Nasal Mites Parasitic in Nasal and Upper Skull Tissues in the Baboon (Papio sp.)

Abstract. *Nasal mites* (Rhinophagus *sp.*) *were found within the mucosal and submucosal nasal tissues and bone marrow of the upper skull in two of five adult baboons* (Papio *sp.*).

Interest in acarine parasites of the respiratory passages of nonhuman primates has increased with the use of primates in biomedical research (*1, 2*). Little is known about the life history or pathogenicity of respiratory mites which affect the lungs and nasal fossae of primate species. The taxonomy, habitats, and hosts of known primate respiratory mites have been reviewed (*3, 4*), and mites isolated from respiratory tracts of baboons have been summarized (Table 1). Nasal mites have usually been found at necropsy or in nasal washings, but neither the specific host tissues parasitized nor the potential pathogenicity of the mites has been determined.

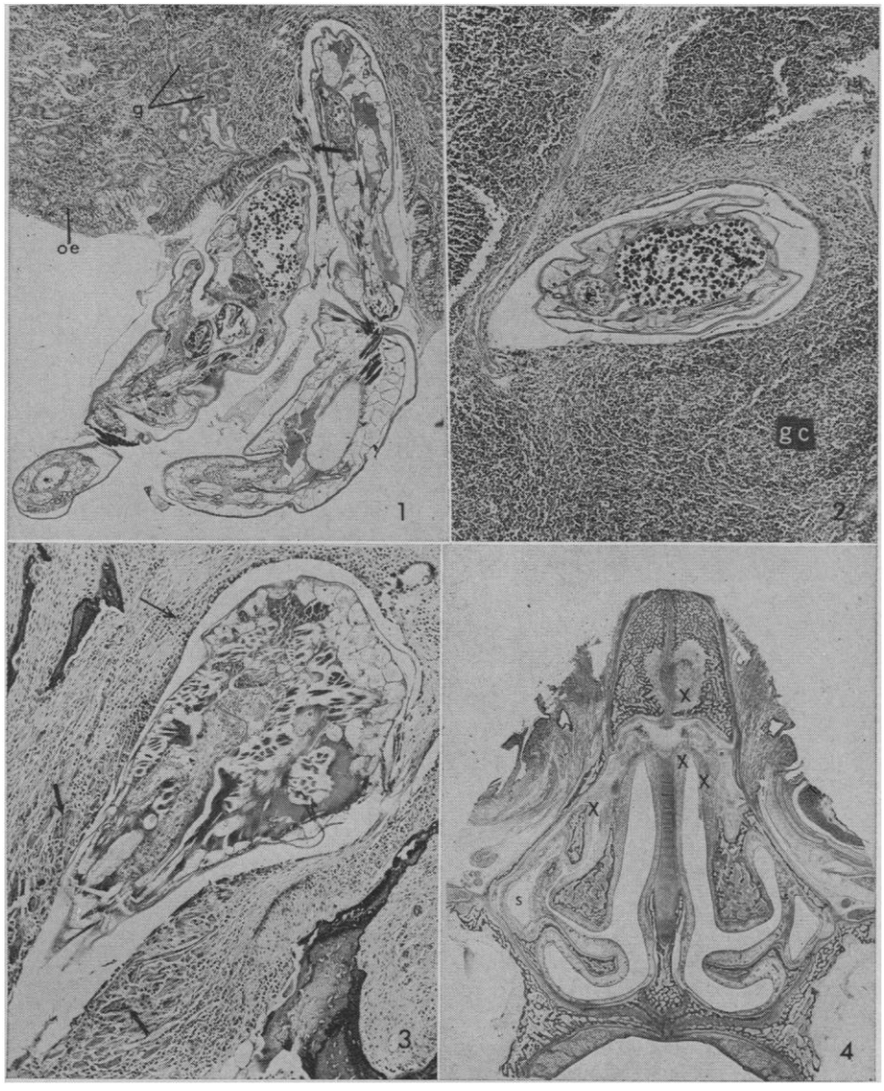

Fig. 1. Two mites apparently entering the olfactory mucosa. There is partial epithelial desquamation (arrow) associated with area of penetration and mild connective tissue proliferation around the anterior portion of the mite. *g*, Olfactory gland; *oe*, olfactory epithelium, cut obliquely. Stained with hematoxylin and eosin (×60). Fig. 2. Transverse section of mite embedded in mass of lymphocytic tissue, including germinal centers (*gc*). Note partly desquamated lining of mucosa surrounding the mite. Hematoxylin and eosin (×75). Fig. 3. Oblique section of mite in bone marrow of upper skull near olfactory cleft. Note multinucleated giant cells (thick arrows) and mild lymphocytic infiltration (thin arrow). Hematoxylin and eosin (×100). Fig. 4. Low-power view of histologic section through mid-nasal fossa of a 146-day-old baboon fetus showing main areas of mite infection (X). Hematoxylin and eosin (×5).

We have been examining upper respiratory tracts as part of a study on the pathogenesis of respiratory mite infection in Old World monkeys. We have found nasal mites in two of five adult baboons examined to date. Although the nasal mites were not demonstrable in nasal washings, histologic sections (*5*) of the upper skull and nasal fossae showed mites parasitic in the submucosa and intraosseous spaces of two baboons imported from Kenya, Africa, and killed after maintenance for 6 weeks in laboratory cages in this country. In one specimen, four or five mites were seen in histological sections to be in or entering the olfactory mucosa, eliciting little apparent host response (Fig. 1). Seven or eight mites, however, were well embedded in upper lateral wall tissues, and marked mononuclear and mild eosinophilic infiltration had replaced normal mixed sero-mucous glands; the mucosa was partly desquamated around the posterior end of the mites, and there were germinal centers adjacent to the embedded parasites (Fig. 2). Occasionally, multinucleated giant cells similar to those that surround foreign bodies surrounded the mites, as did golden brown pigment which resembles hemosiderin and is presumably an excretory product. Mites were also found within the inter- or intraosseous spaces; and one was deeply embedded in the bone marrow of the upper skull amid a mild granulomatous cellular reaction (Fig. 3).

Although the mode of entry, tissue specificity, and life cycle of this mite remain to be studied, in these two baboons the parasites seem to have localized in and around the olfactory clefts (Fig. 4); histology suggests that they might penetrate by forcing entry via a major gland duct, but direct mucosal penetration by other means cannot be ruled out.

The structural differences between these nasal mites and the *Pneumonyssus* spp. commonly found in primate lungs concern chiefly the dorsal plate, posterior extremity, and certain internal organs. Structure of the baboon nasal mites as seen in our sections seems similar to that of *Rhinophagus papionis* described by Fain (*4*). The nasal environment somewhat resembles that of

Table 1. Known parasitic mites of the respiratory tract of the baboon (*Papio* sp.) host.

Mite	Habitat	Source
Pneumonyssus congoenesis	Trachea and lungs	Fain (*7*)
P. mossambicensis	Lungs	Zumpt and Till (*8*)
P. santos-diasi	Lungs	Zumpt and Till (*8*)
Rhinophagus papionis	Nasal fossae	Fain (*3*)

the lower respiratory tract: humidity is high, oxygen is readily available, and the mucosal surface provides a choice of serous fluids, mucus, and cellular debris for nutrition.

The incidence of pulmonary acariasis in several hundred African baboons recently captured and autopsied in the field was 80 to 90 percent (*2*, *6*). In the field, respiratory mite infections may be maintained by grooming, lip smacking, and other sexual activities in the troops.

Primate morbidity and mortality from various respiratory infections during all phases of transportation and maintenance are extremely high. Whether *Pneumonyssus* and *Rhinophagus* infections reduce host defense against respiratory bacterial or viral agents remains to be investigated, but heavy infection could well predispose the animal to tuberculosis and other common respiratory pathogens. If so, a systemic acaricide should substantially reduce mortality. The presence of nasal mites in the baboons emphasizes the need to examine nasal tissues routinely at autopsy.

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Puffing and Histone Acetylation in Polytene Chromosomes

Abstract. *Fixation with picric acid or formaldehyde retains incorporated [^{3}H]acetate which is lost after fixation with ethanol and acetic acid. Unlike [^{3}H]uridine, [^{3}H]acetate is diffusely incorporated into polytene chromosomes, and not preferentially into existing or newly induced puffs. It is suggested that puff formation does not include an acetylation of histones.*

The stimulation of RNA synthesis by phytohaemagglutinin in cultured human lymphocytes was reported to follow a prior increase in acetylation of histones (*1*). It was proposed that "a change in the structure of the chromatin —brought about by, or coincident with acetylation of histones—is a necessary prerequisite to the synthesis of new RNA's at previously repressed gene loci" (*2*). Although some evidence consistent with this idea has been reported (*2*, *3*), other data seem to be at variance with it (*4*). Since puffing in polytene chromosomes of dipteran insects is believed to represent a morphological expression of differential rates of RNA synthesis along the chromosome (*5*), puffing, and especially puff induction, would be expected to be accompanied by histone acetylation. However, in experiments with *Drosophila melanogaster* no preferential incorporation of acetate into existing puffs or into puffs induced in the presence of [^{3}H]acetate was detected (*6*). Similar negative results were reported for the puffs induced by ecdysone in *Chironomus* (*7*). Ellgaard's experiments with *Drosophila* were criticized by Allfrey *et al.* (*8*) on the grounds that in the conventional method used to prepare autoradiographs of polytene chromosomes a large portion of acetylated histones is extracted.

The question of histone extraction when chromosomes are fixed in ethanol and acetic acid and subsequently treated with 45 percent acetic acid has been a matter of concern and controversy for some time. Whereas Allfrey *et al.* (*8*)

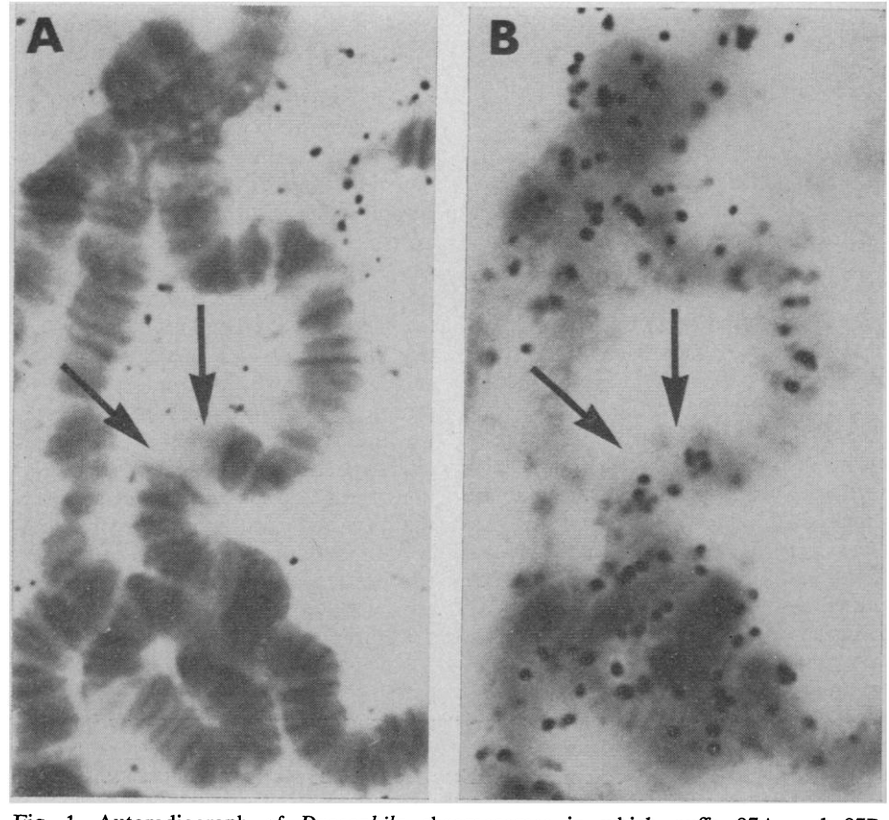

Fig. 1. Autoradiograph of *Drosophila* chromosomes in which puffs 87A and 87B (arrows) were induced by heat treatment (30 minutes at 37°C) in the presence of sodium [^{3}H]acetate (500 μc/ml). Glands were fixed in 10 percent neutral formaldehyde and prepared for autoradiography without staining. After photograph (B) was taken to display grains in the emulsion, the slide was stained with lactic-acetic-orcein and the chromosomes were photographed (A). Exposed 40 days (about $\times$ 4000).