and bacillary angiomatosis. The infection is usually transmitted by lice in homeless people.<sup>1</sup> *Bartonella* species have been reported in many other arthropods, including mites<sup>2,3</sup> and soft and hard ticks.<sup>4,5</sup> Interestingly, the transmission of *B. quintana* by *Dermanyssus* sp in family members was recently reported.<sup>2</sup> Here we report the serendipitous detection of *B. quintana* in Demodex mites from a patient with erythematotelangiectatic rosacea.

### 2. Methods

Forty-five subjects from the general population of Schenefeld/Hamburg and neighbouring communities were recruited into this study, with the allocation of 15 subjects per study group as follows: subjects with erythematotelangiectatic rosacea, with flushing and persistent central facial erythema and optional telangiectasia (mean age  $54.89 \pm 10.49$  years;  $n = 15$ ) and subjects with papulopustular rosacea defined as moderate to severe with persistent central facial erythema and transient papules and/or pustules (mean

age  $50.86 \pm 11.2$  years;  $n = 15$ ), from the Galderma rosacea database; and 15 healthy subjects with no active skin disease (mean age  $52.38 \pm 13.68$  years). Subjects with rosacea received no treatment and were asked to stop any treatment with benzoyl benzoate, lindane, pyrethrin, malathion, allethrin, crothamiton, and metronidazole at least 7 days before sampling.

Demodex were sampled by standardized skin surface biopsy from the alar crease.<sup>6</sup> A total of 356 Demodex mites from 28 patients were selected under the loop ( $115\times$  magnification) and were washed in 70% ethanol. In order to identify the bacterial flora of the mites, DNA was extracted from individual mites by a modified protocol with the QIAmp DNA Mini Kit (Qiagen). Finally, the bacterial collection of 72 Demodex mites from 13 patients was assessed by 16S rDNA clone libraries.

### 3. Results

We were surprised to identify the 16S rDNA of *B. quintana* in two Demodex mites from the same patient. Amplification of spacer 894<sup>7</sup> matched with *B. quintana* Toulouse strain (coverage 100% and identity 100%, GenBank accession number **AY660712**).

We developed a specific qPCR targeting the *vompD* gene sequence (**AY618465.1**) with forward 5'-GGGTGAGGTTAG-CATCGGTA-3', reverse 5'-TTGACTGCATCGGTGCTTC-3', and probe FAM-AGCCTGCTGCCACTCTGCT. We tested all collected mites

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with this system and found three mites to be positive: the two already identified by 16S rDNA and another from the same patient. *B. quintana* was finally identified in three out of the six Demodex mites collected from that patient.

The patient was a 63-year-old woman from Schenefeld/Hamburg (Germany) who presented with erythematotelangiectatic rosacea defined by a mild telangiectasia and moderate flushing, but neither non-transient erythema nor papules and pustules. To our knowledge, she was not homeless, infested with lice, or in contact with lice-infested homeless people. As no blood samples were collected during this study, we could not perform *B. quintana* serology testing to establish whether or not the patient was contaminated with *B. quintana*. Finally, in this study we identified *B. quintana* in 3/72 tested mites in 1/13 patients.

#### 4. Discussion

To date, the louse *Pediculus humanus humanus* is the only confirmed vector of *Bartonella quintana*, even though this species has been identified by molecular biology or culture in many other arthropods, including the house dust mites *Dermatophagoides farinae* and *Dermatophagoides pteronyssinus*<sup>3</sup> and haematophagous mites of *Dermanyssus sp.*<sup>2</sup> This is the first report of the detection of *B. quintana* 16S rDNA sequences from Demodex mites collected from a patient with erythematotelangiectatic rosacea. It is not yet known whether Demodex mites play a role in the pathogenesis of rosacea or whether they may serve as a host for Bartonella.

Demodex mites are not haematophagous and do not excrete faeces, so the 'classical' (as for lice and sand flies, for example) epidemiological scheme of Bartonella transmission does not appear to be applicable here. However, Demodex mites are highly contagious and the transmission of Bartonella-infected Demodex mites from one individual to another is possible. Further studies should be performed in order to clarify the role of Demodex mites as hosts and possible vectors of *B. quintana*.

*Conflict of interest:* None declared.

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