7 Summary

Proof of an infection with the avian leukosis virus; subgroup j, at slaughtered broiler chickens with pathological liver modifications.

Since the 1990, there have been increasing reports internationally about infections at young broiler chickens and fattening parent animals with the avian Leukose Virus subgroup J (ALV-J).

The aim of the present study was to evaluate whether, and in which extent, macroscopic or microscopic pathological modifications occur at livers of slaughtered young broiler chickens indicating the presence of an ALV-J infection. Other organs of these animals should be included in this investigation. For the further etiological explanation the occurrence of typ-C particles was tested using different electron-microscopic procedures and ultimately the proof of ALV-J-Genom obtained through particular amplification by means of the polymerase chain reaction (PCR).

The investigations were carried out on a total of 74 slaughtered young broiler chickens aged 33-35 days. 64 animals showed macroscopically pathological liver modifications (group LV, modifications were classified in model I to model VI). 10 animals showed unchanged livers (group OLV). Histologically active multi-colored substances were applied. Furthermore transmissions-electron-microscopic procedures were employed (thin cut technique, negative contrast technique) as well as several PCR-methods.

During the investigation of young broiler chickens with and without provable ALV-J infection, respectively with and without liver modifications, a negative correlation between body mass and the occurrence of liver modifications was detected. A decreased body mass, an increase of the liver measures and a small heart mass occurred frequently in combination. However a direct connection with an ALV-J-infection could not be verified. Obviously an infection by bacterial exciters leads to similar discoveries.

With the pathological-anatomical evaluation of changed livers, it was stated that a certain macroscopic diagnosis of an ALV-J-infection, and the liver-modifications caused by them, wasn‘t possible. Mottle and swelling of the livers with rounded liver edges were suspicious, but not pathognomonic. Also, the other organs did not show any characteristic modifications.

Histologic accumulations of myelocytes has to be regarded as typical in different organs. They appear most frequently in liver, heart, kidneys, lung, proventriculus, suprarenal glands and colon. Furthermore, tumors of other target cells (e.g. fibrosarcomas) can appertain to the manifestation of the ALV-J-infection. An infection without significant accumulation of myelocytes, to be verified through positive PCR results, was frequent. Necrosis, granulomas, fibrosis and other liver modifications did not stand in any recognisable relationship to the appearance of the ALV-J-infection.

With electron-microscopic techniques at 42 (=56,76%) of the bone marrow samples and at 34 (= 45,95 %) of the liver samples typ-C particles were found. Their assignment to the sub-group J can only be presumed due to their localisation in the myelocytes and considering the PCR results. By far more frequent was the proof through PCR illustrating the higher specificity and sensitivity of this investigation method.

By the evaluation and comparison of the different PCR-procedures it seems that the nested DNA-PCR, which was derived as a modification of the PCR-technique presented by Smith et al. (1998), must be considered the most sensitive and selective form of proof. To confirm the investigation findings resulting from both the DNA-PCR and from the nested DNA-PCR have been sequenzied and compared with the arrangement tribe HPRS-103.

The use of PCR techniques shows a surprisingly high level of infected animals in the investigation material. Among 81,08 % of the examined animals, an ALV-J-genom-sequence could be detected.

Comparing the PCR-results with the histological findings, it could be shown that the myelocytes-accumulation result from an ALV-J-infection. All other pathogenic ALV (with the exception ot the endogenous sub-group E) has been excluded by the PCR method of Smith et al. (1998).

The pathognomonic myelocytes-accumulation are not related to further conspicuous liver modifications (Granuloma, necrosis, haemorrhages, connective tissue proliferation and bile duct obstructions) which presumably are the result of a bacterial infection or metabolic disorder. A connection between bacteriological findings and ALV-J-infections could not be made.