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MORPHOLOGICAL STUDY OF THE CHICKEN ADRENAL GLAND AFTER LEAD POISONING

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I examined the morphological changes of adrenal glands in chickens subjected to the following treatments: i) intra-oral administration of lead shot and ii) exposure to cold.

Six-week-old chickens were divided into 4 groups. Groups 1 and 2 were given 50 and 60 JIS#5 lead pellets, respectively. Group 3 was exposed to cold stress and group 4 served as an age-matched control. At necropsy, they were examined for gross lesions, and samples of the following tissues were weighed and collected for histological evaluation: adrenal gland, spleen, thymus and bursa of Fabricius. The adrenal glands were also observed ultrastructurally.

Macroscopically, swelling of adrenal glands was observed in all treatment groups (groups 1, 2 and 3). The weights of adrenal glands were significantly heavier than those of the control group ($p<0.05$). Thymic atrophy, a bile-stained lining and hyperkeratosis of the gizzard, impaction of the proventriculus and distention of the gall bladder were also observed.

Microscopically, there was hypertrophy and hyperplasia of the adrenocortical cells with swollen nuclei mainly in the inner zone of adrenal glands. Lymphatic organs were also affected in all treatment groups. There was mild lymphoid follicular depletion in the spleen and bursa of Fabricius. In the thymus, there was a marked decrease in the number of cortical lymphocytes. Changes in the spleen and bursa of Fabricius were similar in all treatment groups, whereas those in the thymus were more obvious in lead-ingesting groups (groups 1 and 2), suggestive of a direct effect of lead.

Ultrastructurally, an increase of smooth surfaced endoplasmic reticulum, changes of the cristae of mitochondria and depletion of lipid droplets were observed in adrenal cortical cells of the chickens in the treatment groups.

In this study, the morphological changes in all treatment groups were qualitatively similar. Therefore, the hypertrophic and hyperplastic changes in adrenal glands of lead-treatment groups can be interpreted as non-specific stress reactions.