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VIEWING EYELASH MITES

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I. OBJECTIVES:

To view *Demodex* mites, an arthropod symbiont living on our own bodies.

II. BACKGROUND:

According to one Web site, the classification of these mites is

Kingdom: Animalia
Phylum: Arthropoda
Class: Arachnida
Order: Acarina
Family: Demodicoidea

Genus: *Demodex*
or according to another Web site
Phylum: Arthropoda
Class: Arachnida
Order: Prostigmata

so, it would appear that the classification at the order level is currently in flux.

These microscopic mites (*Demodex folliculorum* and *D. brevis*) live in the sebaceous glands in the hair follicles not only around the eyelashes, but also on people's noses, cheeks, foreheads, etc. where both adults and immatures pierce epithelial cells to eat the cytoplasm. Males come out, usually at night, to move around on the surface of the skin to look for mates.



D. folliculorum measures 0.3 to 0.4 mm in length, whereas *D. brevis* is about half that size (0.15 [= 150 μm] to 0.2 mm) with a similar head and thorax but a shorter abdomen. That's amazing because these are complex, multicellular arthropods, yet are only slightly larger than a single-celled *Paramecium*! Like other Arachnids, they have eight legs, and it has been estimated that they can move at a rate of 8 to 16 mm/hr. Their bodies are long and somewhat scaly to help anchor them in the hair follicles. Their mouthparts resemble those of spiders, scorpions, and other arachnids, but are much smaller and designed for eating skin cells and oils within the hair follicles. One source claims that, "the mite's digestive system is so efficient and results in so little waste that there is no excretory orifice!" These mites live in the follicles, oriented parallel to the hair shaft,

head inward, often with the tip of the abdomen (the opisthosoma) protruding. A single follicle may contain as many as 25 *D. folliculorum* mites.



It has been estimated that their life cycle, from egg to adult, takes about 14.5 days, including about 5 days as an adult, and it has been reported that females may live an additional 5 days after oviposition. Interestingly, sexual maturity is reached in the larval form (called **neoteny**). Females remain within "their" hair follicles while (at night) the males wander over the skin's surface from follicle to follicle in search of females. Copulation occurs at the opening of the hair follicle, after which the female crawls back into the follicle near the opening of the pilosebaceous gland to lay her eggs.

The mites are transferred between people through facial contact, and it has been estimated that 96 to 98% of all people harbor these mites. In most cases, people don't even know they have these mites, but rarely (perhaps due to a suppressed immune system) the mite population can increase enough to cause a problem, resulting in a condition known as **demodicosis**. A different species of *Demodex* causes mange in dogs.

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III. MATERIALS NEEDED:

microscope
a tool to scrape the sebum from your face (fingernail, m'scope slide, knife, etc.)

teasing needle
salad oil (in a beaker with a dropping pipet)
microscope slide and coverslip

IV. PROCEDURE:

Some sources say that, "It is quite easy to look for your own *Demodex* mites, by carefully removing an eyelash or eyebrow hair and placing it under a microscope," but I have never had any success that way. However, you are certainly welcome to try that method.

Note: one Web page quotes a procedure, similar to the following, as explained on page 177 of Wilson, Edward O. 1992. The Diversity of Life. W. W. Norton. New York.

Several other Web pages quote the same procedure, but neglect to reference E. O. Wilson's book as the source of that quote, while several other Web page authors use other slight variations on this method.



Obtaining samples from different face parts (forehead, nose, cheeks) may boost your chances of finding mites.

1. Place a drop of salad oil onto a microscope slide as though you were going to make a wet mount. Optionally, separate drops could be used for different samples from nose, cheek, etc.

V. DATA:

Draw pictures of any mites that you see and take notes on any movement that you observe. Note how many mites you see, and if

2. Use the fingers of one hand to stretch the skin of the area to be sampled. Using a long fingernail, the edge of a second microscope slide held at a 45° angle, or the side of a knife or spatula blade, press down hard enough to squeeze some sebum out and scrape the tool sideways across the skin to collect a "gob" of the mixed sebum, discarded skin cells, etc. Note: do not pull a knife or glass slide across the skin as though cutting! You don't want to cut yourself, just squeeze sebum out of your hair follicles. Rather, use a sideways motion, like shaving with a razor.

3. Use a teasing needle to remove the obtained sebum from the scraping tool, put it into the drop of oil, and gently mix it so the sebum will dissolve in the oil. Samples from different areas of your face may optionally be placed into separate drops of oil or may be combined in the same drop. As the sebum dissolves in the oil, this will help to free any mites that are present, making them easier to see. You may gently move the coverslip from side to side to help spread out the sample.

4. Place the coverslip on the slide and examine the slide under the microscope. Scan the drop at 40× looking for mites. When you find one, you may increase the magnification to see more details. As the microscope light warms the slide, that will increase the chances that you may see a mite moving, so between that and the fact that the sebum may still be dissolving in the salad oil, if you don't initially see any mites, don't give up too soon – be patient and keep looking. One Web site reports that, "They can live away from the host approximately 36-58 hours in a drop of oil." The immature mites don't crawl around like the adults do, but it is reported that at higher magnification, you can occasionally see their mouthparts moving.

you put samples from different areas of your face into different oil drops, note how many mites you find in each location.

VI. DISCUSSION:

If you put samples from different areas of your face into separate drops of oil, did you

notice any differences in where the mites were found?