

Note

Avian lymphoid leukosis: Virus-like particles in kidney Cells

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Introduction:

The Kidney of Poultry is often involved in the neoplastic process of avian lymphoid leukosis or visceral lymphomatosis (Sevoian and Chamberlain, 1964; Jungherr and Hughes, 1965; Burmester and witter, 1966). The affected Kidneys are pathologically characterized by diffused grayish enlargement, often showing nodular tumor formation. The spleen of the affected chickens with visceral lymphomatosis is the organ which has been extensively studied by electron microscopy (Dmochowski, et al, 1959, 1964; Dmochowski, 1960 a.b.c.: 1961, 1963).

The present paper records the electron microscopic observation of virus-like particles in kidney cells of naturally affected adult chickens with visceral lymphomatosis.

MATERIALS AND METHODS:

Small pieces of kidney tissues from ten affected Leghorn chickens affected with visceral lymphomatosis and one apparently healthy bird were taken and immediately immersed in a drop of 1% buffered osmium tetroxide (Dalton, 1955). They were cut into 1mm. Cubes and fixed in osmium tetroxide for one hour at 4° C. The tissues were rapidly dehydrated in graded alcohols, embedded in Epon 812, and sectioned by automatic L.K.B. microtome with a glass knife. Suitable thin sections (300-500 Å) were mounted on specimen grids, stained with uranyl acetate for 10 minutes on (Watson, 1958) and further 10 minutes with lead acetate (Reynolds, 1963). The specimen were examined in siemens Elmescope A-I electron microscope.

RESULTS:

Electron microscopic study of thin section from the kidney tissue from ten affected birds revealed structures resembling virus particles. These particles (figures, 1, 2 and 3) are largely round in outline with a limiting membrane from which short tick spikes project and which enclose amorphous material that strains with varying density. The

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particles were variable in shapes and the more predominant ones, spherical structures, had an average diameter of 150 to 180 millimicrons. In addition to the spherical particles, oval and filamentous structures with a limiting membrane were also seen in the kidney cells (Fig. 2). The affected cells showed some degenerative changes (Fig. 3). (Fig. 4) Shows the pattern of infiltration by leukemic cells into the renal tissue.

The thin section of kidney cells from an apparently healthy bird revealed similar virus-like particles. They were few in number and had not quite the quality of the others.

DISCUSSION:

The spherical virus-like particles found in kidney cells from lymphoid leukemia affected chickens reported here, are not unlike the viruses of avian leukemia tumors, i.e. Rous sarcoma, Myeloblastosis, Erythroblastosis, Lymphoid leukemia and Nephroblastoma viruses (Vogt, 1965; Dmochowski, 1965). Prior to 1967, these viruses were classified in myxovirus group of viruses; to day these together with other leukemia viruses of vertebrates, e.g. murine leukemia (Andrewes and Pereira, 1967) are classified in to the new Leukemia virus group. (Wily, *et al*, 1967).

Pleomorphism with regard to size and shape of avian leukemia viruses, leading to the appearance of tailed forms have been reported (Bonar, *et al*, 1963). Whether the oval and filamentous structures, reported here, are different forms of lymphoid leukemia virus particles or are completely different entity, e.g. mycoplasma structure (Dmochowski, *et al*, 1967) remains to be clarified by biological testing.

Since we were unable to examine the kidney cells from a leukemia free chicken, tissues from an apparently normal bird was chosen for control measures. However, the kidney cells of this chicken also revealed similar virus-like particles. It was considered that the control chicken was suffering from an inapparent leukemia virus infection.

SUMMARY:

An electron microscopic study was carried out on kidney cells from ten lymphoid leukemia affected Leghorn chickens and one apparently healthy bird. Structures which different from normal cell components and resembled virus particles were found in all specimens. Most of these structures which were not unlike avian leukemia viruses were spherical with a limiting membrane and had an average diameter of 120 to 180 millimicrons. The presence of similar particles in kidney cells of an unaffected chicken was considered to be due to an inapparent infection with a leukemia virus.

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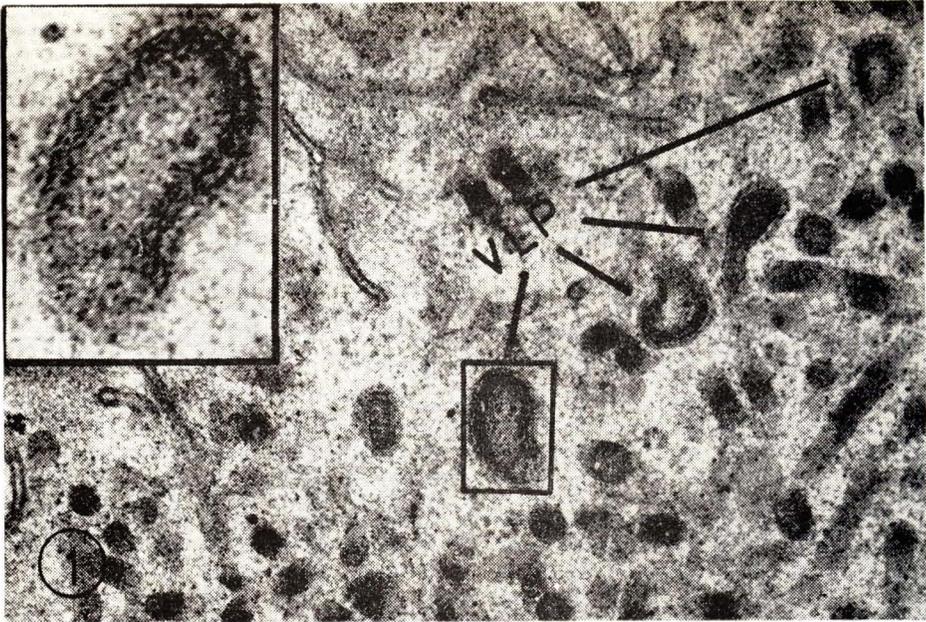


Fig. 1. Part of cytoplasm of cell Present in the kidney of a chicken containing Virus like Particles (VLP). X90/000. Insert: A Virus like Particle at higher magnification. X220/000.

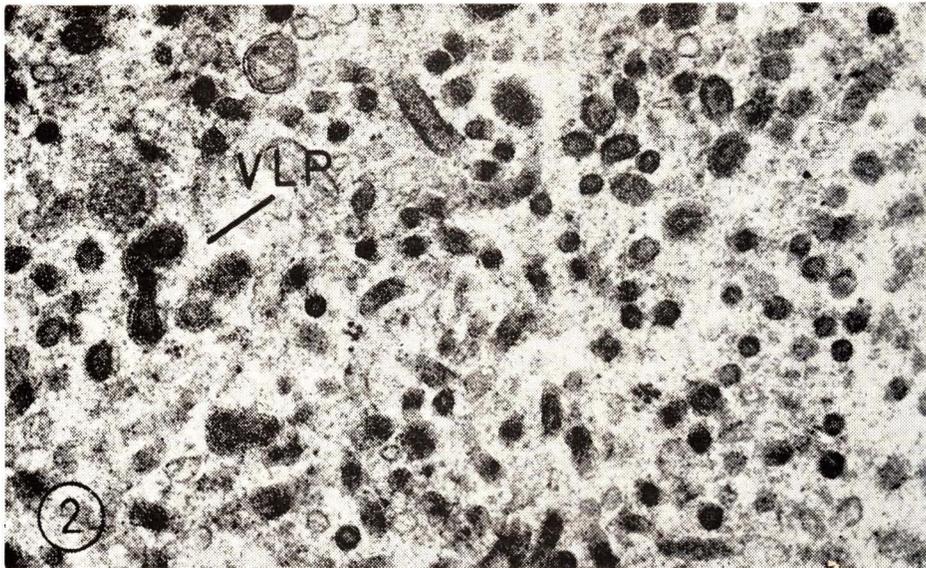


Fig. 2. Part of another cell in the chicken kidney with Virus like Particles (VLP). X55/000.



Fig. 3. Chicken Kidney. Degenerative changes in the Proximal convoluted tube X120/000

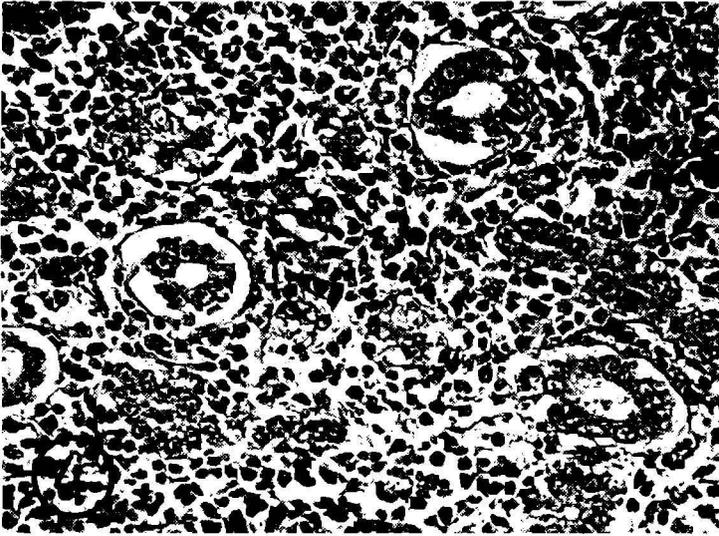


Fig. 4. The architecture of renal tissue is completely disturbed by infiltration of leukemic cells. The remnants of the proximal tubules are detectable in some areas. X350.