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pattern closely resembles to the data of the literature, even if certain details are present with different frequency or intensity. That is why

we believe that there are indeed many cases, which allow an etiologic diagnosis without demonstration of the causative agent.

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PEROXIDASE-ANTIPEROXIDASE LABELING OF LEISHMANIA AMASTIGOTES IN TISSUE

E. Wunderlin, A. Pospischil

Formalin fixed and paraffin embedded tissue of 5 dogs experimentally infected with *Leishmania infantum* and 13 dogs with natural *Leishmania* infections contracted in Spain or Italy, were investigated using a PAP-technique. The primary anti-*Leishmania* antibody was diluted 1:400 and was incubated on the tissue sections for 18 hours at room temperature as had been determined in preliminary experiments.

The results of this study show that *Leishmania* amastigotes can be labeled specifically by a PAP-technique which allows a fast and highly sensitive identification of *Leishmania* amastigotes in tissue of experimentally and naturally infected dogs. This is of special interest for routine post mortem samples as well as biopsy material since in HE or in Giemsa stained sections parasites are recognized only when they occur in relatively high numbers.

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ENDEMIC PAPILLOMATOSIS OF VIRAL ORIGIN IN WATER FOWL OF THE BASLE ZOOLOGICAL GARDEN

N. Zangger, M. Müller

Papillomas, or warts, are benign proliferative epithelial tumors of the skin or mucosal epithelium. In man, many mammals and a few reptiles papillomas are induced by papilloma virus (Papovaviridae). Papilloma virus induced warts in birds are rare; they are known in the European chaffinch (*Fringilla coelebs*) and in an African gray parrot (*Psittacus erithacus*). The skin of the head, legs, feet and cloacal area are predilected. Papilloma should be differentiated from cutaneous pox lesions and bumble-foot, an avian pododermatitis. For the first time a papilloma virus induced papillomatosis on the plantar surface of the feet will be described based on an endemic in water fowl of the Basle Zoological Garden.

Material and methods

Twenty-one birds of the orders Anseriformes, Gruiformes, Ciconiiformes and Phoenicopteriformes presented proliferative verrucous skin lesions on the sole of the feet.

Specimens of the lesions were fixed in 4% formalin, embedded in paraffin, sectioned at 4 µm and stained with hematoxylin and eosin. For ultrastructural examination samples were postfixed in 1% osmium tetroxide and embedded in Spur®. Ultrathin sections were contrasted with uranyl acetate and lead citrate; they were examined by means of a ZEISS EM 902 microscope.

Results

A variable number of firm, split or ulcerated warts were distributed on the sole of one or both feet. The 0.5–5 cm sized verrucous hyperkeratotic lesions were chiefly limited to the metatarso-digital and interdigital articulations.

The histological features were characterized by papillomatosis, acanthosis, para- and hyperkeratosis. In the stratum spinosum and granulosum vacuolated nuclei with asymmetrical margination of the chromatin contained homogenous basophilic inclusions of different size. Foci of ballooning cells with a small dark nucleus were in the

upper stratum spinosum and granulosum. The focal necrotic epidermis was interspersed with dense colonies of coccoid bacteria. Clefts extended to the hyperplastic subcutis. The dermis was infiltrated with mononuclear cells, and in cases with necrosis, with heterophils. The arterioles were regularly obstructed by thrombi.

Ultrastructural examination revealed in the upper epidermis intranuclear dense aggregates of virions in cristalline array corresponding to the basophilic inclusion bodies. The non-enveloped spherical viral particles had a diameter of 50 to 55 nm.

Discussion

The typical verrucous lesions on the sole of the feet in several orders of water fowl, associated with the histopathological and ultrastructural findings allow the first description of an endemic viral papillomatosis in birds.

In man and many domestic mammals several types of papillomaviruses affect specific parts of the body. As the papillomas were limited in chaffinches to the legs and in the water fowl to the sole of the feet a favored localisation of the papillomavirus is suggested in birds, too. Papilloma virus is relatively resistant to heat, drying, and cold, and can persist for a long time in desquamated epidermal cells; characteristics that enhance their spread in susceptible populations. Viruses penetrate the epidermis via microlesions, which occur frequently in the vulnerable plantar skin on the articulations of the sole. Moreover the maceration of the skin may be an important predisposing factor as suggested in humans by the increased incidence of plantar warts in swimmers who frequent public pools.

The proliferative lesions seem to be very painful and caused ataxia. They would also render the birds vulnerable to predators. Most of the affected birds were emaciated, one duck had been attacked by a marten.

In poultry-farming, bumble-foot may be a result of inadequate floors (type, humidity) and confinement. To differentiate this pododermatitis from the virus-induced papillomatosis in feet, further investigations are necessary.