

The Hair Follicle Mites (*Demodex* spp.)

Could They be Vectors of Pathogenic Microorganisms?

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Wolf R, Ophir J, Avigad J, Lengy J, Krakowski A. The hair follicle mites (*Demodex* spp.). Could they be vectors of pathogenic microorganisms? *Acta Derm Venereol* (Stockh) 1988; 68: 535-537.

The hair follicle mites *Demodex folliculorum* and *D. brevis* are the most common permanent ectoparasites of Man. Ordinarily they are harmless to their human host and appear to be of no medical significance. We present, however, an unusual finding regarding this mite, namely, that in a potassium hydroxide mount of a skin scraping from a mycotic plaque we found numerous *Demodex* mites containing inside them spores of *Microsporium canis*. This could mean that the putatively inoffensive *Demodex* has the potential to ingest various microorganisms that are found in its niche and transport them to other areas of the skin or possibly to other individuals. (Received March 23, 1988.)

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The hair follicle mites *Demodex folliculorum* and *D. brevis* are the most common permanent ectoparasites of Man. Man is their sole host. These two *Demodex* species belong to the family Demodicidae of the superfamily Cheyletoidea of the subclass Acari (1, 2, 3). Both species are typically located in the epidermis of the nose, forehead, eyelids and adjacent regions of the face (1-5). Ordinarily they do not cause any harm to their human host and appear to be of no medical significance (1), but on rare occasions they may possibly be associated with a variety of facial dermatoses, including rosacea (6), perioral dermatitis, pustular facial rash (7) and blepharitis (8).

The present case report makes a novel observation regarding *Demodex*, namely, that it is apparently capable of ingesting spores of the fungus *Microsporium canis*. The implications of this finding could be wide ranging.

CASE REPORT

A 29-year-old woman, employed as a nurse in our hospital, came to our dermatologic clinic because of three pruritic plaques on her face, neck and left shoulder. The patient was otherwise healthy.

The clinical diagnosis was tinea corporis and accordingly a culture on Sabouraud's medium was performed by which *Microsporium canis* was identified. In addition potassium hydroxide mounts of scrapings from all the plaques were performed. On microscopic examination of these mounts we observed filaments and spores of the fungus and numerous *Demodex* mites, some of them surprisingly containing spores of the fungus in their abdomen (Figs. 1, 2).

The patient admitted to owning a small dog.

DISCUSSION

Demodex mites are encountered in hair follicles and sebaceous glands of Man, where they feed on contents of the pilosebaceous tissue. It is a common inhabitant of the human skin and can be found in nearly 100% of normal adults (2, 9).

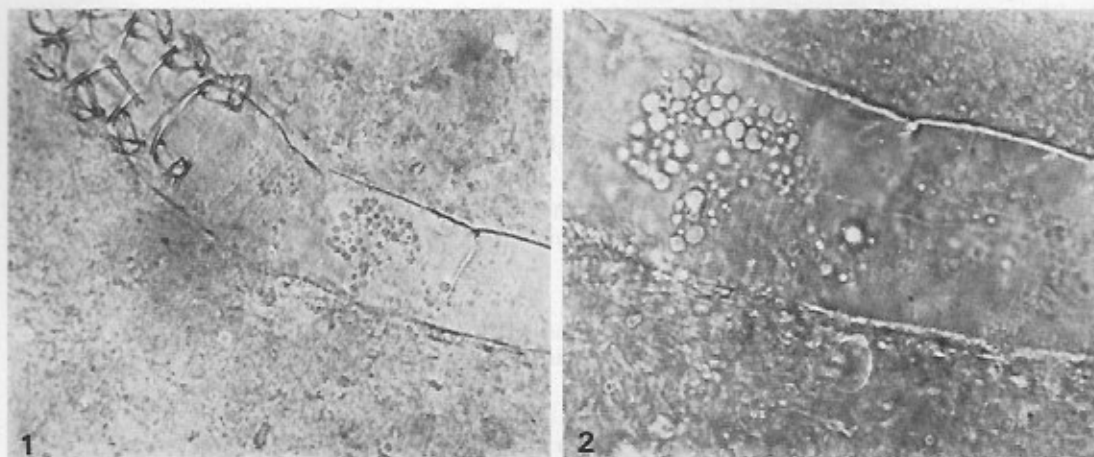


Fig. 1. Demodex mite containing spores inside its abdomen, observed on a potassium hydroxide mount.

Fig. 2. A close-up picture of Fig. 1.

Our finding suggests that this putatively harmless tiny parasite is apparently capable of ingesting various microorganisms present in its niche and introducing them to other areas of the skin or possibly to other individuals.

The possibility that *D. folliculorum* might be responsible for the transmission of pathogenic microorganisms has been raised before.

It was in fact Spickett (10) who first speculated that Demodex acts as an intermediate host for bacteria, having found acid-fast rods in the gastro-intestinal tract of this mite. Subsequently Norn (2, 11) detected, by electron-microscopy, bacteria on the body surface of the mite, and conjectured that mobile specimens of the mite may transport bacteria either from follicle to follicle within the same individual or probably even to another individual.

Certain other mites have long been known to be potential or actual vectors of pathogenic microorganisms such as microfilaria, trypanosomes, spirochaetes, the agents of tularemia and Q-fever and various Rickettsias (12).

Our finding thus lends further support to the theory that Demodex may play a role in the transmission of pathogenic microorganisms.

REFERENCES

1. Desch C, Nutting WB. Demodex folliculorum (Simon) and *D. brevis* Akbulatova of man: Redescription and reevaluation. *J Parasitol* 1972; 58: 169-177.
2. Norn MS. Demodex folliculorum: incidence and possible pathogenetic role in human eyelid. *Acta Ophthalmol (Suppl)* 1970; 108: 166-177.
3. Ruffi T, Mumcuoglu Y. The hair follicle mites Demodex folliculorum and Demodex brevis; Biology and medical importance. *Dermatologica* 1981; 162: 1-11.
4. Riechers R, Kopf AW. Cutaneous infestation with Demodex folliculorum in man. *J Invest Dermatol* 1969; 52: 103-106.
5. Nutting WB, Green AC. Pathogenesis associated with hair follicle mites (Demodex spp.) in Australian Aborigines. *Br J Dermatol* 1976; 94: 307-312.
6. Ayres S, Ayres S. Demodectic eruptions (demodicidosis) in the human. *Arch Dermatol* 1961; 83: 816-827.
7. Ecker RK, Winkelmann MD. Demodex granuloma. *Arch Dermatol* 1979; 115: 343-344.
8. Ayres S, Mihan R. Rosacea-like demodicidosis involving the eyelids. *Arch Dermatol* 1976; 95: 63-66.

9. Fuss F. Parasitic life of *Demodex folliculorum hominis*. Ann Derm Syph 1933; 4: 1053-1062.
10. Spickett SG. A preliminary note on *Demodex folliculorum* Simon (1942) as possible vector of leprosy. Lepr Rev 1961; 32: 263-268.
11. Norn MS. The follicle mite (*Demodex folliculorum*). Eye Ear Nose Throat Mon 1972; 51: 187-191.
12. Hughes TE. Mites or the acari. Athlone Press, University of London, 1959; 225.

Variations of *Pityrosporum Orbiculare* in Middle-aged and Elderly Individuals

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Bergbrant I-M, Faergemann J. Variations of *Pityrosporum orbiculare* in middle-aged and elderly individuals. Acta Derm Venereol (Stockh) 1988; 68: 537-540.

Pityrosporum orbiculare was cultured from clinically normal skin in 60 adults, 30 to 80 years of age. Antibody titers against *P. orbiculare* in serum and lipid measurements were also estimated. There was a parallel between a reduction in number of cultured organisms and an increase in age ($p=0.002$, multiple linear regression analysis). The lipid content of the skin in older people was lower than that in young and middle aged ($p=0.0002$). This may be an explanation for the decrease in number of *P. orbiculare* on the skin in elderly individuals. Antibody titres decreased significantly as age increased ($p=0.02$). One explanation may be a reduced stimulation of the immune system due to a drop in the number of organisms. *Key words:* Age variations; Cultures; Antibodies; Lipid content. (Received April 5, 1988.)

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The lipophilic yeast *Pityrosporum orbiculare* is not only a member of the normal human cutaneous flora (1-3), but also the etiological agent of pityriasis versicolor (4) and *Pityrosporum folliculitis* (5). There are also many studies indicating an association between *P. orbiculare* and seborrheic dermatitis (6). The genus *Pityrosporum* includes the lipophilic yeast *P. orbiculare (ovale)* and the non-lipophilic member *P. pachydermatis*. Earlier, *P. orbiculare* and *P. ovale* were thought to be two different species, but there are now several reports in favour of their being identical (1, 7, 8) and that the oval and round forms simply represent different stages in a cell cycle.

P. orbiculare is rare in normal skin of infants and small children, but increase after puberty (9). The colonization probably starts during the period when the sebaceous glands become active. With quantitative cultures of *P. orbiculare* variations in number of organisms between various skin locations have been described (10); the highest density was on the chest. Patients with pityriasis versicolor had even on normal-looking skin a higher number of organisms (11).

Serum antibody titres against *P. orbiculare* are significantly higher in adults than in children (12). One study found higher titres in patients with pityriasis versicolor than in controls (13), but the reverse was found in another study (12).

It was described earlier (14) that the lipid secretion is approximately the same in men and women until the age of 50. Thereafter the sebaceous secretion remains high in men, whereas the values for women decrease (14).

Quantitative cultures for *P. orbiculare* or antibody titres against the organism have never been studied in older people. The aim of the present investigation was to study these