NEUROPATHOLOGICAL LESIONS DUE TO β, β′-IMINODIPROPIONITRILE (IDPN) IN JAPANESE QUAILS — COMPARATIVE STUDY BY USING NORMAL AND NEUROFILAMENT-DEFICIENT QUAILS —

Kiyoshi MITSUISHI

Department of Comparative Pathology,
Faculty of Veterinary Medicine,
Hokkaido University, Sapporo 060, Japan

SUMMARY

β, β′-Iminodipropionitrile (IDPN) is a neurotoxin that induces proximal axonal swelling due to marked impairment in transport of neurofilaments. We analysed the morphological effects of this neurotoxin in normal and neurofilament deficient quails. Adult quails (6 weeks old) were given an intraperitoneal injection of IDPN (0.2 g/kg body weight) 3 times every 3 days. For light and electron microscopic examination, the quails were necropsied 10–12 days after the first injection.

In normal quails, axonal swellings were observed at the intramyelic motoneurons, ventral root, comissura grisera and spinal ganglion. The axonal swelling was filled with normal neurofilaments. Mitochondria and smooth endoplasmic reticulum were scattered in the axon. The myeline sheath was thinner than in normal axons. Although there was no significant morphological change in most of the neuronal perikarya, dendrites and distal axons, a few neuronal perikarya and dendrites also showed increases of neurofilaments. These findings were similar to those induced by IDPN intoxication in mammalian experimental animals.

In neurofilament-deficient quails given IDPN, no axonal swelling or any other abnormalities of neuronal organelles were detected in any of the axons. These findings suggest that there was a selective effect of IDPN on the neurofilaments and that neurofilament-deficient quails are useful for experiments to investigate the effects of IDPN and related neurotoxins.