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decrease of the glomerular filtration rate, because the renal blood flows were comparatively well maintained. The Doppler method was useful as a diagnostic method, together with blood and blood chemical examinations, urine examination, clearance methods, diagnostic imaging and renal biopsy, for the evaluation of the acute tubular necrosis.

It is thus concluded that in the evaluation of renal hemodynamics, the Doppler method offers a new diagnostic technique for the evaluation of renal function.

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Pathological studies on skin lesions caused by Marek's disease virus in chickens

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Marek's disease virus (MDV) is an avian alpha-herpesvirus which induces malignant transformation of T lymphocytes. As a result of this event, Marek's disease (MD) lymphomas develop at many organs and tissues including the viscera, skin, peripheral nerves, and musculature. Since the inspection system was carried out from 1992 in Japan, skin leukosis has been encountered frequently at the poultry processing plants. The same problem occurs in other countries. However, the disease entity of MD skin leukosis is unknown in many respects including the developmental processes, classification, and nature of the lesions. In addition, relationships among the skin, visceral and feather pulp lesions (FPL) or between these and nuclear inclusion (NI) formation in the feather follicle epithelium (FFE) have not been studied. The purpose of this study was investigated to elucidate the pathogenesis of skin lesions in MD, especially the developmental processes of the lesions.

The sequential skin biopsies from the experimental birds infected with MDV revealed two patterns of perifollicular cutaneous lesions, tumor-associated and non-tumor-associated. The tumor-associated pattern was subdivided into two types, progressive and regressive. The former type was manifested by a continuous increase of lymphoid cell aggregates (LCA) in the skin, resulting in the development of gross skin tumors with or without visceral tumors. The latter type was characterized by initially increased and finally regressed LCA in the skin, associated with the development of visceral tumors. The non-tumor-associated pattern was manifested by initial transient inflammatory lesions without development of MD tumors in any organs and tissues. The initial perifollicular small LCA, especially in those with the progressive type, consisted mainly of inflammatory reactive small lymphocytes and a few tumorous lymphoblasts. Thereafter, the tumorous lymphoblasts increased more rapidly in number and finally, occupied almost all large LCA. The developmental processes of MD skin lesions were closely related to the dynamics of NI

formation in the FFE and FPL. Regardless of any type, the tumor-associated pattern was accompanied with persistent NI formation in the FFE and initial R1-type (inflammatory) to late T-type (tumorous) FPL. On the other hand, the non-tumor-associated pattern was associated with early transient NI formation in the FFE and initial R1-type (inflammatory) to late R2-type (inflammatory) FPL.

In the field MD skin leukosis, the skin lesions comprised various sizes and numbers of feather follicular nodules, which tended to fuse each other with increasing their size. The predilection tracts to skin leukotic lesions were the dorsocervical tract, followed by the ventrocervical, abdominal, sternal, outer crural, and inner crural tracts. According to the proportion of tumorous lymphoblasts and inflammatory small lymphocytes and mitotic figures, skin leukotic lesions were histologically classified into five types, A (almost inflammatory), B (mainly inflammatory with some tumorous), C (equal composition of inflammatory and tumorous), D (mainly tumorous with some inflammatory) and E (almost tumorous). Based on the developmental processes of MD skin tumors as described above, the histological development of field skin leukotic lesions was considered to proceed from type A (inflammatory) to type E (tumorous). These histological lesions were related to the size of gross skin nodules ; the small feather follicular nodules consisted mainly of types B and C with type A, whereas large fused feather follicular nodules were composed mainly of types D and E. In the present study, the proportion of lymphoblasts in the FPL was increased with severity of the skin lesions. The incidence and intensity of MD visceral lesions were closely related to the grade of skin leukosis. With increasing the grade, the incidence and intensity of MD visceral lesions were augmented. NI formation in the FFE was closely related to the skin leukotic lesions because it was observed in the skin lesions of all grades.

By the analysis of transcriptional and translational activities of MDV specific phosphorylated protein (PP) gene in the various MD skin lymphoma lesions, PP antigens and its gene transcripts were detectable only in the cytolytically infected cells such as FFE or in the tumorous lymphoblasts converting to the abortic state. These findings suggest that abundant expression of MDV PP is associated with lytic infection cycle rather than the transformed state in MD. The proportion of the PP antigen-positive cells was mostly correlated with the number of lymphoblasts in the necrotic MD skin lymphoma lesions ; the large necrotic cutaneous LCA rich in lymphoblasts had many antigen-positive cells, while the small LCA predominant in small lymphocytes with a few lymphoblasts had a few antigen-positive ones. The RT-PCR analysis of the transcripts of PP genes revealed also that abundant transcriptional activity was detected in the necrotic MD lymphoma lesions. The PP antigen-positive cells were placed usually around the necrotic blood vessels. The ischemic damage due to the necrosis of blood vessels led to induce the necrotizing process of lymphoblasts with abundant expression of PP.

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