Papilloma-like virus infection in an African gray parrot

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A RECENTLY IMPORTED, adult male Timneh African gray parrot *(Psittacus erithacus timneh)* was admitted to the Veterinary Medical Teaching Hospital, University of Florida, with proliferative skin lesions distributed over the head. The palpebrae, cutaneous areas at the angles of upper and lower beak, and skin contiguous with the lower beak were most severely affected (Fig 1). Superficially, the lesions resembled skin changes associated with *Knemidokoptes* infestation, but a close examination failed to demonstrate characteristic "honeycomb" lesions resulting from infestation with this parasite; multiple scrapings were negative for demonstration of mites. The bird was anesthetized with ketamine hydrochloride[1] and diazepam,[2] and several lesions were biopsied and fixed in a modified 4% formalin/1% glutaraldehyde mixture.

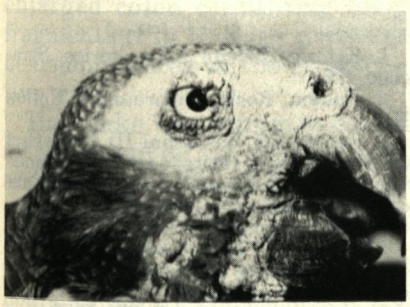

Fig 1—African gray parrot with proliferative skin lesions.

For light microscopic examination, fixed skin specimens were embedded in paraffin and sectioned at 7μm, and sections were stained with either hematoxylin and eosin or by the Shorr method for demonstration of inclusions. Additional sections were reacted with serum from rabbits hyperimmunized against disrupted bovine papillomavirus type I, utilizing the indirect peroxidase-antiperoxidase technique used for detecting genus-specific antigens of mammalian papillomaviruses.[3] Virus-positive bovine and equine cutaneous papillomas and mule deer cutaneous fibromas were used as positive controls. For a negative control, normal rabbit immunoglobulin[4] was substituted for the papillomavirus genus-specific antiserum.

For electron microscopy, specimens were fixed additionally in 1% osmium tetroxide and embedded in an Araldite/Epon mixture. Sections (1 μm) were first examined by light microscopy, following staining with toluidine blue. Subsequently, ultrathin sections were placed on copper grids, stained with uranyl acetate and lead citrate, and examined with an electron microscope.

Histologically, the lesions consisted of multiple long, thin folds of hyperplastic epidermis supported by thin fibrovascular dermis (Fig 2). The epidermis was moderately acanthotic and parakeratotic. Nuclei retained in the stratum corneum were elongate and ovoid, and in many instances were homogeneously eosinophilic. These retained nuclei failed to stain by the Shorr method, but stained positively for papillomavirus structural antigens by the peroxidase-antiperoxidase technique.

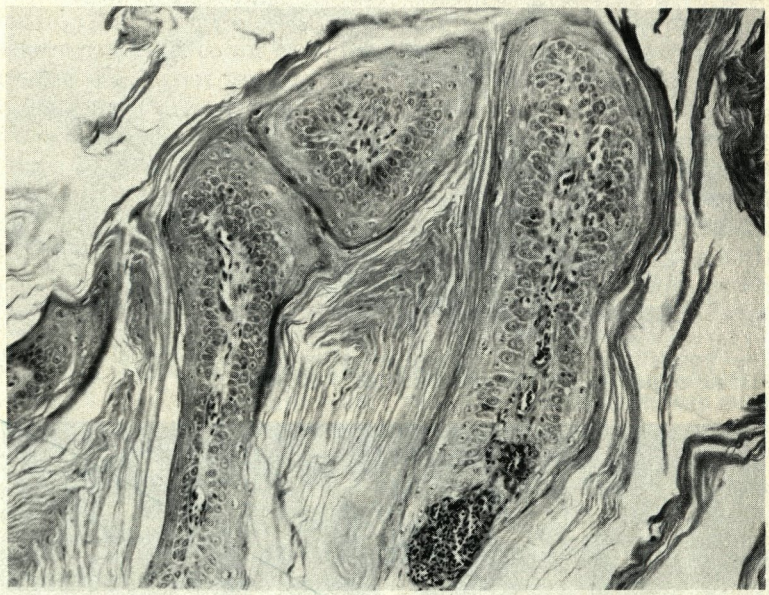

Fig 2—Photomicrograph of a skin lesion, showing long, thin folds of hyperkeratotic and hyperplastic epidermis. H&E stain; ×40.

By electron microscopy, numerous intranuclear viral crystalline arrays consisting of viral particles of uniform size were seen within cells in the outer epidermal strata (Fig 3). These aggregates were particularly prominent within retained nuclei in the stratum corneum. The mean diameter of these particles was 47.5 nm, had hexagonal outlines, and did not have an envelope. The size, shape, arrangement, and location of viral particles, in addition to positive

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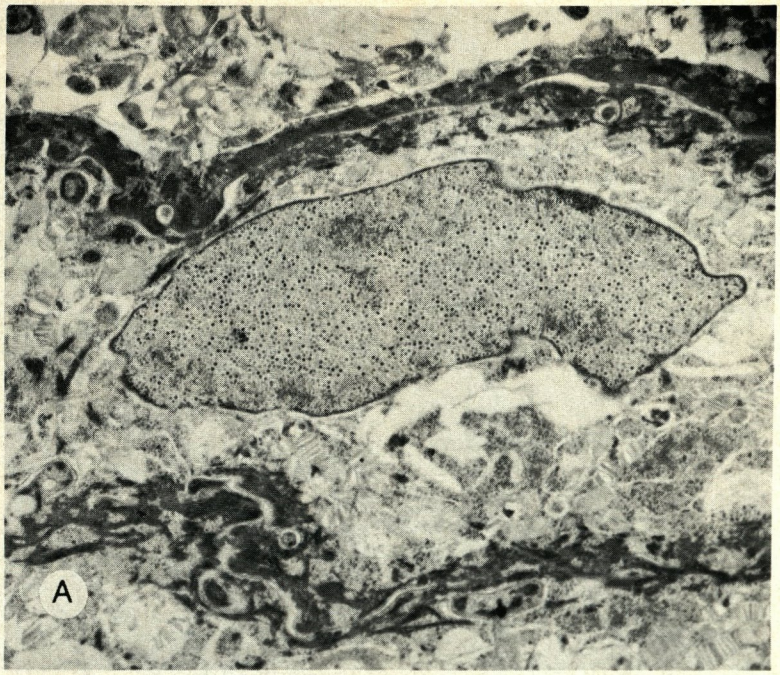

Fig 3A—Transmission electron micrograph showing an epithelial cell with an intranuclear crystalline array of viral particles. ×10,395.

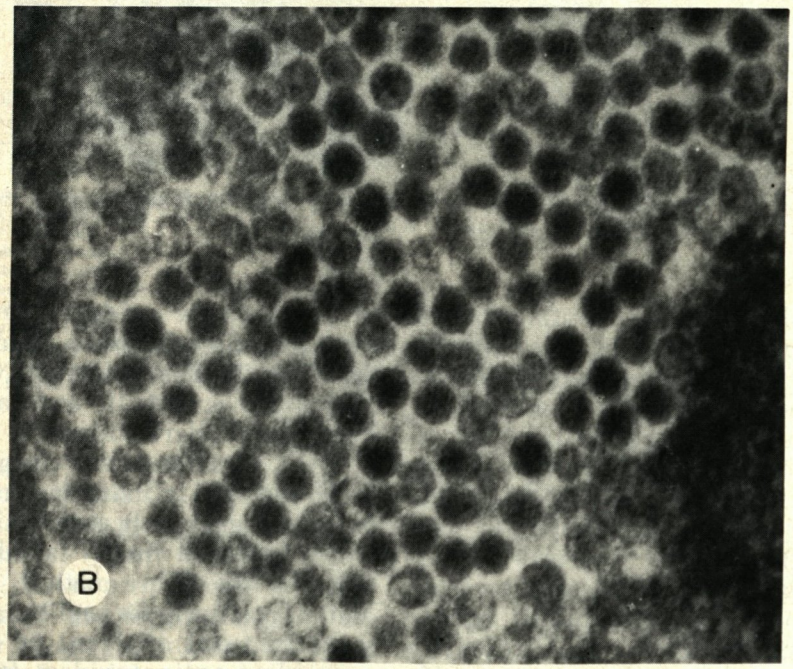

Fig 3B—At higher magnification, particles have hexagonal outlines, are of uniform size, and are not enveloped. ×190,588.

staining by the peroxidase-antiperoxidase technique, supported a diagnosis of papillomavirus infection.

Although papillomaviruses infect a wide variety of mammals, there are few reports of infection in other vertebrate classes. Detection of virus in avian papillomas has been demonstrated only for the European chaffinch *(Fringilla coelebs)*.[5] This virus has been purified and its physicochemical properties have been characterized.[6] With European chaffinches, papillomas developed exclusively on the legs, whereas in this African gray parrot, lesions were confined to the head. Of approximately 25,000 chaffinches examined, 330 had papillomas, whereas among more than 5,000 African gray parrots examined by one of the authors (SC), the parrot in the present report was the only one with this lesion.

Regardless of species of origin and serotype, mammalian papillomaviruses share antigenic determinants and polynucleotide sequences.[3,7] Genus-specific antigens have been detected in papillomas, fibropapillomas, and fibromas of numerous mammalian species by the peroxidase-antiperoxidase technique.[7] Based upon staining by this method, evidence is presented that a common antigenic determinant(s), which appears to be genus-specific for mammalian papillomaviruses, is also present in an avian papillomavirus.

The lesions in this African gray parrot have persisted for approximately 1 year, during which time they have become more extensive. In mammals, papillomas are generally not life threatening and often regress without treatment.

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1. Ketaset, Bristol Laboratories, Syracuse, NY.
2. Valium, Roche Laboratories, Nutley, NJ.
3. Jenson AB, Rosenthal JD, Olson C, et al: Immunologic relatedness of papillomaviruses from different species. *J Natl Cancer Inst* 64:495–500, 1980.
4. Dako Corp, Santa Barbara, Calif.
5. Lina PHC, van Noord J, de Groot FG: Detection of virus in squamous papillomas of the wild bird species *Fringilla coelebs*. *J Natl Cancer Inst* 50:567–571, 1973.
6. Osterhaus ADME, Ellens DJ, Horzinek MC: Identification and characterization of papillomavirus from birds (Fringillidae). *Intervirology* 8:351–359, 1977.
7. Lancaster WD, Jenson AB: Evidence for papillomavirus genus-species antigens and DNA in laryngeal papilloma. *Intervirology* 15:204–212, 1981.