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MORPHOLOGICAL STUDY OF GLYCOGEN STORAGE DISEASE II AND MYOTONIC DYSTROPHY-LIKE LESIONS IN A LWC-STRAIN OF JAPANESE QUAILS

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Three strains of Japanese quails with glycogen storage disease II lesions have been established. The affected quails showed difficulty in lifting their wings. One of the three strains, LW-strain, has no glycogen storage in the muscle though showing the same clinical symptom. This strain has been bred with a normal strain, and a new strain originating from their F_1, has been established (LWC). Difficulty in lifting the wings occurred in 52 out of 77 birds examined during a period from 3 to 13 weeks after hatching. Affected quails were undergrown compared with non-affected controls.

Macroscopically, underdevelopment of both female and male genital organs, delay in involution of the thymus, and sometimes slight discoloration and an increase in hardness of the pectoral muscles were observed.

Histologically, two separate lesions, glycogen storage disease (GSD) and myotonic dystrophy-like changes (MyD-l), were recognised. Of 52 birds showing clinical signs, 13 (7 females and 6 males) had GSD and 33 (15 females and 18 males) revealed MyD-l. Out of these 46 birds, 6 had both lesions. No changes were seen in the other 12 cases. In GSD, glycogen storage was found in skeletal, cardiac and smooth muscles and nerve cells. These findings coincided with those reported in RW-strain quails with GSD. MyD-l were limited to the pectoral muscles and consisted mainly of sarcoplasmic masses and ring fibers, sometimes associated with hyalinization, targetoid fibers, fiber splittings, ragged-red fiber-like lesions and αR fiber type groupings. These changes closely resembled those in myotonic dystrophy of man.

On histochemical examination of M. pectoralis profundus, small vacuoles containing PAS positive granules which showed hyperactivity with AcP stain, were observed in both αR and αW fibers of birds with GSD, as reported in RW-strain quails with GSD. MyD-l, on the other hand, were also found in both αR and αW fibers, although more prominent in αR fibers in birds with severe MyD-l.

In brief, difficulty in lifting wings in LWC quails was not caused by GSD, but mostly by MyD-l. This new strain is available as an animal model of human myotonic dystrophy rather than that of glycogen storage disease.